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Magdalena Anna Ogórek

DETECTING FINANCIAL REPORTING MISCONDUCTS WITH FINANCIAL AND NON-FINANCIAL RATIOS. A CASE OF POLISH CAPITAL MARKET

(WYKRYWANIE NARUSZEŃ OBOWIĄZKÓW INFORMACYJNYCH W ZAKRESIE SPRAWOZDAWCZOŚCI FINANSOWEJ NA RYNKU REGULOWANYM W POLSCE NA PODSTAWIE WSKAŹNIKÓW FINANSOWYCH I POZAFINANSOWYCH)

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Promotor: dr hab. Piotr Wójtowicz, prof. UEK

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Supervisor: dr hab. Piotr Wójtowicz, prof. UEK

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Adesto, Domine, famulis tuis.

The Author of this thesis is a member of:

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In loving memory of our beloved Rudolf,

who passed away on September 9th, 2022.

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Introduction

The aim of this dissertation was to develop a logistic regression model to detect Financial Reporting Misconduct (FRM) in the Polish Regulated Market, utilizing both financial and non-financial indicators derived from publicly available information. The study addresses the specific challenges of Poland's regulatory and economic environment, filling a gap in research on FRM detection in the CEE region (Murcia, Borba 2007). Despite emerging markets contributing over 50% of the global economy by 2008 (OECD 2018), capital market efficiency remains inconsistent, particularly in transitional economies like Poland (Leaven 2014; Ivanitsky, Tatyannikov 2018). Poland's Capital Market Development Strategy (SRRK 2019) aims to restore trust and enhance reporting standards, which are essential for global competitiveness (World Bank 2020). However, FRM has eroded public trust over the past three decades, further emphasizing the need for research on FRM development of FRM detection tools (PWC 2018; Reurink 2016; Albrecht et al. 2015; COSO 2010; ACFE 2021; AAA 2023).

Literature suggests that corporate disclosure fraud damages trust and market participation (Amiram et al. 2018; Giannetti, Wang 2016). Theories like the amalgamate theory American Dream Theory (Choo, Tan 2007) and research on senior management frauds (Beasley et al. 2010) underline the growing scrutiny of executive intent in fraud cases. FRM is now recognized as a leading form of market fraud (Velikonja 2013), with significant financial repercussions for numerous stakeholders and the society (Zainudin, Hashim 2016; Beasley et al. 2010). Disclosure obligations, explored through various theoretical lenses, examine both economic and non-economic impacts, including effects on governance and information asymmetry (Hermalin, Weisbach 2007; Lander, Auger 2008; Leuz et al. 2008). Research into the discretionary nature of corporate reporting has revealed a "gray area" in practices (Amiram et al. 2018). Numerous theories, including trust violation and excessive managerial power (Albrecht et al. 2015; Reurnik 2016), aim to explain FRM, with frameworks like the Fraud Triangle and all its advancements and progressions offering insights (Albrecht 2014; Dorminey et al. 2011; Kassem 2012; Cheliatsidou et al. 2021; Morales et al. 2014; ACFE 2021). Studies show that senior managers are implicated in the vast majority of FRM cases (Beasley et al. 2010), and the late 20th and early 21st centuries saw growing scrutiny of executive accountability (Chinniah 2015), and intent is a crucial element (Wójtowicz 2009; Albrecht et al. 2012; ACFE 2021). FRM is now recognized as one of the most frequent types of capital market fraud (Velikonja 2013), with the greatest financial impact on stakeholders as well as high non-financial impacts (Roxas 2011, p. 56). In 2017, potential global losses from financial

fraud were estimated at USD 4 trillion (ACFE 2018, p. 8). The victims of FRM span society, investors, creditors, businesses, and citizens such as retirees and employees (Zainudin, Hashim 2016; Beasley et al. 2010). Yet, FRM presents significant challenges for detection, as it is directly unobservable, only its indicators, symptoms, indications – Red Flags- are observable and it also remains concealed by perpetrators, often for a long time, until it becomes egregiously apparent (Albrecht et al. 2015, 2012; ACFE 2021). Red flags serve as indicators of potential FRM risk (Albizri et al. 2019) and are used in models to predict fraud (Yao et al. 2019). To obtain a reliable predictive value for the decision rule beyond financial features (Rezaee, Riley 2010; Moyes 2008; Apostolou et al. 2001; Nieschweitz et al. 2000), non-financial features will also be included (Albizri et al. 2019; Yao et al. 2019; Jan 2018; Kim et al. 2016; Albrecht et al. 2015; Ames et al. 2012; Brazel et al. 2009). The author will adopt a broad perspective on non-financial variables (Albizri et al. 2019; Albrecht et al. 2018), considering not only CSR and Corporate Governance but also innovative areas of detection (e.g., CG indices, industry complexity, macroeconomic and informational indicators) (Albizri et al. 2019; ACFE 2018; Albrecht et al. 2018; Mantone 2013; Amiram et al. 2015; Bhattacharya et al. 2011; Kent et al. 2012; Francis et al. 2013; Ndofor et al. 2013; Gompers et al. 2003; Hogan et al. 2008). In the study of FRM in Emerging Markets, especially in the CEE region, there remains a research gap, particularly evident in studies on FRM and its detection (Murcia, Borba 2007; Kanapickiene, Grundienie 2015, Yao et al. 2019). Filling this gap is crucial, as there is insufficient coverage of this area in contemporary international (English-language) literature on the CEE region (Albu et al. 2017), whereas literature on FRM and its detection in other emerging regions is considerably more developed, addressing the specificities of individual countries (Ozcelik 2020; Yao et al. 2019; Yendrawati et al. 2019; Jan 2018; Rye et al. 2015; Chen et al. 2014; Huang et al. 2014; Hasnan et al. 2013). In Poland, research into FRM has largely focused on internal audits or financial analysis or financial ratios (Fadilah et al. 2019; Hulicka 2008; Wyrobek et al. 2021), with few ACFE (Association of Certified Fraud Examiners) CFEs Certified Fraud Examiners and AAA (American Accounting Association) FAs Forensic Accountants – inspired tools available for broader and more advanced detection purposes. The Author is a member of both the ACFE and the AAA. The specificity of national markets and their environments, as well as the objectives of the study, define the modeling methods, the nature of preselection, and the results of empirical verification when selecting literature-based indicators as potential variables (Yao et al. 2019; Jan 2018; Hung et al. 2017; Kanapickiene, Grundienie 2015; Wuerges, Borba 2014; Murcia, Borba 2007). Especially in rapidly transforming emerging markets (Murcia, Borba 2007) and their continuous, intensive

development (Albu et al. 2017; Laeven 2014), it is not feasible to create universal models, necessitating empirical verification of predictor and FRM relationships each time.

Author's model integrates both financial and non-financial indicators, offering a comprehensive approach to FRM detection. The key statistically significant variables included Restatements, Financial Dissolution Proceedings, Incidence of Financial Statement Divergence, Negative Cash Flow from Investing Activities, Negative Cash Flow from Operating Activities, Average Litigation Costs, Supervisory Board Size (Small), Index of Tangible Book Value per Share, and ESG GPW Respect Index. The creation of the SQL-based relational database (and earlier preprocessing data to make them structured) enhanced the model's ability to adequately analyze large datasets, addressing the limitations of earlier fraud detection tools that often overlooked non-financial governance variables and most importantly, didn't employ structured data. Modeling based on artificial intelligence (AI) was rejected because it required large amounts of data (large number of PTCs, large amounts of punished PTCs -FRM observations; thus their limited availability would result in low performance for this approach (Gepp, 2015). Small, shallow, young financial markets do not yield a sufficient number of observations required by AI methods to be reliable (Gepp, 2015), and the Polish capital market is precisely such a market. The use of logistic regression models to determine FRM and their high efficacy is confirmed by numerous studies (Yendrawati et al. 2019; Kanapickiene, Grindiene 2015; Perols 2011; Ravisankar et al. 2011; Lenard, Alam 2009). These models can be used for detecting and predicting such violations (Dechow et al. 2011; Ngai et al. 2011; Price et al. 2011; Cecchini et al. 2010). Logistic regression (LR) models are among the most effective methods (Hajek, Henriques 2017; Bai et al. 2008; Spathis et al. 2002; Abbott et al. 2000; Bell, Carcello 2000; Beneish 1999), especially when compared to data mining techniques (Yao et al. 2019; Huang et al. 2014; Perols 2011). LR model was developed, yielding a high predictive power with sensitivity at 90.91% the ability to correctly detect fraud (minimizing false negatives/Type II errors) and specificity at 99.44% (the ability to correctly detect non-fraudulent cases (minimizing false positives/Type I errors). The model's strong performance demonstrates its potential for early detection of FRM in Poland, a market characterized by incomplete and unstructured data (publicly available data regarding PTCs and FRM). The key statistically significant variables, or red flags, that emerged from the model were Restatements, Financial Dissolution Proceedings, Incidence of Financial Statement Divergence, Negative Cash Flow from Investing Activities, Negative Cash Flow from Operating Activities, Average Litigation Costs, Supervisory Board Size (Small), Index of Tangible Book Value per Share, and ESG GPW Respect Index. These findings underscore the

importance of integrating both financial and non-financial variables into fraud detection models, particularly in emerging markets like Poland where financial transparency is evolving. In conclusion, the logistic regression model developed in this study makes a significant contribution to both academic literature and practical applications in fraud detection for numerous stakeholders from supervisory institutions, enforcement agencies, to professional market participants and the investing public. By integrating financial and non-financial indicators, it addresses key gaps in traditional models. The structured SQL database supports efficient data analysis, setting a new standard for FRM detection in transitional economies. Although some variables were not statistically significant, future models will benefit from enhanced financial and non-financial data collection platforms like ESAP (European Single Access Point), potentially increasing predictive accuracy and applicability across markets. This model stands as a critical step forward in understanding and detecting FRM in Poland.

1 The Role of Capital Markets in an Economy

1.1 Development and Paradigms of Economic Growth. Challenges and Threats

The exploration of the doctrine of wealth reaches ancient times (Boesche 2002). Development economics, considered as natural development practice, is one of the oldest fields in economics. Organized development economics was born when England outdistanced fellow countries in industrializing. It appears as a body of thought and action intended to push for change and progress, enabling countries to catch up with those others ahead of them, especially in per capita income (Janvry and Sadoulet 2014). Yet until today, queries remain on how to employ development economics for an actual economic development strategy (Janvry and Sadoulet 2014; Fischer 2004). After World War II, it was established as a formal sub-discipline of economics, reinforced by the formation of the international development community, official development assistance (aid), influential global institutions, and other manifestations of the integration of economies (Baum and Tolbert 1985; Führer 1996). The global development landscape has been shaped by the leadership of the World Bank, the International Finance Corporation (IFC), the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD), the United Nations (UN), the European Investment Bank (EIB), and others (Solimano 2001). Along with regional development banks (RDBs), such as the European Bank for Reconstruction and Development for the Central, Eastern, and Southeastern Europe and the African, Asian, and Inter-American Development Banks (BMZ 2016). It happened via numerous policy activities (Bull and Bøas 2003; Neumayer 2003). Development economics explores how all economies and societies grow, mature, and change (Meier and Stiglitz 2010a). Therefore, there are multiple measures employed for their assessment. From the most standard one and commonly used, branded a cross-country development measure after the Bretton Woods Conference, that is Gross Domestic Product (GDP) (OECD DC 2018; Meier 1971), to so-called 'Beyond Growth' measures (OECD 2019), such as HDI (Human Development Index), IHDI (Inequality-adjusted HDI), and MPI (Multidimensional Poverty Index) (UNDP and OPHDI 2020) or Equally Distributed Equivalent Income (EDEI) (IMF 2017). GDP, GNI (Gross National Income), WGP (World Gross Product) are perceived as most typical and are admittedly most extensively used. Most meaningfully, for the formal country-development classifications along with cyclical reevaluation of growth-related performance (MSCI 2020; United Nations 2014; IMF 2020).

The development process is a journey (Hirschman 1963), as it represents an advancement of a country from under-development towards the developed or high-income

status. It is achieved gradually, through the frontier, emerging, advanced-emerging status or low-, lower-middle-, upper-middle-income groups (S&P Global 2019; MSCI 2020; Stoxx 2020). The utmost node is a progression within the highest class to sustain long-term growth. Therefore it is an incessant motion, a continuous process aiming at permanent advancement, with a relative benchmark (a point of reference) represented by developed or high-income status (World Bank 2020a; Serajuddin and Hamadeh 2020). The Development Stages presents the drive to maturity as its last phase (Rostow 1990). Development is the most pressing challenge facing the human race (Summers and Vinod 1993, p. 241). Its importance is commonly shared, up to Nobel winners (Meier and Stiglitz 2010b; Pleskovic and Stiglitz 1999). Development thinking embraces all fundamental challenges that the world is facing on its path of evolvement, along with the competence to form and evaluate growth policies (Meier 2010a). The nature, strength, and goals of growth are not easily determined (Basu 2010; Bellù 2011). The development process and elements driving economic growth are still not entirely understood (World Bank 1991). Those unsettled matters and remaining questions are tasks for development economists of the 21st century (Yusuf and Stiglitz 2010). Prime challenges are the recognition of gaps between richer and poorer countries and the understanding of the sources of growth (Meier 2010a, 2010b). Conclusions of seven decades of development studies are that (1) there are multiple successful paths to development; and (2) replication of development strategies, proven to be quite successful somewhere, does not indicate success elsewhere, it is not efficient, as it does not deliver desirable effects. Paths of early industrializing countries shall not be directly repurposed for developing countries. The plurality of undertaken successful and failed development paths worldwide indicates that a universal path does not exist. Looking for a one-size-fits-all paradigm shall not be an objective (Meier and Stiglitz 2010a; Tedesco et al. 2015; Pleskovic and Stiglitz 1999). The circumstantiality of development manifests itself in socio-economic conditions (country-, period- and context-related aspects (Bellù 2011)). Challenges of economic growth are unlike and diverse among countries and regions (Hausmann 2015), so that nation must form its very-own development path, yet remain conscious of being an integrated element of the global economy (World Bank 2019b).

Development economists and their philosophies endure variably to prefer some growth-determining factors over others (driving forces), favoring given elements (ingredients) as engines of growth, prioritizing some objectives, and means over others. It gives life to development paradigms, many of which do not conflict, rather complement (Janvry and Sadoulet 2014; Bellù 2011). They have a very feasible nature serving as development recipes and useful keys for the construction of actual development paths of a given state (OECD and

MSZ RP 2016). Turning points in development thinking, paradigm shifts, happen usually due to some critical moments in the world-economy or at some sort of crossroads (Innis 1951; OECD DC 2010, 2018). Development paradigms are placed throughout the Five Phases of Development. Industrialization, growth, modernization (Trade and Industrialization development theories), Structural transformation, More independence in developing economies (Dependency Theories), Macroeconomic stability: The Washington Consensus and adjustments and Goal-based development (OECD DC 2018). Heterogeneity and myriads of them sectioned off Old and New Generations of development economists and Old (Classical) and New Paradigms (Meier 2010b; Crafts 2010).

Growth paradigms are favored ways of achieving development, often overlapping or supplemental. They share common ingredients and general features, acknowledge mutual cause-effect relations, highlighting the role of the chosen, e.g. the market. Yet, the greater the granularity level, the greater the discrepancy between views (Bellù 2011; Rocha 2013; Schmelzer 2016). Nonetheless, across many periods and paradigms, financial capital was front and center. Throughout all phases, numerous development strategies build on financial capital and open-market as a fundament to achieve rapid growth (OECD DC 2018; Srinivasan 2006). Functions, features, and the role of the capital market are unique and cannot be replaced or substituted by any other construct (Laeven 2014b; Narayanaswamy et al. 2017). Capital markets promote development through various channels, enable alignment of market-related ideas with other development considerations, and therefore are fundamental for transitional processes and capital account openness (EBRD 2019a; Rada Ministrów 2019, 2017). Contemporary development economics builds on experience from past generations but is more complex and analytical than during the times of development pioneers (Meier 2010b; OECD DC 2017; Meier and Bauer 1987). It is formally described as sustainable development, as it concerns both economic and non-economic areas (Basu 2010). Modern development thinking acknowledges its multilayered nature with global, regional, and national interrelations (World Bank 2009, 2019b). Sustainable development sprang out in the 1980s with Brundtland's Report on Common Future (a pioneer navigating principle that bridges broadly understood economic development with environmental and human-related concerns). This notion was endorsed globally with the UN's Millennium and Sustainable Development Goals. Over a hundred countries, including emerging, as signatories of the Agendas, pledged to achieve them via adequate growth strategies (GA UN 2000, 2015). They are supported by the European Union and influential stock-related organizations, e.g. WEF (WEF 2017; EC 2019a). The notion of a widespread commonwealth shot off in the 1920s (Hogan 1989). Lessons learned from the

development paradigms ever since, show that in the 21st century, developing countries must create their own, original path towards increasing prosperity, further development, and sustainability (OECD 2018; OECD DC 2018). Transitional emerging economies of the CEE/CESEE region are separated as a distinct research area, with the high granularity of regional and local (national) specificities (Skare and Porada-Rochoń 2019; Iorgova and Ong 2008; EBRD 2019b). Therefore it needs tailor-made, dedicated market-oriented growth policies (World Bank 1996; Narayanaswamy et al. 2017).

1.2 Market-Oriented Economic Growth

Since the Industrial Revolution, Western countries gradually pushed their advancement, following certain paradigms, subsequently cementing their status as the Developed World (Tedesco et al. 2015). Even during the First Generation capital accumulation was presented as the central focus of the many development strategies (Meier 2010b, pp. 13–14). Schumpeter's theory of economic development was the first where economic development was addressed directly as a specialized area of economic analysis. It was followed by his market-related theories of the Capitalist Process and Creative Destruction (Schumpeter 1934, 1939, 1942). The idea of Creative Destruction was addressed by the Author as an essential fact about capitalism, which sets and keeps the capitalist engine in motion (Schumpeter 1942, p. 83). Contemporaneously there were established other fundaments, such as Ramsey's model (Ramsey 1928), Allais's (Allais 1947), Samuelson's (Samuelson 1958), and Rosenstein-Rodan's (Rosenstein-Rodan 1943). Harrod-Domar Equation investigates capital requirements in emerging states (Domar 1947; Harrod 1948, 1939) and Arrow-Debreu's model formulates conditions for the market to perform efficient outcomes (Arrow and Debreu 1954). Solow accepted most assumptions of the latter (Bellù 2011, p. 4), but developed a model of his own (known as the Solow-Swan model) (Swan 1956; Solow 1956). This idea further developed as Mankiw, Romer, Weil model (Mankiw et al. 1992) was extended into Milbourne's (Milbourne et al. 2003) and subsequently as Cooray's model. Built on the aforementioned, employing empirical data on plentiful developing economies, exposed a great significance to the stock market for the growth in the emerging world. It created a ground for formulating policies targeting the market's liquidity, size, and activity, to enhance its growth (Cooray 2010, 2009). There is a vast array of modern Schumpeter-inspired paradigms (Casanova and Miroux 2018). They are primarily set on the ideas of backwardness and proximity to frontier (Acemoglu et al. 2002), on complementarity and interrelation of capital accumulation and innovation as in

Aghion and Howitt's endogenous growth theory (Aghion et al. 1999). They induce a connection between financialization and growth (King and Levine 1993). New (or Second) Generation is very fruitful not only in acknowledging the need for rethinking and reassessing existing paradigms but also in establishing completely new development theories (Dunning 2006; Meier and Stiglitz 2010b) (Vinod 2010). The Endogenous Growth is a fundament for knowledge-, innovation-led development with learning-by-doing and spillover effects (Arrow 1999; Romer 1994). Capital markets lead the way in fostering and financing innovation, which is recognized as an imperative concept for development's acceleration, in emerging markets as well (Markiewicz 2020; Sobolewski 2020).

Throughout both Development Generations development strategies employed the attraction of capital as a fundament to achieve rapid growth. Financial capital and markets were core or at least indispensable in numerous growth ideas over periods (OECD DC 2018). The Anglo-Saxon Development Approach (neo-liberal system of growth) is associated with two uppermost developed state markets (the U.S. and the UK), possessing the most sophisticated capital markets. Therefore it serves as a role capital market-based growth model (Srinivasan 2006). The fact that local (national) capital market development spurs and underpins development (especially in emerging countries), is a common view shared by many stakeholders (Narayanaswamy et al. 2017; Levine and Zervos 1996; Atje and Jovanovic 1993). This leading role of capital, Foreign Direct Investments, entrepreneurship, financial development, and a center position of the market, prompted the establishment of Regionalizing Actors (e.g. IADB). They correspond with governments, as non-state actors of regional development assistance already since the 60s (Bull and Bøas 2003). Transitional countries have gained such a label as they abandoned central planning and started passage, called a transition, toward free, decentralized, open-market mechanisms, augmented by extensive private ownership and related profound, fundamental reforms (World Bank 1996)). Central Eastern Europe/ Central, Eastern, and Southeastern Europe (CEE/CESEE) transitional countries are subjects of the dedicated aid of the European Bank for Reconstruction and Development (EBRD). It was founded in 1991, after the collapse of communism, the turning point for the region, to build Post- Cold War era (EBRD 2020). EBRD fosters their transition towards open market-oriented economies and promotes private and entrepreneurial initiatives to facilitate growth in the region (EBRD 2019b, 1997). The 90s exposed the need of developing countries to tailor their growth ideas and policies, considering the development stage, transition processes, reform paths, and other specificities of greater granularity, as the gulf between them was diagnosed in a form of distinction: winners and losers (World Bank 1996). It has built a

common consensus, in favor of market-friendly strategies, indicating governments to sustain, rather than supplant markets (Summers and Vinod 1993; Williamson 1993). Related to the idea of the market having a central role in the economy, economic openness, setting roles of the market and government, it is perceived as a specific international projection of the American concept of the corporative political economy and integration of markets (integrated single market along with mixed capitalist economy). IFC's modern research confirmed empirically that markets do have in general a positive effect on growth (Narayanaswamy et al. 2017). Yet, the longevity and magnitude of the effect differ with market characteristics (Khan and Senhadji 2003).

The performance of the local market, its participants, and stakeholders are closely built upon development thinking translated into growth strategies and related policies (EBRD 2006, 2019b, 2005). A market-friendly approach with properly adjusted institutions and policies focused on investing public, investment climate, integration of markets, and stable macroeconomics, allows the market to function well (World Bank 1991; EBRD 1995). Such a climate (environment), shaped in a country or region, is fundamental for corporate activity, sustained growth, and competitive advantage of nations (Porter 1990; World Bank 2020b). The global promotion of adequate investment climate and open market-oriented economies is a focal point of the EBRD, IMF, and the World Bank. Both Special Agencies have been acknowledging the market and its indispensability over nearly all issues of their various series of publications for a few decades (IMF 2019; World Bank 1996, 2004). General financial development, and particularly stock-market development, affects substantially rates and levels of growth and economic activity (Atje and Jovanovic 1993; Skare and Porada-Rochoń 2019). Nonetheless, only properly functioning capital markets can serve the needs of modern economies, especially those still in the transition process (Narayanaswamy et al. 2017; Kant 2020). Financial systems and markets play an imperative role in the process of ' savings accumulation, transformation into capital, allocation in investment, risk management and corporate governance ' (Grela et al. 2017, p. 25). A deep and fully-fledged system shall accomplish its functions more effectively by the reason of higher liquidity and predominantly - more efficient information (Levine 1997).

Each emerging market shall formulate its own, unique path towards development (OECD DC 2018; OECD 2018). Transitional states of CEE/CESEE are bound to employ dedicated, peculiar policies for local market development along with joint regional strategies to underpin growth (Iorgova and Ong 2008; GPW 2020e; OECD and MSZ RP 2016). The internationally accessible (English) literature on these markets is rather limited (Albu et al. 2017). It shows a lack of consensus in stacks of areas, indicating heightened heterogeneity of

this group and the need for research taking into account the specificity of a given country. The actual efficiency of capital markets in these countries varies greatly (Berggrun et al. 2017; Hoskisson et al. 2000). Some countries have created liquid, huge, and further flourishing markets, while others struggle with stagnation or even decline or downfall of local capital markets (Laeven 2014a). Excessive volatility of assets, improper institutions and governance, insufficient activity, and investors' base creates problems for the appropriate development of emerging markets on a global basis (Berggrun et al. 2017). Particularly, this applies to the CEE region (Ivanitsky and Tatyannikov 2018). As market-oriented development transitional strategies are transpiring in the region, they increasingly acknowledge the uniqueness of paths to foster successful local market development and embrace the country's specificities and individuality of the region along with inner interdependence (Andritzky 2007; Grbić 2020; Iorgova and Ong 2008).

1.3 Towards European Single Market

The single market in the EU is a common market concept of profound outreach, making the EU truly one territory, without borders or other obstacles to the free movement of capital, services, goods, and people. The Treaty of Rome establishing the European Economic Community constituted this view on comprehensive economic integration, with a focus on removing barriers to build a common internal market (EC 2020d; Europäische Wirtschaftsgemeinschaft 1957). The formalized program for the single market in Europe was launched in 1985 when the European Council endorsed the White Paper, followed by related legislation of the late 80s and 90s on the internal market, which has put in place European Single Market (ESM) (Micossi 2016). Phenomena of the European Identity and Community are the backbones of the European Union's (EU) activities. The intensification of European integration is increasing rapidly, especially with economic integration advancing faster and further over past decades (Checkel and Katzenstein 2011). That integration has many layers of depth, such as institutional, political, legal, regulatory, technological, and socio-cultural along with countries' attitudes toward them (Tucker et al. 2002). Waves of enlargements of the EU (increase in EU membership in given years in clusters) were followed each by broadening and intensifying of European integration. Though the degree and type of EU integration alter across various areas and over time (Campos et al. 2019).

Since the symbolic date of birth of the ESM, it has always been the 'cornerstone of Europe's integration and sustainable growth' (Barroso 2010). Nonetheless, its full potential and

benefits have not been delivered yet even after over 30 years (Micossi 2016). The ESM embodies smart, sustainable, and inclusive growth for the EU. Though, there are many ruptures, bottlenecks, and missing links disabling fragmented to act as a forceful growth engine and delivering the benefits idiosyncratic for the single market (COM/2010/2020 final 2010). The ESM is described as the decisive power of the EU and the key strategic objective (Monti 2010; Pelkmans 2019). The empirical evidence on the benefits of the ESM has been and still is commonly recognized. After over three decades of ESM's existence, it was evidenced to have in general raised the EU and individual member states' GDP significantly (In't Veld 2019; Campos et al. 2019). It has even exceeded the expectations estimated ex-ante (Cecchini et al. 1988). Those macroeconomic benefits of the ESM are assessed considering the EU generally, as a whole. Among individual member states, they vary greatly (In't Veld 2019). The ESM is perceived as one of the EU's highest achievements and a driver of economic growth, though in need of a systematic, integrated approach for a fully-fledged ESM and its efficacious monitoring (Barroso 2010). The ESM as an engine of growth builds the global EU's competitiveness, stimulates trade, improves efficiency, builds resilience, and raises quality. The adopted ESM Strategy is to unravel the full potential of the ESM which lies ' at the heart of the European project ' (EC 2020d, 2020e). The ESM aims at regional economic and social development, though with possible diverse effects for areas of different development stages (Leonardi 1992). The European integration and ESM are still unfinished, with legislation and regulatory activities being only partial, with gap areas, market segmentation, and fragmentation (Micossi 2016). The European Commission has published its assessment on how the ESM can and shall be deepened (European Commission, 2018).

To materialize all ESM-related potential benefits, further initiatives are ongoing, targeting persisting and surfacing challenges (In't Veld 2019; Pelkmans 2019; HLF on the CMU 2020). The process of the ESM's creation is unique, as it comprises both rational and socio-cultural components, a rather uncommon feature according to theories of institution-building episodes (Fligstein 2001). After the Financial Crisis, the European Commission adopted the Single Market Act (I, II) to boost the European economy and strengthen stakeholders' confidence in it (COM/2011/0206 final; COM/2012/0573 final). The ESM has brought profits for the EU entrepreneurs and citizens. Though some fields still need further attention, as there the market is not truly integrated yet. Its full potential has not been exploited yet, mostly due to missing legislation and insufficient institutional performance with related administrative difficulties, and a lack of enforcement. Confidence in the ESM ought to be improved to support the stimulation of economic growth and shared prosperity (EC 2018;

COM/2011/0206 final). Through ESM, the EU is a ‘ convergence machine ’. It is particularly true for CEE, though with diverse efficacy. There has been occurring growth in divides in economic outcomes between countries. It is becoming gradually a great challenge for the EU’s ‘convergence promise’. Therefore observation and counterbalance of processes of divergence is a priority. A free market is one of the conditions for this convergence. Convergence 2.0 is said to focus on businesses and people to facilitate further development (Alcidi et al. 2018). Financial institutions and capital markets play an extremely important role in any developed economy (Kabza 2017). From the 90s it was known it would reformulate frameworks of financial markets in terms of both scope and attributes (Underhill 1997). A genuinely integrated financial union reaps benefits from synergy effects, not just be a simple sum of its elements (Thomsen 2018). The EU law and financial system comprise of indispensable parts and encompasses vast elements. It includes among others: currency, budget, fiscal stability, tax, insurance, banking, money, and capital market-related matters with related institutional infrastructure and legal and regulatory framework (Drwiłło and Jurkowska-Zeidler 2017).

The Capital Market Union (CMU) is one of its core elements, whose role cannot be taken over by any other ESM segment (EC 2020a). The CMU is addressing ‘capital markets’ sensu largo, that is equity and debt with corresponding or equivalent instruments, up to venture capital and private equity in the context of all market participants and stakeholders with related legal and institutional frameworks (S&P Global 2020; FESE 2019). Banking-based finance is complementary to market-based (Adamska 2019; Thomsen 2018), therefore an unbalanced financial system and over-banking in the financial landscape are causing profound negative effects in the EU affecting even the real economy (Thomsen 2019; Deutsche Börse Group 2015). In particular, assets are allocated unproductively due to an uneven and split EU financial sector. Over-banking is perceived as a threat to sustainable growth, stability and resilience, suitable private risk-sharing, favorable financing conditions, innovation, and investment fostering (Bhatia et al. 2019; S&P Global 2020). The EU holds excessively strong corporate, governmental, and household bank-dependence. Total banking sector assets vs. GDP equal to 300% in EU, while 85% in the USA, as a result of relatively small capital markets, which impairs resilience and shock absorption. Capital market advancement and integration shall facilitate a ‘healthy diversity’ in EU finance (Thomsen 2019). Thus, CMU principles incorporate an increase of transparency, restoration of trust and confidence in markets, invigoration of market-based funding, bolster financial stability, the advancement of harmonization and convergence, and an orderly and efficient market ecosystem (Deutsche Börse Group 2015; FESE 2019). As of 2020, the CMU is more in the prime focus given and a

priority, as it is needed now more than ever before. Due to the coronavirus-caused economic crisis and Brexit, intense steps are taken by the European bodies to accelerate CMU, as a remedy for recovery and resilience. The development of integrated and large capital markets along with enabling access to market financing intends to facilitate recovery (Lannoo and Thomadakis 2019; COM/2020/590 final 2020). Moreover, the architecture of CMU will be redefined towards ' multi-spokes ', as the 'hub-and-spokes' system can no longer be applied after Brexit (Bhatia et al. 2019; HLF on the CMU 2020).

1.4 The Capital Market Union 2.0 (CMU 2.0)

Already in 2001, the idea of a Single Capital Market was accented (Lannoo 2001). The CMU action plan was adopted in 2015, updated, and complemented in 2017 and 2019. In 2020, it was revised and gained significant momentum (COM/2020/590 final 2020). The CMU 2.0 is a "New vision for Europe's capital markets" (HLF on the CMU 2020). The idea of the EU Capital as a true single market for capital for all stakeholders is one of the leading concerns in building Europe more resilient, robust, dynamic, and competitive globally with sustained growth (EC 2019b). The structure of the financial landscape in the EU is changing, increasingly relying on market-based finance and CMU is said to develop the cross-border dimension of investments (Pires 2019). Only developed, robust, and efficient capital markets (including both debt and equity and related instruments) can perform their functions well (IFC 2016; Narayanaswamy et al. 2017). Though besides the US and China, the EU is the third-largest world economy, representing 16% of world GDP as of 2017 in Purchasing Power Standards (Eurostat 2020), its financial landscape is far from being comparable to the world's most developed capital markets (Bhatia et al. 2019; Pelkmans 2019). To compete globally, as a developed single financial market, the EU must change this landscape (HLF on the CMU 2020). That is, grow tighter over the years to the model advanced financial market of the US. The US market and its characteristics serve as benchmarks in the CMU-related actions (European Parliament 10/23/2020; Lannoo and Thomadakis 2019; FESE 2019). Listed equity in the EA (Euro Area) amounts to less than 70% of its GDP, in comparison to 170% in the U.S. In consequence, this means that not even 30% of EA's non-financial companies' liabilities are tradable instruments, with this ratio twice higher in the US EU-28, with a similar picture of e.g. risk-sharing channels, non-financial corporations funding structure, and general market structure. It consists of those EU Members that have adopted the euro (EUR) as common currency (EC 2020c). By ordinary, addressed as 'eurozone'(Reuters 2020). Fields of

convergence are: nominal, real and business/financial. Original convergence criteria are: inflation convergence, nominal interest rate and fiscal criteria (Franks et al. 2018; Klaus and Ferroni 2015) The Maastricht Treaty established introduction of the euro (TEU 92/C 191/01 1992).

Therefore, for the EU to be globally competitive, catching-up along with possessing a Single Market formed by CMU is crucial (Bhatia et al. 2019). The CMU is a strategy to unlock and facilitate funding for the EU's growth. Since 2013, EU bodies have been taking multiple legislative measures to build it, yet CMU is still in its early phase (EC 2020a; Thomsen 2019). Barriers to capital market integration (identified by various market participants and regulators from EU countries) are shared by most of them (S&P Global 2020; Bhatia et al. 2019). Initial challenges prevail, along with the surfacing of new ones, nonetheless, progress is evident (AFME 2020; EC 3/15/2019). It is supported forcefully further by the new CMU Action Plan or the CMU 2.0 (as a result of the 'rebranded CMU' (Lannoo and Thomadakis 2019)) adopted by the Commission at the end of 2020 to boost efforts for its completion (COM/2020/590 final 2020). It formulates the key objective and ultimate goal of a 'genuine EU-wide single market for capital' to be achieved by established targeted measures (EC 2020b, pp. 1–2). They address CMU barriers, bringing systematization, harmonization, convergence, and consistency in areas related to transparency (e.g. information), regulatory and supervision, single rulebook application, insolvency regimes, investor protection, enhanced competencies, and jurisdiction of EU institutions (Bhatia et al. 2019; HLF on the CMU 2020). Only a large, fully-fledged, high-functioning, integrated EU capital market may deliver the scale of benefits needed for recovery, growth, and global competitiveness, with actions crucial on both national and EU levels (COM/2020/590 final 2020; EC 2020b; FESE 2019). Labeling major obstacles and weighing perks and benefits of the CMU allows for policy actions targeting beleaguered spheres (Bhatia et al. 2019; FESE 2019). In general, EU capital markets are small, some shallow, narrow, and illiquid, with an insufficient investor base, limited size, and constant (or decreasing) number of PTCs, curbed efficiency of private risk-sharing and asset allocation (Lannoo and Thomadakis 2019; HLF on the CMU 2020; AFME 2020). Moreover, there are disparities and discrepancies in many capital market-related fields, predominantly transparency (reporting, governance, accessibility, and availability of information), listing standards, market infrastructure, and regulatory quality (laws, government institutions, SROs), insolvency practices (including debt enforcement), taxation, and administrative procedures. It affects all elements of the life cycle of any security and breeds severe market fragmentation - EU capital markets are split along national lines (Bhatia et al. 2019; COM/2020/590 final 2020). The

inherently subsistent complexity of the capital market due to being a set of multifaceted institutions and conjoining nexuses (Black 2001) is additionally heightened in respect of EU multi-markets architecture (Thomsen 2019; Vienna Initiative 2018).

There is also a legal and institutional dualism, caused by EU specificity – the simultaneous prevalence of acquis communautaire and national legal framework (Trubalski 2016) with an accompanying lack of single institutions (e.g. supervisory, regulatory). Coexisting 'central and decentralized implementation and enforcement' (Pelkmans 2019, p. 2) along with the variable quality of NCAs (National Competent Authorities) is problematic. Market supervision in the EU is predominantly a competence of NCAs, as ESAs (European Supervisory Authorities) perform merely harmonizing roles, with limited jurisdiction (Bhatia et al. 2019). The European landscape characterizes itself with some further features, heightening its complexity or disadvantaging integration, such as home bias, double layer institutional infrastructure (EU and national, present on all layers of securities markets with their environment), prevailing lack of standardization, unification, harmonization, and transparency (foremost issuer information-related), convergence tools. Member States have an obligation to designate a competent authority for the purposes of most acts (author's footnote: EU directives and regulations) and to notify their identity to the EC and ESMA' (ESMA 2021). The expression is commonly used in science, regulatory and market practice (van Rijsbergen 2014; FSB 2014). The European System of Financial Supervision consists of: European Systemic Risk Board and 3 European Supervisory Authorities (ESAs): European Banking Authority, European Securities and Markets Authority, European Insurance and Occupational Pensions Authority' (EC 2021). It is supported by NCAs (ESBG 2018).

Those disparities and others, insufficiencies of legal and institutional preconditions for effective CMU and prerequisites needed for a strong securities market are noticed by stakeholders, making them reluctant to participate in the market (HLF on the CMU 2020; S&P Global 2020). Such a landscape is generating extensive market segmentation and fragmentation costs. Among them: uneven corporate funding costs and credit rationing, regulatory and supervisory polarities, absence of macroeconomic benefits (e.g. growth, resilience, stability), disheartening private-risk sharing, and impairing transparency-related issues. They are scuttling chances for the efficient CMU, hence not delivering its supposed benefits to the Community (COM/2010/2020 final 2010; COM/2020/590 final 2020; AFME 2020). The European Parliament Research Service approximations presented potential benefits from the efficient CMU as of 137 billion euros per year (EP 2019). Aspects associated with market transparency (integrity) are of the top policy priorities of the CMU and ESM (EP; EC 2013; FESE 2019).

They manifest themselves in multilayered- (issuers, infrastructure, reputational intermediaries, SROs, government institutions, a legal framework (Black 2001)) and multidimensional- aspects (accounting, reporting, supervision, enforcement, stability (Lehmann 2020; Deutsche Börse Group 2015)). There are numerous groundbreaking transparency-related activities of European bodies facilitating unity, convergence, market integration, integrity, and CMU completion (Bhatia et al. 2019; AFME 2020; FESE 2019). Many of which are linked to market information, though on diverse stages of completion. Among them corporate disclosure 'common language' (ESEF - European Single Electronic Format, IFRS, Taxonomy) (ESMA 2020), Single Rulebook (a unified set of EU financial market rules), along with integrated supervisory architecture (European System of Financial Supervision - ESFS) fostering convergence, stronger and more integrated CMU. Multilayered market convergence, resulting in a leveled playing field for market participants and stakeholders, is a prerequisite for a fully-fledged, complete CMU (EC 4/1/2019, 3/21/2020). Accessibility, availability, and usableness of market information are its fundaments (ESMA 2015; EP; EC 2013, 2014). Implemented in 2020, the ESEF is a milestone for all market participants, as it provides annual financial statements as publicly available, standardized, structured, harmonized datasets in both human- and machine-readable formats (ESMA 2020). ESEF, along with the materialization of the idea of an open-access EU-level database for market information (largely corporate reporting) both financial and non-financial – would enhance transparency to an unprecedented level. Creating a single access point for market (corporate) data on an EU level would provide stakeholders with unified access to standardized information, which is currently considered (COM/2020/590 final 2020; Bhatia et al. 2019).

Forming a competitive, integrated, profound, liquid European capital market is a priority for the Next CMU High-Level Group, as it aims to uphold the current EU (EU-27 in present economic, social geopolitical context) as one of the uppermost two financial centers of the world (Next CMU HLG 2019). As of the end of 2020, the CMU Action Plan 2.0 is formally agreed on and gaining momentum (COM/2020/590 final 2020). Nonetheless, the deepening of the integration of European markets and infrastructure, enhancing convergence in supervision and legal frameworks are agreed on to likely unbundle the full potential of capital markets of the EU (AFME and AEB 2020; Bhatia et al. 2019; S&P Global 2020). Assuming transparency and efficiency, capital markets (investments) are seen as long-term drivers of development and engines of economic growth, assuming the proper environment (AFME 2020; Next CMU HLG 2019). The completion of the CMU 2.0 means a true single market for capital for everybody (Wieser 2020). It requires further steps, such as multilevel convergence, unification, and

harmonization, Single Rulebook expansion, single supervision system, single institutional and infrastructural network - to achieve comprehensive Internal Market integration. Removal of barriers and obstacles for the CMU is 'indispensable in order to move Europe forward' (Wieser 2020, p. 2), accompanied by efforts and engagement of all stakeholders (Lannoo and Thomadakis 2019; HLF on the CMU 2020). Acknowledgment of national and regional specificities and proportionality of solutions are essential, especially for the CEE/CESEE region (Redłowska 2017; Vienna Initiative 2018, 2017). As the 'New-EU' is particularly affected by unification and harmonization of market-related issues, CMU architecture, and ongoing convergence and consolidation. Targeted measures and policies shall be adapted for the CMU 2.0 completion in Emerging Europe (Lehmann 2020; Alcidi et al. 2018).

1.5 Capital Markets in Developing Economies of the CEE Region

There are some definitional biases when defining CEE - Central Eastern Europe, or CESEE - Central Eastern and South-Eastern Europe (Morita 2017). Therefore most studies, as a common practice, list the countries they refer to. The divergence is noticeable. The Federation of European Stock Exchanges (FESE) defines the CEE region as 'Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic, Slovenia, and the three Baltic countries' (FESE 2018, p. 1). The Polish Central Bank (NBP) refers to CEE as 'CEE-6' interchangeably and it includes 'Bulgaria, the Czech Republic, Hungary, Poland, Romania, and Slovakia' (Grela et al. 2017, p. 8). A related concept, growing in popularity is the 'EU-11' as it is devoid of this bias, that is, elements of this body are inarguably settled by the formal cut-off point. EU-11 consists of countries from CEE/CESEE which joined the EU in or after 2004 (Lehmann 2020). Emerging Europe lately is named the 'Three Seas Region' (TSR), due to growing interconnectedness, interdependence, and cooperation within this collective, likewise its formal joint projects (Popławski and Jakóbowski 2020; Iorgova and Ong 2008). CEE-6 transitional countries share an extensively akin growth model (Grela et al. 2017). Simultaneously, they are generally deeply divergent, but they experience the same fundamental challenge. The systemic post-Soviet transition of the region's economies influenced them deeply. Likewise, their markets, making them a heterogenic group (by cause of different transition paths and their effects) cleaved off from the general cluster of emerging economies (World Bank 1996; EBRD 2005, 1997). This 'transitional post-communist world' (Tucker et al. 2002, p. 558) has made striking progress - from centrally planned to market-oriented. Yet this exceptional economic transition has broken down this world into countries which benefited

from it, so-called ‘winners’ and ‘losers’ which did not conduct processes successfully enough (World Bank 1996). Nonetheless, emerging Europe is habitually treated as a collective, which can be noticed in indices and global funds (Huth et al. 2014; MSCI 2021). Withal, often they include even Turkey and Russia (FTSE Russell 2020). Market institutions' reforms undertaken during the transition were found to be key conditions for a successful transition (Wyplosz 1999). EU membership has also proven to be an ultimate, implicit kind of guarantee that free-market reforms of transitional countries set in motion in the 90s were not reversed (Tucker et al. 2002).

The region has achieved remarkable progress during the previous three decades, both in economic growth and convergence. During the past twenty years, its average growth rate beats out the Old EU more than twofold (Grela et al. 2017). Primarily it was induced by intense capital inflows (mainly FDIs) additionally boosted by in-depth market reforms and other transition-related processes carried out during the 90s (World Bank 1996; EBRD 2005). Moreover, the accession to the EU of the CEE countries was a driver for its performance in the second millennium (Grela et al. 2017). Economic reforms in CEE and the consequent establishment of local capital markets and their subsequent development are interrelated (Morita 2017). Trimarium has generated 15% of the EU GDP in 2004 and respectively 19% in 2018, with a 243% increase in trade turnover during this period and a total capitalization of exchanges at the end of this period of 347 billion euros (Popławski and Jakóbowski 2020). As of 2020 (EU-27), CEE makes up for 29% of the EU’s territory, where 25% of the EU’s population live, generating 19% of the EU’s GDP in PPP. The high dynamism and growing economic potential of the region is evident, when considering EU statistical data, and can be sustained or even accelerated, provided cooperation and connectivity in CEE. In contrast to this data, CEE represents only 10% of the EU’s capital market (Popławski and Jakóbowski 2020; President of Poland 2020). Emerging transitional Europe has achieved a quick pace in developing local capital markets, right after the end of communism (since the early 90s). CEE capital markets are heterogeneous, with the plurality of institutions, instruments, and investors-related issues (Iorgova and Ong 2008). Every country has established its stock exchange, most of them in the 90s, yet their characteristics, ways, and dynamism of development were and still are influenced by country-specific factors, such as institutional and political features (Adamska 2019). The rate of advancement has been extensively contrasting across countries and segments of markets. It was fortified by the differing degrees of advancement achieved in core areas. Predominantly in fixing pricing benchmarks, in capital market laws and regulations (their shape, adoption, implementation, and enforcement). Moreover, in facilitating the enlargement

of the investor base (institutional, individual) and supplying suitable trading infrastructure. Such a landscape calls for designed policy responses, as they are essential for further advancement of the breadth and depth of CEE markets (Iorgova and Ong 2008).

The ‘ CMU is a step in the right direction ’ (FESE 2018, 1), nonetheless to safeguard its accomplishment the key matter is a boost, an advancement of the development of so-called ‘small(er) capital markets’ (SMs) – in a different way: CEE markets (Lehmann 2020; Vienna Initiative 2018). SMs are markets with the dominance of SMEs (small, medium enterprises) and mid-caps or markets in jurisdictions determined to have frontier or emerging classification with some exceptions (FESE 2018). Stock (capital) markets of the transitional countries were described as ‘vastly undersized’ at the end of the 90s (Wyplosz 1999, p. VI). The advancement in markets’ maturity is visible (legal and institutional framework), yet the development in the context of size, liquidity, global attractiveness, and recognizability (Grela et al. 2017; Popławski and Jakóbowski 2020). The EU SMs are located in the CEE region and are stocked with SMEs, an investment gap persists, and their market capitalization is more often than not - less than 20% of GDP or about 17% of GDP on average (FESE 2018; Wosion-Czoba 2020). This represents a ratio three times smaller than the average for the whole EU and even less in comparison with Western Europe (Dietl 9/7/2020). The CEE region is also known as ‘Trimarium’ (Three Seas Region in Latin), due to the formalization of wide-ranging regional cooperation activities, altogether named the ‘Three Seas Initiative’ (Popławski and Jakóbowski 2020; Motusic 2017). The cooperation has gained support from influential stakeholders, such as the US government. It encompasses broadly understood economic partnership along with its infrastructure and foremost projects related to capital market collaboration, such as the CEEplus index (President of Poland 2020; GPW Benchmark 2020). Each CEE country has its very own stock exchange, but with size and liquidity indisputably limited. CEE markets are fragmented, with diverse statuses in the Market Classification of global indices suppliers. Even aggregated (as a region) are still not enough recognizable and not sufficiently attractive for global investors (Dietl 9/7/2020; Wosion-Czoba 2020). Therefore there are many regional and European initiatives being undertaken and considered to foster local capital markets development of CEE countries and to take advantage of the catch-up potential of the whole CEE region (Kamiński 2020; FESE 2018). EU institutions coordinated the establishment of the Vienna Initiative Working Group on CMU to target CESEE underdeveloped capital markets (Vienna Initiative 2018). Trimarium (inc. CEEplus Index) is a new but hastily gaining momentum flagship initiative. Different from the ‘Old-EU’, CEE is dominated by SMs and both listed and non-

listed SMEs (FESE 2018; SEG 2018). Moreover, there are transitional-related imports and other specific socio-cultural features (EBRD 2019b).

Therefore, there have been diagnosed specific challenges that CEE SMs face. Among them: lack of proportionality, resources, equity culture, attractive stocks, harmonization of investment rules, quality capital, post-trade infrastructure, and missing capital market orientation. Moreover, there are low weights of individual and aggregated CEE markets in international portfolios, usually low and various local market classifications (disparities in classifications among CEE SMs as perceived by indices providers (S&P Global 2019; MSCI 2020)). Primarily challenges are related to lack of analytical coverage, transparency, and trust in the local legal and institutional framework (FESE 2019, 2018; Lehmann 2020). Resolving all or most of them requires regional cooperation (Prezydent RP 2020; Dietl 9/7/2020), along with EU level collaboration, as it would allow for the creation of most beneficial opportunities for making CEE SMs successful (FESE 2018, 2019). The economic inequality in the EU is certainly not a modern issue (Dunford 1994), even though the convergence is materializing, gaps, discrepancies, and economic divergence remain (Alcidi et al. 2018; Rozmahel et al. 2013). It is especially visible in the context of capital market development, as exemplified above. There is a profound divergence among EU countries in numerous contexts (Kouba et al. 2015). They differ in their advancement and dynamics, economic capacity, and market size, along with deeply rooted in traditional divergence in the legal landscape and enforcement (Vienna Initiative 2018; Bhatia et al. 2019; Lehmann 2020). These and other disparities shall be addressed to facilitate further EU integration and the creation of ESM (including CMU) in a successful, enduring manner (EC 2018; FESE 2019, 2018).

Economic inequality among countries and regions in the European Community, picturing its winners and losers, is being debated for three decades (Dunford 1993, 1994). Already in the 80s/90s one of the concerns of single market and integration was that liberalization may likely incline the promotion of countries with already established highly developed and large financial markets (Grilli et al. 1989). Gaps among member states are narrowing, nonetheless, they remain substantial. The divergence is predominantly evident between highly developed and lately developing member states in the EU. They are referred to respectively as ‘Old EU’ (Western Countries) and ‘New EU’, due to the moment of joining (Spasova 2019; Motusic 2017) or ‘EU-15’ and ‘CEE’ (Grela et al. 2017). Moreover, CEE markets are particularly afflicted by the current consolidation of the EU exchanges, as it has curtailed liquidity in SMs and the traded securities of SMEs (Lehmann 2020). Most of the EU countries from the CEE/CESEE region are latecomers developing small markets with exhaustively dissimilar specificities than

advanced ‘EU early comers’ (Motusic 2017; Żurawski vel Grajewski 2017; FESE 2018). CEE markets institutions, instruments, and investors vary among countries (Iorgova and Ong 2008). Their paths of growth and conditions in which their evolution took place are different, resulting in the occurrence of diverse market development models (Adamska 2019). As the significance of constructing local capital markets manifests itself as the most beneficial and propitious way of national development financing (Narayanaswamy et al. 2017), development in the CEE countries, which are EU member states, shall consider both regional and country specificities along with acknowledging similarities and strong relations among them as well (Alcidi et al. 2018; Lehmann 2020; Vienna Initiative 2018).

1.6 Perspectives, Priorities, and Guidelines for the Polish Capital Market

‘One size fits all’ is not an appropriate attitude towards effective institution building, as countries must acknowledge and embrace their specificities and diversity to establish efficient national growth policies. Open information flows and open trade are central for the proper building and functioning of national market institutions (World Bank 2002). Corporate and entrepreneurial activities are dependent on the conducive country’s business environment and citizens’ trust in the market. Therefore for the effective functioning of market economies, national-level defined preconditions are necessary along with a cyclical evaluation of the investment environment and improvements to advance growth (World Bank 2020b, 2004). As a strong liaison between native financial development and real sectors’ economic performance along with subsequent constructive role for capital markets and institutions has been proven (Levine and Zervos 1998b; Tadesse 2004), it has been operationalized in national strategies for stock market building. Capital markets in the emerging world following the liberalization incline to advance. Countries with PTCs (Publicly Traded Companies) that broadly disseminate wide-ranging information have larger markets with higher liquidity and are further internationally integrated (Levine and Zervos 1998a). This notion was fundamental to the creation of actual native strategies for capital market development. Due to the existence of different transition paths, objectives, political conditions, and historical aspects – transition processes related to the local capital market building are rich in country-specificities, subsequently producing heterogeneous outcomes (Wyplosz 1999; World Bank 1996).

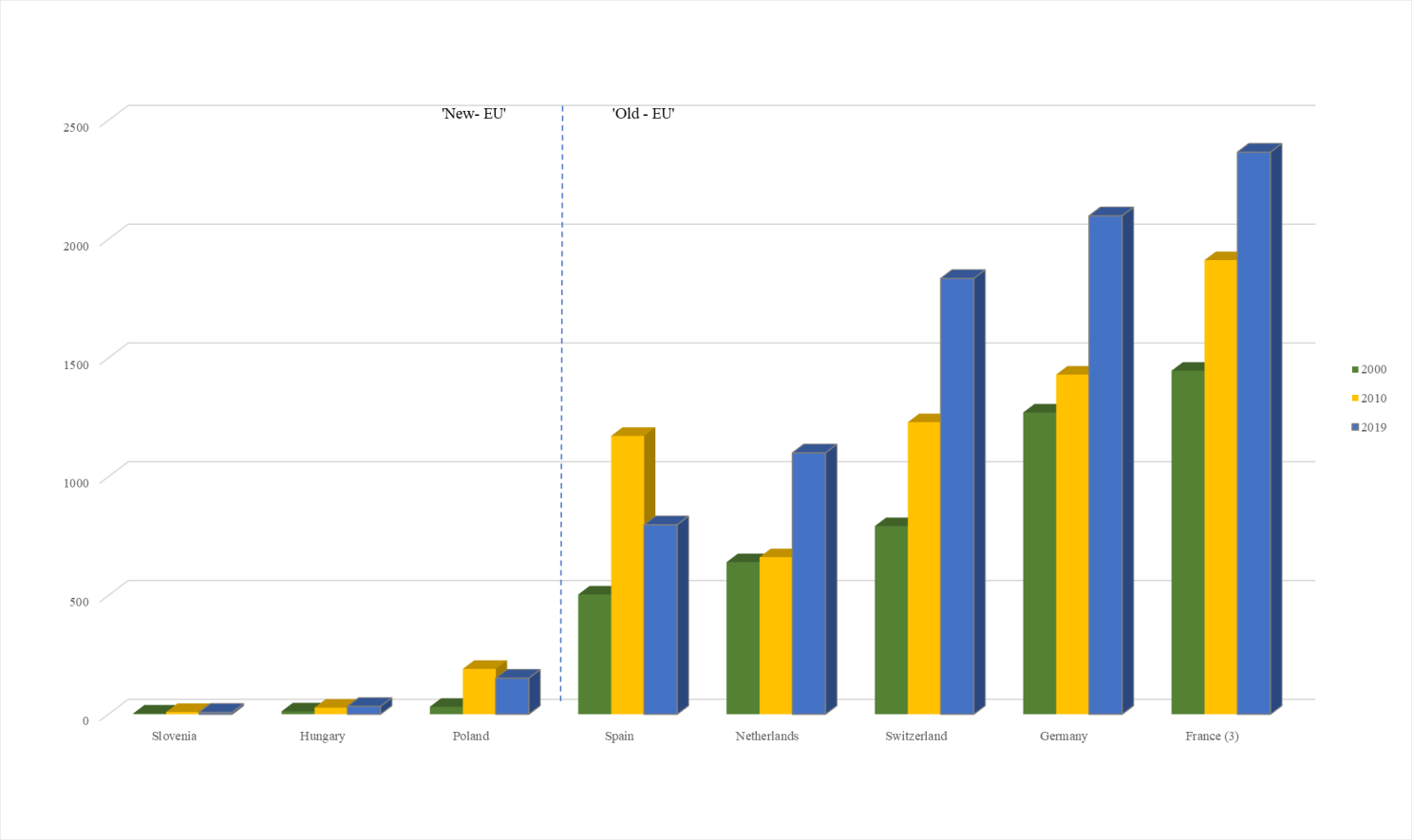
On average, CEE continued to outperform the EU-15 growth rates for twenty years, though the volatility among individual countries differed substantially (Grela et al. 2017). Yet, their local market advancement is not following those trends, as they do ‘lag behind their EU

peers' (Vienna Initiative 2018, p. 6). Global decedents have always acknowledged divergence in economic performance and sovereign riskiness of developing countries, with Poland graded favorably (Izvorski 1998). Among 'heterogeneity in the degree, dynamics and determinants of market development' Poland is of CEE's 'most developed' (Baele et al. 2015, p. 30).Poland has always been among the top performers in the group. It has accomplished high-income status quicker than any other state, except for South Korea (Alcidi et al. 2018). Transition processes in Poland were seen as successful from their beginning and positively distinguished themselves on the background of other transitional economies, earning an epithet of 'Soaring Eagle' (Lenain 2000; Broeck and Koen 2006). Robust growth during 20 years of Polish transformation was grounded on the accumulation of capital. During the global crisis it has shown extraordinary performance and exceptional resilience overall and in comparison to its European peers (Gradzewicz et al. 2014; Grela et al. 2017). Yet, in principle, integration with the EU has exposed Poland to additional international vulnerability, such as capital, trade, labor flows fluctuations, and general instability, especially during crises (Richter and Krzak 2011).

Poland has revealed itself as a bond market innovator, as it issued sovereign green bonds as a world pioneer (Pronina and Krajewski 2016). Poland's exceptional economic growth ultimately caused its rise to be described as 'Europe's growth champion' (Piątkowski 2019). However, the 'post-transition growth model has reached its limits ' (Grela et al. 2017, p. 14). Past growth drivers are not sufficient to sustain future growth in Poland. Poland shall embrace enduring weaknesses of its economy and introduce reforms that bolster economic capacity (Richter and Krzak 2011). This has ignited the search for a new path to maintain its growth rate on a satisfactory level (or favorably to accelerate its high growth) along with a strategy building for the capital market to catch up with the current size and capacity of the economy (Rada Ministrów 2019; EBRD 2019a). Except for current global macroeconomic conditions (HLF on the CMU 2020; World Bank 2019b), the external environment (World Bank 2020c) and regional challenges (Popławski and Jakóbowski 2020) Poland's stage of development, i.e. being on the verge in country's classifications (not an emerging country anymore (FTSE Russell 2018), yet not fully advanced (IIF 2020)) required proper policies on a national level (Ministerstwo Finansów 2019; World Bank 2019a). Poland, to advance from the emerging markets basket to the advanced category acknowledged by the entirety of influential indices providers and all global stakeholders, needs to adopt policies and strategies appropriate for the facilitation of further advancement, to reach developed status (MSCI 2020; IIF 2020). High-quality capital markets, i.e. robust, fair, efficient, orderly, and transparent with the adequate environment are of key importance for such classifications (Ramotowski 2018). They are the

core element of any mature, developed economy and the attractiveness of the market shall be strictly related to the degree of economic and social development (Kabza 2017; Czerwińska and Nowak 2018). The Polish market is a relatively positive exception in the context of a still comparatively unfavorable overall CEE picture of the securities exchanges and financial sectors (Ramotowski 2018; Grela et al. 2017). The CEE struggles with underdevelopment, small significance for domestic economies, and corporate financing (Lehmann 2020; FESE 2018), and the Polish market is yet still far from advancement and liquidity that characterizes developed markets of Western Europe (Köke and Schröder 2002). Domestic capital resources are tapering off (Grela et al. 2017) and this domestic capital flows out of the Polish market (Dietl 9/7/2020). Poland was one of CEE's pioneers in introducing all the needed macroeconomic and market reforms throughout the transition. Its early accession to the EU and consequent market integration resulted in significant market capitalization and turnover in comparison to other CEE countries, backed additionally by fruitful transitional reforms (Iorgova and Ong 2008). The Polish quality of the market environment, securities settlements/custody, dealing landscape, market accessibility, and liquidity transparency were assessed by FTSE as meeting developed market criteria, but there is room for improvement and catching up with the West (Ramotowski 2018).

Picture 1: Stock Market Capitalization (1) in 2000, 2010, and 2019 in current USD (US $) in billions (2)



Notes: A (1) Data according to the World Bank: DataBank World Development Indicators (WDI). Last available data as of 4th January 2021. Data in current US $. Market Capitalization in World Bank's WDI calculating convention is a sum of all listed domestic companies on all markets of a given country; A (2) Convention used (following Bank for International Settlements): billion = thousand million; A (3) For France: last available data as of 4th January 2021 for the year 2018.

Source: Own elaboration based on the World Bank Data Bank, World Development Indicators as of 4th Jan. 2021.

Picture 1: presents Stock Market Capitalization (1) in 2000, 2010, and 2019 in current USD (US $) in billions (2). As evidenced above, the market capitalization factor visibly divided the set of presented Member States into two subsets- aligned with the split into 'New-EU' and 'Old-EU'. In 2000, the Polish stock market capitalization amounted to USD 31.4 billion in comparison with (in billions) USD 1,270.2 in Germany, USD 11.9 in Hungary, and USD 3.1 in Slovenia. The Polish bond market in that period amounted to USD 17.9 billion. In comparison with (in billions) USD 2,076.5 in Germany, USD 9.2 in Hungary, and USD 1.1 in Slovenia (Köke and Schröder 2002). At the end of the current decade (2019) market capitalization was as follows (in billions), in Poland USD 151.619, while USD 2,098.174 in Germany, USD 1,100.105 in the Netherlands, USD 2,365.950 in France, USD 797.286 in Spain, USD 1,834.453 in Switzerland, USD 32.887 in Hungary, and USD 7.923 in Slovenia, see Picture 1. Due to the reclassification of Poland to the FTSE developed world, the weight of its market in the FTSE Developed All Cap Index was 0.154% underway the process (FTSE Russell 2018) and perceived as truly low (Ramotowski 2018).

The Polish stock market capitalization in relation to the GDP, as a percentage thereof, amounted to 34.4% in 2010 and only 25.7% in 2019, expressing a declining trend. Respectively, in Germany this ratio was 42.1% and 54.6%, in the Netherlands 78.1% and 131.9%, in France 72.3% and 84.9%, in Switzerland 201.6% and 260.9%, while in Hungary 21.1% and 20.4%, and in Slovenia 19.6% and 14.7%. Market liquidity (value of shares traded as a percent of GDP) in Poland declined from 14.5% in 2010 to 8.5% in 2019, additionally, the Turnover Ratio (Value of shares traded as a percent of market capitalization) in Poland dropped from 36.4% in 2010 to 33.2% in 2019 (World Bank Database 2020), see Picture 1. The number of all listed domestic companies in all public markets in Poland (regulated markets and ATSs, organized by the Polish Stock Exchange in Warsaw – GPW w Warszawie S.A.) throughout the recent decade (2010-2019) grew from 570 to only 798 altogether. At the end of 2020 (28th Dec.), the total number of all listed PTCs in Poland in all public markets amounted to 804 altogether (including just 54 foreign). On the Regulated Market 431 entities (330 on Main- and 101 on Parallel Market) with a total capitalization in the local currency of PLN 1,064,586.74 million and on the Alternative Trading System (ATS) New Connect 373 entities with capitalization in the local currency of PLN 19,220.67 million (GPW NC 2020; GPW MM 2020; World Bank Database 2020). Poland is no exception in the 'SMEs-dominated landscape of CEE markets', as having regard to the EU threshold of EUR 200 million, only 85 PTCs exceed this threshold, while 749 do not (SEG 2018). The number of total issuers in 2019 on the debt market Catalyst reached 145 active issuers, less than in most previous years (GPW 2020d, Table1). Not only a

small number of issuers but also liquidity is problematic (Kozdra 2015). Though, is performing rather well in comparison with CEE markets, a total of 1,530 series debuted during the first decade of its functioning. On Catalyst in 2019, there were four times more debt instruments listed than in the neighboring Czech debt market (GPW Catalyst 2020). Yet, capital market-related Doing Business Scores are lately declining (World Bank 2020b). As it was pictured above and directly pointed in Capital Market Development Strategy (CMDS), the Polish capital market is still underdeveloped, with the declining significance of the stock market in relation to GDP, deteriorating market liquidity, and worsening turnover ratio, delistings, scarce IPOs, and SPOs, the limited base of investors, insignificance in financing county's development and financing corporations. It is profoundly less developed than leading European markets, though prominent in the still-developing CEE region (Rada Ministrów 2019; Lehmann 2020). The CMDS's main goal is to develop the capital market in Poland to underpin the country's growth (EBRD 2019a). Its advancement, maturing and parallel growth with an emerging country's overall development (GDP) is fundamental to fund upcoming growth, unlock new opportunities, and ensure the competitiveness of an economy. Emerging countries shall (and cannot) postpone anymore the development of capital markets as their economies grow hastily, yet simultaneously keep ignoring the role of markets. Leaving capital markets underdeveloped while economies are quickly advancing (their current size and potential) will create imbalances and subsequently impair future growth (Bruno and Drexler 2016; EBRD 2019a).

Therefore, targeted actions, customed to the CEE market characteristics and especially country-level specificities shall be taken on national, regional, and EU levels (Vienna Initiative 2018). The cornerstone of a developed, fully-fledged capital market is built on solid infrastructural and institutional fundamentals. The Polish market is perceived as well-functioning and the largest stock exchange in the CEE region. Nevertheless, its current condition, and regulated stock market primarily (Main Market, which in the first place affects the condition of the whole exchange), give many signals of concern and highlight areas for essential and possible improvement. Similarly, the regulated bond market calls for improvement in size, the number of issuers, liquidity, recognizability, and market stability (Rada Ministrów 2019). It struggles with scant transparency (Masztalerz 2016; GPW 2020c), corporate disclosure issues (Kurek and Górowski 2019; Comporek 2017; Szymański and Kocemba 2013), and other capital market misconducts and abuses (Płońska 2014; Ochman 2014). This results in a lack of common trust and confidence in the local capital market, up to the degree to make its improvement the top priority of SRRK (Rada Ministrów 2019, 10,12). CMDS, the first Polish strategy of that kind, crafted in cooperation with EBRD and EC, is a

response to that call, targeting impediments hindering the market growth (Ministerstwo Finansów 2020). Additionally, in 2020, GPW initiated the implementation process of the new 'Code of Best Practice for GPW Listed Companies 2021 (DPSN 2021)' (GPW 2020a, 2020b). Poland's economy and capital market in the previous two decades advanced significantly, in size and complexity (Minister Aktywów Państwowych 8/5/2020b). Capital market's institutions, infrastructure, instruments, and investors advanced as well (Czerwińska and Nowak 2018, pp. 7–8). There were national strategies formulated and implemented (Rada Ministrów 2019, 2017). This motion, along with the new EU-level capital market legislation ('securities regulation' (Warren 2003)) has subsequently influenced the acceleration of the work on amendments to the capital market-related legal framework ('prawo rynku kapitalowego' (Chłopecki and Dyl 2019)) on a national level (Moskała 2020). Predominantly, commercial law (as core legislation the Commercial Code that urgently necessitated to be modernized and adjusted to the current business environment (Deloitte Polska 2020)) and other entrepreneurial-related acts as well (Minister Aktywów Państwowych 8/5/2020a, 8/5/2020b). Additional amendments are highly needed in legislative and regulatory acts concerning the financial market, especially the capital market. This direction towards advancement and catching up with developed market standards is primarily induced by the EU member state obligations (including MAR, TD and SRD and other CMU-related legislation and delegated acts, ESMA guidelines) and the reclassification of the Polish market from emerging to developed (FTSE Russell 2018; Vienna Initiative 2018).

There have been the most pressing challenges and impediments, obstacles, and barriers for the development of the Polish capital market on the national and EU levels explored (Vienna Initiative 2018; Rada Ministrów 2019, 2017; EBRD 2019a). Structural concerns are e.g. limited size, turnover, liquidity, insufficient investors' base, small size, and low free float of PTCs, lack of overall strategy for the capital market (CMDS - 2019), modest individual savings. Regulatory issues are among others: lack of ' principle of proportionality ' in legislation, high volume and complexity of legislation and rules, labile milestone regulations, regulatory overload, excessively burdening harmonization, ESMA's narrowing interpretations, limited access to knowledge, the inadequacy of regulatory solutions, unrealistic timing of adaptation, lack of elasticity. On a national level, there can be mentioned obstacles such as lack of comprehensive publicly available database with corporate disclosure of PTCs from the regulated market, low quality of disclosures, lack of 'capital culture' and relatively new and therefore limited 'corporate governance culture', lack of experience in financial and non-financial PTCs reporting due to the emerging status of the market and recent integration with more mature EU

markets, obstacles faced by FMIs (Financial Market Infrastructures), including brokerage houses (in key areas, initial/secondary public offering, market making, analytical coverage).

There are also taxation-related problems (primarily lack of incentives) and supervisory issues (predominantly difference in NCAs quality (Bhatia et al. 2019)) lengthy acceptance and authorization procedures, strict interpretations of regulations, high regulatory and enforcement risks (unpredictable changes and actions). Culture-related problems such as widespread financial illiteracy, lack of education programs, lack of confidence, and trust in market infrastructure and financial institutions. The main problem is also lack of incentives and minor attractiveness of stock and bond corporate financing for national and foreign PTCs, making capital market finance insignificant in comparison with other forms of corporate financing, which in turn is resulting in negative effects which do influence growth, its acceleration, and stability and competitiveness of the economy (Vienna Initiative 2018; Rada Ministrów 2019; Lehmann 2020). Trust and confidence in the market are vital, as well as attractive and diverse investment opportunities, diversification of investors, and financial literacy of market participants (Bruno and Drexler 2016). Without market integrity, transparency, high-quality corporate disclosure, adequate information accessibility, and availability, and a suitable legal and institutional framework, advancement or even sustaining the status quo of the market will not be possible. Both national and global market participants and stakeholders find the Polish market lacking trust and transparency (IRP et al. 2019; Rada Ministrów 2019; U.S. Department of State 2021) with a ‘ huge information gap ’ (Sroka 2018, p. 71). It needs to catch up with transparency and the market regulatory environment that characterizes advanced markets, to be treated as such (World Bank 2020b). As a developing pioneer in CEE (FTSE Russell 2018), it shall lead by example among CEE less mature, emerging markets. SOR and CMDS have settled new cultural, corporate, legal, institutional, and investor-related priorities targeting obstacles and challenges impeding growth and maturing of the Polish capital market. Nonetheless, without trust, mitigation of information asymmetries and other transparency-related elements enabling the proper functioning of the market, as orderly, fair, efficient - CMDS’s benefits would not be reaped (Rada Ministrów 2019; EBRD 2019a). Polish capital market quality and infrastructure, though developed enough to be eligible for FTSE’s reclassification, still need advancement to be comparable with the West (Ramotowski 2018)..

2 Corporate Disclosure and Economic Growth

2.1 The Role of Information on Financial Markets

2.1.1 The Informational Environment of Contemporary Financial Markets

The birth of informational economics (IE) was described by the Nobel Prize winner Stiglitz as the information revolution (Stiglitz 2017, p. 19) due to the substantiality of its contributions to 20th-century economics (Stiglitz 2000). Consequently, informational considerations have caused a paradigm shift in economics, bringing a revolution in economic thinking and policymaking (Stiglitz 2002, 2017). As a science, IE introduced information as a central consideration for markets and economies, overturning long-lasting fundamentals, proving them incorrect or nonexistent in the real-world markets (Stiglitz and Grossman 1980; Greenwald and Stiglitz 1986; Stiglitz 2017, 1981a). Thus, the presumption of market efficiency in the form of the a) Efficient Market Hypothesis (EMH) or Perfect/Ideal Markets were proven nonexistent and become bygone (Stiglitz 2000; Greenwald et al. 1984; Stiglitz 2004; Greenwald and Stiglitz 1986). Informational imperfections and failures (IIaF), so pervasive in the real-world markets (mainly information asymmetry (AoI) manifestations and epitomes) become fundamental (Löfgren et al. 2002; Greenwald and Stiglitz 1986; Stiglitz 2017; Stiglitz and Weiss 1983; Akerlof 1970; Spence 1973; Shiller 2003). Informational considerations become an indispensable component for considerations of viable and properly functioning markets (Stiglitz 2017; Stiglitz and Grossman 2011; Stiglitz 1981a, 1999). IE has exposed and evidenced a) the impossibility of the existence of informationally efficient markets (Stiglitz and Grossman 2011, 1980; Löfgren et al. 2002; Akerlof 1970; Akerlof and Shiller 2015); b) the absence of a complete set of risks; c) the permanence of imperfect information; and d) the persistence of imperfect competition (Greenwald et al. 1984; Stiglitz 2017, 2002). It gave birth to evidencing behavioral phenomena related to IIaF, such as strained investors' rationality and deep informational distortions, proving EMH and complete market rationality to be highly limited or impossible (Czupryna et al. 2015; Stiglitz 2017; Shiller 2003, 2016; Shleifer 1999; Grossman 1980).

The perfect market was defined by Fama as such a market in which "(...) prices provide accurate signals for resource allocation (...) security prices at any time fully reflect all available information" (Fama 1970, p. 383). The EMH is attributed to Fama (Fama 1965) and Samuelson (Samuelson 1965) (Lo 2015), simultaneously yet independently, with divergent explanations of the phenomena of the random character of stock prices (Delcey 2017). L. Bachelier presented the possibility of the existence of the concept of informally efficient markets by a strictly

scientific approach, yet with an understanding highly similar to the contemporaneous (Buła 2014). It stated that past, present, and even discounted future events are incorporated/mirrored in stock prices (Bachelier 1900/1967, p. 17). It also discussed the mathematical formula describing Brownian motion (the concept over time becoming known as a random walk in stock prices (Fama 1965) (Elton et al. 2010, p. 411). The EMH, market behavior, and valuation set by Bachelier (Kumar 2016; Buła 2014; Bernstein 2012) were followed by Cowles, Jones, Kendall (Cowles and Jones 1937; Kendall and Hill 1953), Cootner, Samuelson (Cootner 1967; Samuelson 2016), and Fama (Fama 1970, 1991, 1965). According to the EMH, if the current stock price fully mirrors all available information instantaneously, this results in the elimination of the possibility of obtaining any extraordinary gain/excess return with publicly available information (Elton et al. 2010, p. 410; Fama 1970; Sewell 2011). The EMH attained both recognition and critique (Stiglitz 2004) while being a central premise of finance, labeled amongst most controversial (Sewell 2011, 2012) as it asserts that once information arises, the news is disseminated rapidly and subsequently incorporated into the prices of securities, all without any time lag (Malkiel 2003). The information set (Sewell 2011, p. 2) is incorporated in a real-time process, in an unbiased manner, providing unbiased/identical estimations of underlying values (Basu 1977). Revising his work, Fama expanded the market efficiency definition, admitting the "positive information and trading costs" (Fama 1991, p. 1575), underlying EMH usefulness as a reference point and providing new classification (Fama 1991), however not gaining as much popularity as the previous one (Buła 2014, p. 155).

The EMH has experienced considerable changes due to the search and model for actual, real-world market mechanisms, encompassing costly information and the influence of agency (Elton et al. 2010). Overall, tests for the validity of the EMH revealed disaccord (Sewell 2011). Information matters were challenged: since information is costly, prices of securities could not perfectly incorporate or reflect the available information, thus fully informationally efficient markets are nonexistent in practice (Beja 1977; Stiglitz and Grossman 1980; Tirole 1982). Information, as proven costly, only allows actual market prices to reflect imperfectly the information possessed by informed parties, with such prices not reflecting the true value of a company, so affecting market participants, managerial, and company behaviors (Stiglitz 1981a). In reality, the transaction costs are extensively impactful and genuinely inescapable, not feasible to be omitted or eliminated (only managed) (Kociński 2014; Amihud and Mendelson 2013; Kim and Viens 2012; Fabozzi et al. 2005). Being a) a considerable determinant of investment performance and asset allocating activities; b) an integral constituent of market microstructure; c) an explanatory element for phenomena in the finance theory - must

be considered to understand the mechanisms of a financial system, cannot be neglected in the transaction and dynamic portfolio modeling, analysis, and efficiency assessments (Dempster et al. 2006; Kociński 2014; Czekaj et al. 2001; Garleanu and Pedersen 2013). Heterogeneous beliefs on equity prices, differences, volatility, fluctuations in investors' opinions, their beliefs dispersed, exhibit speculative motives, and various risk-taking types (Mei et al. 2009), affecting capital market efficiency.

Perfect markets failed to embrace evidenced manifestations of IIaF and externalities arising, being incapable to model real-world markets (Stiglitz and Grossman 1980; Greenwald and Stiglitz 1986; Stiglitz 2017, 1981a). The Fundamental Inefficiency Theorem explains that even when expectations are rational if risk markets are incomplete, the market equilibrium will be inefficient (Stiglitz 2010), and the Informationally Inefficient Market Paradigm shows that actual financial markets cannot be informationally efficient (Stiglitz and Grossman 1980, 2011). Thus, the real world is most appropriately described by so-called mixed models, embracing IIaF (Stiglitz 2017, p. 18) (Greenwald and Stiglitz 1986). IIaF, particularly asymmetry of information (AoI), breed market deficiencies and even market failures (Dari-Mattiacci et al. 2021; Akerlof 1970; Stiglitz 2017), and other severe economic and social disruptions (Stiglitz 2002, 2004). Before IE (Stiglitz 1981a, 2002, 2004, 2017), economic theorists undervalued the discussion on information considerations with many significant resolutions of economic theory not being robust to considerations of imperfect information (Rothschild and Stiglitz 1976). Manifestations of the information constraints have been the subject of multiple research (Stiglitz and Grossman 2011, 1980; Stiglitz and Weiss 1983; Stiglitz 1985). Fundaments for the Modern Theories of Markets with Asymmetric Information undeniably altered the way economists consider the functioning of markets (Löfgren et al. 2002). They were laid by Stiglitz, Spence, and Akerlof (Spence 1973; Akerlof 1970) and continued by the latter and Shiller (Akerlof and Shiller 2015, 2010). IIaF revealed themselves as phenomena that could offer consistent, dependable clarifications for numerous unsolved issues of macroeconomic behavior (Greenwald et al. 1984; Stiglitz 1985, 1975). Whensoever there is an AoI present, markets are not efficient (Greenwald and Stiglitz 1986). Thus "Economics of Imperfect Information" (Rothschild and Stiglitz 1976) depicts markets with incomplete information, particularly financial ones with AoI most evident and powerful (Wilson 1977) (Brealey et al. 1977). Along with considerations of related informational (Dhaliwal et al. 2019). Actual financial markets are not free from diverse imperfections (Chevalier and Scharfstein 1994), affecting their functioning, primarily efficiency (Falkinger 2014). Thus, short of adequate information transfers, they perform poorly, amplifying

informational divergences between buyer and seller side, severely noticeable on capital markets (Brealey et al. 1977). IIaF bears implications for macroeconomic stability, financial markets ruling, regulations, and corporate governance (CG) (Stiglitz 2017; Greenwald et al. 1984). It results in the occurrence of pervasive and influential phenomena dominating financial markets built on AoI, conflicts of interests, governance issues, decision-making limitations, adverse selection, and moral hazard (CFA Institute 2016). In the neoclassical economic theory, financial markets are an indispensable linkage between producers and consumers (Zalega 2014). They provide signals for decisions on the right investments. If individuals did not possess any information on events and investment opportunities (relative probabilities and merits), prices would be accidental and random, hence financial markets would be deprived of their role in allocating investments (Stiglitz 1981b). There are two opposing perspectives on information on contemporary financial markets. First, a well-functioning market with value-reflecting prices makes no incentives for acquiring and obtaining information, with a consequence of the non-existence of informed market equilibrium (Stiglitz 1981). Second, by providing a pure exchange market, incentives for the acquisition of information are strong; if one gets into possession of information on the future occurrence of a given state of nature (rise vs. fall of prices on the stock), they can profit from the capital gain (Hirshleifer 1971). Key to understanding the operation of capital markets are a) an analysis of incentives for information acquisition, b) an examination of the degree to which the information of informed individuals is reflected in market prices, and c) an examination of the role that market prices play in shaping managerial behavior (Stiglitz 1981a). Other informational market disturbances and failures, along with overall market transparency and governance setting deficiencies, are highly influential on the execution of financial decisions (Stiglitz 2017; Stiglitz and Grossman 1980, 2011). Financial market transparency is an umbrella concept, in general equivalent, to the overarching concept of market robustness and viability (BIS 2019). There is a relation between the informational setting, understood as transparency, and economic growth. The creation of a transparent and fair financial market environment is especially crucial for the advancement of EMs (Lehmann 2020; EBRD 2008; IFC 2016; Albu et al. 2012). A transparent, fair, orderly capital market environment necessitates a prerequisite in the form of full and fair disclosure systems, addressed to all market participants, specifically capital providers, as their primary users (Levitt 1997; Sirbulescu and Tonea 2015; FASB 2010). The usage of regulated markets in the form of equity exchanges has historically delivered high levels of trade transparency (BIS 2019; FASB 2021).

Financial market processes and functions solidly rely on the phenomena of confidence in the integrity of market institutions and the concept of continuity of markets (European

Commission 2009; Siering et al. 2017a). Market confidence shall not be taken for granted, as it used to be in well-functioning financial systems, before it has vanished, due to disastrous market opacities, gaps in regulatory oversight, from doubtful to fraudulent accounting and risk management practices, and the weakness of governance (Group of Thirty 2009; Hogan et al. 2008a; Rezaee 2005; Rezaee and Riley 2010). Apart from features required for market robustness and maturity, there are drivers attached to capital market functions, e.g., high-quality, highly transparent, and vastly enforceable disclosure standards, internationalization, a wide pool of diversified investors, and efficient market infrastructures, playing a crucial role in the capital market advancement, its international competitiveness, and participation attractiveness (BIS 2019, p. iii). Corporate transparency, specifically credible corporate disclosure, is proven to affect local economic growth (Lu et al. 2021; Rezaee 2004; Narayanaswamy et al. 2017; Jain and Rezaee 2006; Albu et al. 2017). There are global frameworks and policy sets needed to provide safety and operational effectiveness. They include informational-related recommendations:

(a) greater market autonomy to foster capital market pricing and funding allocation, along with policymakers addressing and fixing market failures (including informational failures and other information imperfections (Stiglitz 2017; La Porta et al. 2006a; Hazen 2017)),

(b) strengthening supervisory, enforcement, legal, and judicial systems for investor protection, together with providing efficiency, fairness, consistency of supervisory, enforcement and legal proceedings, sanctioning breaches of duties, and easing access to legal recourse, as it lowers costs of private contract enforcement (Brown and Tarca 2005; European Issuers 2022; FEE 2001; Jackson and Roe 2009; La Porta et al. 2000),

(c) balancing issuers' costs and investors' protection via augmenting regulatory, supervisory, and enforcement independence and effectiveness. Improved investigative powers and quality of undertaken actions would facilitate the effectiveness of the enforcement of regulations and timely reactions to the market failures and other corporate misconducts and disclosure vulnerabilities. Capital culture and capital market investment environment can be strengthened via enhancing accounting and disclosure standards and systems, assisted with the promotion of best practices in corporate governance (BIS 2019, pp. i–iii; Hazen 2017; ESMA 10/22/2019; Farvaque et al. 2009; Farvaque et al. 2011; Gray and Fata 2017; Rezaee 2004).

Among the prominent differentiating features separating EMs from advanced ones are information availability and accessibility, institutional and economic size-associated characteristics, liquidity, nature of the market integration, and interactions with the financial system, the whole economy, and stakeholders (Bilgrami 1998; Laeven and Perotti 2001;

Narayanaswamy et al. 2017). Informational imperfections exist and occur on EMs extensively, resulting in lower transparency, governance, and accounting information challenges and deficiencies (Albu et al. 2012; Badu and Appiah 2018; Bae et al. 2004). To make local capital EMs internationally attractive and investible (Bae et al. 2004; Kaye 2003), an enhanced investment climate (World Bank 2016, 2004) and mitigated barriers and limitations for cross-border investment, foreign ownership (Bekaert 1995b; Bekaert et al. 2003) are needed. Advances in financial market transparency, including investor protection rights and high-quality corporate information, are required (Albu et al. 2012; Laeven and Perotti 2001; EBRD 2019). Accounting and auditing standards are the backbone of a wide-ranging public involvement (Levitt 1997; Guiso et al. 2008; Rezaee 2004). Market efficiency and transparency are derived also from the shape of smart rules and regulations that may encourage investing (CMA 2015; Bhatia et al. 2019; Oteh 2016). Without transparency and trust, investors and other market stakeholders are not willing to participate in capital markets (Guiso et al. 2008; Giannetti et al. 2002; Giannetti and Wang 2016). Willingness to participate in the capital market builds a broad and diversified investor base (Levitt 1997; Narayanaswamy et al. 2017). This provides liquidity, depth, stability, better asset pricing mechanisms, efficient allocations, and pressure for suitable disclosure and high-quality accounting standards, that result in mitigation of informational imperfections (primarily information asymmetries) and help to enhance fairness and market vitality (BIS 2019).

Transparency affects the economic growth of EMs significantly (Mendonca and Calafate 2021). Corporate transparency can be designated with the quality and availability of corporate information (Bushman et al. 2004; Francis et al. 2009). Its local transparency is assessed with measures constructed of readability (Li 2008), specificity (Hope et al. 2016), conciseness (Franco et al. 2015), and non-boilerplate disclosures (Lang and Stice-Lawrence 2015), and how it forecasts national economic growth (Lu et al. 2021). A local corporate transparency environment encompasses the quality of accounting information and facilitates the efficiency of local assets allocation (Francis et al. 2009). Relevance or informativeness of accounting disclosure, for the viability of the local real economy and macroeconomic outcomes, is evidenced in the literature, e.g., as an indicator for the local GDP growth (Konchitchki and Patatoukas 2014b, 2014a). Transparent local corporate disclosure not only mitigates AoI but also uncertainty, fostering local corporate economic activities (a substantial component of economic growth) and contributing to overall local economic growth (GDP). Thus, it is crucial for a robust local information environment and is advantageous to local economic growth (Lu et al. 2021).

2.1.2 The Ubiquity of Information Asymmetry and other Information Failures on Modern Financial Markets

The AoI is a key determining factor of international capital flows and returns (Albuquerque et al. 2002). It occurs because of the divergence in information between informed and uninformed traders or parties (Ghafoor et al. 2019; Schwarcz 2011b, 2010). The concept of AoI is ubiquitous, in practice and multidisciplinary literature, as it depicts the foundation of a) corporate entity (separated ownership and control) (Berle and Means 1932; Jensen and Meckling 1976; Fama and Jensen 1983), b) corporate disclosure (Farvaque et al. 2009; Healy and Palepu 2001; Lambert et al. 2012), and c) management literature (Bergh et al. 2019). Economic theory on AoI, as "the Lemon-problem" (Schwarcz 2010, p. 448), is a state in which one party (in a relationship or a given setting) has more or superior information compared to another (Akerlof 1970). The phenomenon is fundamental to organization theory (Paruchuri and Misangyi 2015), organization behavior (Brodbeck et al. 2007), international entrepreneurship, and global business (Cuypers et al. 2015; Cuypers et al. 2017), entrepreneurial processes (Eckhardt and Shane 2003), corporate social responsibility (McWilliams et al. 2006), strategic management and HR management (Bergh et al. 2008; Gomez-Mejia and Balkin 1992; Martin et al. 2013), and managerial conduct and behavior theories, power theories, specifically managerial fraud theories (Choo and Tan 2007a; Albrecht et al. 2004; Abernethy and Vagnoni 2004; Pepper and Gore 2015; Albrecht et al. 2015). The contingencies, challenges, and prospects shaped by AoI are constitutional elements of theories on the agency (Jensen and Meckling 1976; Fama and Jensen 1983; Pepper et al. 2015), behavioral agency (Wiseman and Gomez-Mejia 1998; Pepper and Gore 2015) (Pepper et al. 2015), resource-based and resource-dependence (Barney 1991; DiMaggio and Powell 1983), signaling (Spence 1973; Löfgren et al. 2002), transaction cost economics (Williamson 2010; Amihud and Mendelson 2013) and corporate executive crime and deviance (Coleman 1987; Amiram et al. 2018; Choo and Tan 2007a; Albrecht et al. 2004; Albrecht et al. 2019; Camfferman and Wielhouwer 2019). Capital market information failures may further be intensified, and more likely to occur, when material informational imperfections exist (Schwarcz 2011b). Primarily they manifest themselves in a form of an AoI per se or no information (asymmetric lack of information) (Dari-Mattiacci et al. 2021; Hughes et al. 2007; Healy and Palepu 2001, 2001; Akerlof 1970; Stiglitz 2017). It can take any form of an informational advantage or informational superiority of either party in a contractual relationship (Chrisidu-Budnik 2020; Dari-Mattiacci et al. 2021). According to

classic models, regarding AoI criterium there are heterogeneously informed traders: liquidity traders and informed traders (who establish and exploit a private information advantage) (Glosten and Milgrom 1985; Copeland and Galai 1983) and market makers experience losses when trading with the latter (Ghafoor et al. 2019). As an informational advantage can occur on either side of a transaction, i.e., only one of the parties is knowledgeable (Kronman 1978), or has a general informational advantage (company, market, or macroeconomic level) ready to exploit (Damodaran 2002, 112-151; Albuquerque et al. 2002). There is the informed seller - the market for lemons (Akerlof 1970) and the uninformed seller - the market for gems (Dari-Mattiacci et al. 2021; Kronman 1978) as two variants of adverse selection, dual to one another, both disadvantageous to social welfare as opposed to the ideal world, when buyers and sellers, are both knowledgeable or sufficiently informed and all prices reflect fully an actual quality (Dari-Mattiacci et al. 2021). Investors who are capable of establishing advantages, such as a cost advantage in information collection or transaction costs, would be more capable of making use of small inefficiencies than those who do not have this kind of advantage. This implies that investors who seek to establish cost advantages, particularly concerning information, might be able to generate excess returns through these advantages (Damodaran 2002, 112-151).

Numerous active market participants make efforts to benefit from the information at their disposal, as they are motivated by benefit opportunities. They attempt to make use of the slightest informational advantage which is at their disposal (actually or perceivably), whereas undertaking such acts, they incorporate their information into stock market prices and swiftly eliminate the profit occasions and opportunities that initially motivated their acts and behaviors (Lo 2015). AoI and its consequences are intensified by the erosion of investor protection, limited financial literacy, and the bounded rationality of investors, proven to be a strained paradigm of well-informed and confident investors (Kingsford Smith and Dixon 2015; Farvaque et al. 2009). Also, deficiencies in overseeing on behalf of the public, in systematized approach and frameworks to prevent and detect market information failures (misconducts) are rooted in an AoI or unequal power between originators and investors (Albrecht et al. 2015; Albrecht et al. 2004; Albrecht et al. 2019; Association of Certified Fraud Examiners 2018). There are divergences among market participants in their potential for establishing informational advantages and feasibility, probability, means, motivations to exploit them once established, various degrees of information superiority among advantaged parties, private information, and insider information in many forms and gradations (Coval and Moskowitz 1999; Grinblatt and Keloharju 2001; Damodaran 2002; Bailey et al. 2004; Ivanitsky and Tatyannikov 2018). As the AoI can occur at any moment of information processes collection,

processing, dissemination, and usage (Stiglitz 2017), it is not only an issue between the originator and the investor side (Schwarcz 2004, 2010, 2011b) but other market participants as well, e.g., market infrastructure elements and services (Kingsford Smith and Dixon 2015; Schwarcz 2010). Alterations in information volume and information processing capability may segment investors by nationality (Bailey et al. 2004). The evidence on local versus foreign investors' (FI) informational superiority is mixed: superior information processing capability of FI (Grinblatt and Keloharju 2000; Bailey et al. 2004), FI experiencing hardships in generating and interpreting information (French and Poterba 1991), familiarity, proximity, and home bias (Coval and Moskowitz 1999; Kang and Stulz 1997; Coval and Moskowitz 2001), divergence in informational endowments with a conventional opinion on local investors having cumulative information advantages concerning the domestic market (Brennan and Cao 1997), as exhibited i.a. in domestic holdings (French and Poterba 1991, p. 222). However, the global factor in private information was found opposing the view on international capital market investors trading on country-specific knowledge (Albuquerque et al. 2002). AoI is persistently present in all markets, thus far targeted with mitigating means, such as high-quality, usable, mandatory corporate disclosure (CD), and high-quality corporate governance (CG) systems (Hopt 2000; Pachucki and Plutecki 2018; Hopt 2011) and recent technological advancements in publicizing CD (employing structured data formats available via public access points (La Torre et al. 2018; ESMA 2020; SEC 2021)). This seems promising to become a breakthrough and a milestone in reducing AoI and its consequences in both emerging and developed markets (Liu et al. 2017; C/2020/7535 2020; Beerbaum and Piechocki 2016). However, imposing CD obligations is proven to be not sufficient to reduce AoI and prevent CD misconduct (Farvaque et al. 2009).

The history of CD, CG, and exploitation of AoI can be described as a history of corporate scandals (Coffee 2005; Reinhart and Rogoff 2009; Hopt 2011). Therefore, AoI (with its most imperative results relevant to the financial market - moral hazard and adverse selection (Balakrishnan and Koza 1993)), creates a fertile ground for managerial optimism, overconfidence, ethically doubtful behaviors, disadvantageous and unfavorable conduct, short-termism, failure to exercise due diligence, negligence, breakage of fiduciary and related loyalty duties, up to legally illicit behavior, unlawful misconduct, and outright fraud (Schwarcz 2011b, 2010, 2004; Ben-Shahar and Schneider 2010; Farvaque et al. 2009). Such misconducts used to be considered as a piece of evidence of the failure of the given models of CD and CG, that are not sufficient to counteract the risks of manipulation of information, inadequate, deficient, not-usable, or misleading disclosures (Farvaque et al. 2009; Ben-Shahar and Schneider 2010; Amiram et al. 2018). Most academic definitions of CD encompass targeting the AoI and

elaborating on how it is addressed with it (for a review of such definitions, see Table 2 in (Farvaque et al. 2009)). AoI, corporate disclosure, performance, and misconduct are multifariously interrelated (Healy and Palepu 2001; Lambert et al. 2012; WELKER 1995). Its heightened occurrence on capital EMs is a separate field of research, due to divergence from mature markets, heterogeneity of local specificities, and distinction of outcomes amongst this group (Ghafoor et al. 2019; Drábková 2018; Martins 2003).

2.1.3 The Capital Market Informational Efficiency of the CEE Economies

The aforesaid information failures gave rise to market-induced and governmental-introduced responses (MiGiR) targeting them, as mature markets are expected to function as properly, orderly, and efficiently as only feasible, as a result of those solutions mitigating disclosure failures (SEC 2019, 2017; La Porta et al. 2006a; Hazen 2017). As society typically responds to market failures by developing institutions and contracts (Stiglitz 2004) (Stiglitz 2017), guarantee-related schemes, or sorts of governmental or private sector certifications of quality (Schwarcz 2010). The prime position of the MiGiR on mature markets (MMs) to information failures is held by full and fair disclosure systems (all phases, elements, incl. external environment) (Levitt 1997; Ezzell 2003; Hail and Leuz 2006; Lander and Auger 2008; Hopt 2000). Adequate CD and CG may enhance the "overall information environment", eventually mitigating the information failures related to market participants' lack or deficiency of timely or correct information (Han et al. 2014; FASB 2010; Hermalin and Weisbach 2007). In MMs, securities regulations used to be focused exclusively on full disclosure (Hazen 2005) or had it at their heart (Ferrell 2007). Yet, even on MMs, the disclosure as an exclusive, sole remedy to mitigate AoI, CD misconduct, and conflicts of interests between the originating parties and users, with time, was found insufficient to address it satisfactorily (Kingsford Smith and Dixon 2015; Farvaque et al. 2009; Sirbulescu and Tonea 2015). Due to the multifarious convolution and complexity of CD, e.g., its cognizant and temporal complexity, volume, CD was found frequently ineffective or diminishingly effective, as it still allowed for information failures and misconducts in markets, revealing that current CD is "necessarily imperfect" and unsatisfactory to overcome them (Schwarcz 2011b, 2010; Ben-Shahar and Schneider 2010). This induced a reconsideration of the disclosure paradigm of capital market/securities laws (questioning the continuity of exclusive or sole reliance on disclosure, requiring supplemental protections to minimize CD misdeeds or mitigate their consequences (Schwarcz 2010)) (Farvaque et al. 2009; Ben-Shahar and Schneider 2010). Further, the complexity and

convolution of the CD can be intentional and employ concealment, e.g., considering deliberate manipulative, fraudulent accounting transactions, making disclosure itself inadequate to communicate the essence of transactions and activities (Schwarcz 2004, 2011b; Farvaque et al. 2011). There is vast empirical evidence on the failure of the obligatory disclosure regime in informing market participants and enhancing their financial decisions (for a review see (Ben-Shahar and Schneider 2010)).

Research attempting to assess the capital market informational efficiency (CMIE) presents results in line with findings of behavioral economics, exposing instances of lack of, or limitations to, informational efficiency in markets or occurrences of periodical or sectoral/segmental inefficiencies (Czekaj 2014; Kszczotek et al. 2021; Shiller 2016). Significant from the perspective of EMs is a fact of an increase in the CMIE, observed along with their advancement and growth (Czekaj et al. 2001). The advancement towards the CMIE over a given time frame has been observed, and stock return predictability is to be justified within the outline of the AMH (Lim and Brooks 2011). Empirical CMIE of EMs is a distinct segmented field of research, as they diverge from MMs, heterogenic local specificities amongst EMs, discrepancies amid findings on their efficiency (Mobarek and Fiorante 2014; Jamróz and Kilon 2015; Claessens 1995). Substantial divergences in CMIE were discovered amongst the EU Member States as well (Borges 2010). EU transitional states are economically significant, yet merely developing cross-border capital culture, are a distinctive subgroup within the EU, also regarding fledging high-quality, internationally acknowledged CD, CG, and its enforcement framework (Farkas 2011; Albu et al. 2020; Nicolae Albu et al. 2021; Albu and Albu 2012; Albu et al. 2012). The higher degree of investors' irrationality (inability to valuate assets) in EMs is signaled (Victor Dragota et al. 2009). They are represented by code-law legal traditions, concentrated ownership, unfavorable investor protection, poor enforcement, and inadequate regulatory quality (Albu et al. 2020). They are perceived as rather corrupted, deficient in government performance, shallow, immature capital markets, with disparities between law development and law enforcement, limitedly reliable and credible CD and CG systems, unsatisfactory protection of shareholders' and creditors' rights (Albu et al. 2017; Albu et al. 2014; Albu et al. 2012). It generates divergent challenges and a low, unfavorable information environment of EMs (Verrecchia 2001). EMs do exhibit larger potential for AoI, CD failures, and their exploitation by various parties via a higher likelihood of capital market- and specifically CD-related risks and failures (Narayanaswamy et al. 2017; Hopt 2000; Albu et al. 2012; Ivanitsky and Tatyannikov 2018).

Information is easier to acquire and interpret once capital market institutions are vastly developed and set in an adequately regulated environment (Bailey et al. 2004; Farvaque et al. 2009). A high degree of AoI, CD failures, poor CG, and enforcement on the EMs, together with influential local underdevelopment and specificities - offer a unique setting to explore the effects of institutional characteristics on the CD and CG-related advancements (Ivanitsky and Tatyannikov 2018; Ghafoor et al. 2019) and the so-called westernization of CD enforcement systems on EMs (Nicolae Albu et al. 2021). Yet, one-size-fits-all CD regimes, universally optimum level, the content of CD and frameworks are rather untenable (Farvaque et al. 2009).

As information stimulates trading activities on capital markets (Kim and Verrecchia 1994; Wang 1994), a credible, reliable informational environment is a precondition for the development of local capital EMs (Narayanaswamy et al. 2017) (Verrecchia 2001). There are pioneer attempts to investigate the effect of fraud announcements on AoI in EMs, bringing forthright evidence on corporate fraud-AoI association (Ghafoor et al. 2019). On transitional capital markets, the excessive volatility rooted in AoI and ineffective market control generate obstacles for advancement, market transformations, and institutional changes, creating additional conditions for financial fraud and manipulation (Ivanitsky and Tatyannikov 2018; Reurink 2016). In underdeveloped markets, corporate activities are problematic, also considering the costs of dishonesty as related to the interaction of judging quality differences in prospect purchases and uncertainty (Akerlof 1970). Cause-and-effect associations between poor, limited reliable and credible capital market information, lack of capital culture, lagged legal and institutional framework, heightened risk of AoI, CD failures, the magnitude of their consequences, the likelihood of exploitive misbehaviors are particularly affecting EMs, prone to occur there as corporate misconduct (Reurink 2016; Schwarcz 2011a; Schwarcz 2011b; Ghafoor et al. 2019; Hazen 2017).

2.2 Globalization and Internationalization: Harmonization and Standardization of Accounting System and Corporate Information Framework

2.2.1 Local Specificities as Limiting Factors for Financial Market Globalization and Integration

Financial market integration (FMI) is directly linked to economic growth (Obstfeld 1994). The globalization of financial markets affects the real economy as well (Bekaert et al. 2003) (Henry 2003). Capital market growth is influenced by the temporary and permanent effects of financial openness (FO) and other macroeconomic growth components (Bekaert et al. 2009). There are real and financial effects of this openness identified, with a core focus on

equity market impacts (Bekaert and Harvey 2003). Financial market segmentation (FMS) is the opposite of FMI (Bekaert and Harvey 2000a) and distortions occur if a market is segmented (Obstfeld 1994). The more problematic it becomes if, as typical for EMs, the financial market is small, the number of issuers and securities is modest, investors' base and diversification opportunities are limited, thus, segmentation straightforwardly induces an inefficiency (or at least reduced efficiency) of allocation of productive resources (Bekaert and Harvey 2000a). That is, FO is related to the allocative efficiency and productivity of the real economy (Bekaert et al. 2009). Globalization, as related to asset prices, has two aspects, financial integration (FI) and economic integration (EI), both in de jure and de facto forms (Bekaert 2006). De jure FI is described as capital account openness or liberalization (Quinn and Toyoda 2008) and equity market openness (Bekaert et al. 2001), while facto FI as capital flow data (Bekaert 2006). Globalization is influential to asset prices in country-specific aspects and distinct degrees and mixed intensity (Bekaert and Wang 2009). The financial development stage and quality of institutions differ among countries too, affecting productivity growth responses (Bekaert et al. 2009). A grand advancement occurred in the elimination of capital controls (inflows and outflows) in both MMs and EMs, yet despite the formation of a gradually integrated and financially liberalized world, meaningful FMS prevails, specifically regarding capital markets (Dhaliwal et al. 2019; Giannetti et al. 2002; Bekaert et al. 2011).

Equity market liberalization (EML) is conducted in numerous ways and is local-specific, as countries have taken diverse routes for EML (Bekaert et al. 2003). The world and local information capture changes in the level of FMI: the more segmented EMs are, the more influential local factors are; the more integrated, the more it is affected by world information (Bekaert and Harvey 2000a). Apart from global segmentation factors, local segmentation factors are proven to perform a significant role in equity market segmentation (EMS), with the latter enduring meaningfully more in equity EMs (Bekaert et al. 2011). Country specificities are found to be a decisive segmentation factor, defining the level of integration of a local market with international financial markets (Ball 2006a, 2016). Specifically, “Four Cultures” (business and financial, accounting, auditing, and regulatory cultures) are what substantially differentiate countries; cumulatively being a disrupting factor for authentic global convergence (Zeff 2007). World FI may not be easily or comprehensively feasible to materialize, as there is a primacy of local factors to shape national financial markets, especially equity, and furthermore less mature and less internationalized ones (Ball 2006a). Globalization on financial markets is a compelling force, yet encounters substantial limits as a result of economic and political forces having a local nature, being most impactful on capital markets and CD (Ball 2016, 2006a). Together,

with other country-specific factors, they shape capital culture, corporate environment, and market participants' undertakings, and corporate behaviors (incl. occurring CD behaviors and its preparers' and enforcers' incentives) – even in the 21st c. remaining local altogether (Ball et al. 2000; Ball et al. 2003; Leuz et al. 2003; Bushman et al. 2004).

Local factors are not only direct barriers to FMI but are a considerable source of disparities (both factual and perceived) (Zeff 2007; Bekaert 1995a; World Bank 2004, 2020) and increasing competition (Ben Slimane 2012; Bagheri and Nakajima 2004; Hopt 2000). It is on a country, market, and stock exchange level, as exhibited by investability, ratings, investment climate grades, and various amid countries, regardless of jointly shared globally accepted codes, rules, standards, bodies, technology, stock exchange infrastructure, and transaction technologies (OECD 2004; World Bank 2020, 2016). There are prevailing disparities within regions (Carrasco et al. 2014; Ponomarenko et al. 2018), up to within the CMU, there are discrepancies amid local markets, regarding attractiveness as capital destinations (Bhatia et al. 2019). Those disparities are seen as necessitating a reversal or mitigation (Hudecz et al. 2020). Indigenousness of business, financial, and regulatory aspects impedes global integration and comparability (Zeff 2007), so does country-defined company law (Hopt 2000). Accounting is also understood as a social and institutional practice (Hopwood 1994a) and it follows diverse patterns in diverse parts of the world (Gray 1988). Social institutions (Seumas 2019) impact capital markets and shape market participants' behaviors, incl. accounting and CD practice, at the same time, as often local in nature, breeding discrepancies amid countries (Guiso et al. 2008, 2003; Ramamoorti 2008), e.g., religiosity of corporate figures (Adhikari and Agrawal 2016; Grabiński and Wójtowicz 2022, 2019), financial, accounting, anti-fraud education (Rezaee 2004; Rezaee et al. 1997; Monroe and Woodliff 1993; Rezaee et al. 2004; Schwartz and Ketz 2004), corporate and accounting ethics (Agarwalla et al. 2017; Albrecht et al. 2006; Dedoulis 2006; Berrone et al. 2007), work (Bowles and Cooper 2012), financial media (Bednar 2012; Coffee 2019; DYCK et al. 2010), law (La Porta et al. 2006b; Bhatia et al. 2019), politics and economy (Ball 2006a, 2016). Culture, a social institution as well, exhibits cross-national variances and it, as a nexus of societal values, impacts capital markets extensively, specifically accounting/CD practices (Gray 1988; Salter and Niswander 1995; Zarzeski 1996; Chui et al. 2002; Hope 2003; Doupnik 2008; Kwok and Tadesse 2006; Radebaugh et al. 2006).

The FMI induces a wide range of benefits (Errunza and Losq 1985) (Henry 2000b, 2000a; Bekaert and Harvey 2001), but it encounters limits, barriers, exhibits heterogeneity among countries, and generates unequal outcomes (Dhaliwal et al. 2019; Bekaert and Harvey

1995b; Bekaert et al. 2003; Ball 2006a). Incomplete FMI display information-related frictions among markets (Bekaert and Harvey 1995a; Bekaert et al. 2003; Bekaert et al. 2002; Bekaert et al. 2013, 2011). Despite the reductions in barriers for international investments (e.g., opaque markets, capital controls, various costs), preference for familiarity, Stay-at-Home-Shareholders (Weldon 1998; Huberman 2001), larger, culturally, and geographically closer companies, language- and culture-closeness prevail (Coval and Moskowitz 1999, 2001; Ackert and Deaves 2010). Thus, the actual costs of collecting information and of trading, differ widely and extensively across capital markets (Damodaran 2002, pp. 112–151). As corporate information is a product of market processes and political courses, inclusive of liaisons amid parties involved in these notions, seeking maximization of their own expected utilities (Watts 1977; Watts and Zimmerman 1986; Ball 2006b), those processes are altering over time, driven by EI and FI movements, cross-border capital flows, determined by internationalization processes (Ball 2006b; AICPA 1994; Barlev and Haddad 2007). Accounting information systems are a consequence of global integration movements, as they serve and mirror the economic environment they provide for (Radebaugh et al. 2006; Iqbal et al. 1997; Epstein and Mirza 2000). The power of local economic and political forces demonstrates the limited ability of global convergence undertakings to completely overcome country-specific differences, particularly corporate information practice (Ball 2006b, p. 36, 2016). Full FMI is limited by lawmaking and cultural considerations as abovementioned, but further, also by monitoring, governance, legal, and enforcement practices being highly local in nature and of a great variety across countries (La Porta et al. 1997; La Porta et al. 1998). Nonetheless, as economic and financial issues shifted beyond the control of individual countries, transnational (supranational) actors are progressively influencing the global governance system (Lloyd et al. 2007; Buchanan and Keohane 2006). The transnational lawmaking and standard-setting aim to address quality uncertainties and coordination crossways the global economy, yet there are some dissonant views on the legitimacy and accountability of such out-of-state power or strictly private bodies (Lloyd et al. 2007; Richardson and Eberlein 2011). With globalized financial information (Amiram 2012), governance, lawmaking, and rules are often supranational (internationally accepted principles, standards, issued by supranational bodies and organizations) (Richardson and Eberlein 2011; Bieri 2009; Roberts 2011; Muir Watt and Fernández Arroyo 2014; Buchanan and Keohane 2006).

As reviewed, most capital market aspects are governed by local forces, remain domestic in nature, and prevail country-specific, a) uneven adoption of global accounting, auditing, and securities standards, uneven implementation of related legal norms into the country's legal

framework (Ball 2016, 2006a); b) processes of the application of law (judicial and extrajudicial application, specifically administrative (Wróblewski 1988), inclusive of enforcement, interpretation of legal provisions and argumentation (legal systems, public authority structures, conduct, jurisprudence, legal culture) (Koszowski 2013; Chen and Zhang 2010; Bhatia et al. 2019; Pownall and Wieczynska 2018); c) legal protections of market participants, perceived legal security, legal certainty (La Porta et al. 1998; La Porta et al. 1997; La Porta et al. 2000); d) gatekeepers, public watchdogs (Coffee 2019; Coffee 2002; Miller 2006); e) rules complementing the securities framework (Hazen 2017; Bhatia et al. 2019); f) in company's law fundamentals (Bux and Maciejewski 2021); g) governance models (Li and Yang 2016; Ball 2006b); h) institutional framework (Daske et al. 2013). Though the environment of financial markets is globalized, significant regional and country-specific disparities remain, thus, the efficacy of a global framework for financial regulation requires the ability to accommodate the varying levels of "financial glocalization" (the specific mix of global, homogenizing trends, and local, heterogeneous characteristics (Bieri 2009, p. 308). Also, to acknowledge countries with their various national institutional histories, legal systems delivering the fundamental building blocks for the globalized financial market and system (Bieri 2009). Financial market globalization is limited and has led to unequal and uneven outcomes among countries (Daske et al. 2013; Barlev and Haddad 2007; Dhaliwal et al. 2019), with gaps hard to fill and divides tough to cross (Dhaliwal et al. 2019; Bekaert et al. 2011; Giannetti et al. 2002).

2.2.2 Constraints on International Convergence of Transitional Emerging Capital Markets

To explore the constraints on the progress of transitional EMs towards global financial market convergence, two concurrent yet conflicting characteristics must be accounted for. Firstly, CEE/CESEE markets are developing EMs, while at the same time, as Member States of the EU, are assembled into the Internal Market and CMU, formed and led by the Old, Western EU, and its well-developed, mature markets (Redłowska 2017; GPW Benchmark 2020; Vienna Initiative 2017). The CEE and its financial markets have progressed, yet often not linearly and not consistently over time (Badea 2020). Over the last two decades, the CEE accomplished notable, although uneven gains, exhibiting the potential to be attractive globally, with ascending cross-border investability, bringing opportunities for growth as an increasingly harmonized part of the global capital market (GCM) (Huth et al. 2014; Heilbronn 2020). Nonetheless, there are constraints in the form of deficiencies in the institutions and insufficiencies in market structures of transitional EMs, the elimination of which requires

strengthening financial market discipline (Knight 1998), as the potential for market manipulation is much more severe in small and advancing markets, moreover with low liquidity (Bekaert and Harvey 2000b). A key aspect for the global advancement of the CEE capital markets is to deepen the international (and local) investor base, by encouraging global institutional investors, who understand the CEE economies, and also transmit best practices (Januszewski 2020). To become an acknowledged part of the GCM, transitional EMs necessitate enhancement in CD and CG systems (i.e., financial reporting enforcement system (FRES) (Nicolae Albu et al. 2021), harmonization of capital regulation (Heilbronn 2020), CG (Albu et al. 2012), IFRS-compliant CD (Albu and Albu 2012; Albu et al. 2020; Albu et al. 2017), cost efficiency of listing and trading (Ridzak 2020)). Their secondary markets shall intend to be built on investor confidence and specifically target underdeveloped market segments, to be a share of the GCM (Heilbronn 2020).

There are improvements needed in economic organization and managerial learning (Child and Czeglédy 1996), upgrading limited management accounting education and practice (Chow et al. 2006; Duh et al. 2008). International investors' confidence and trust persistently limited, discouraging CEE market participation of cross-border and institutional investors (Heilbronn 2020). There are gaps in access to the CEE capital markets, incl. SMEs, PTCs bond markets, international or offshore financing (Heilbronn 2020; Badea 2020; Januszewski 2020). Transparency, integrity, cost-efficacy, and market efficiency are set as goals by the CEE markets, to meet the needs of international investors and issuers (Gazic 2020). As local CEE capital markets remain small and shallow considered individually (Heilbronn 2020; Badea 2020), the idea emerged to establish inter-CEE exchanges cooperation, to deliver equity investment opportunities for global, cross-border institutional investors (Ministerstwo FiPR 2019; Januszewski 2020), and to induce global recognizability (Kamiński 2020; Wosion-Czoba 2020). Confluent cooperation of the CEE exchanges would bring profits from an integrative strategy, enabling visibility and attractiveness for global investors (Heilbronn 2020; Redłowska 2017; Gazic 2020) (Ridzak 2020). Convergence, advancement, and employment of best practices in the CEE markets' CD and CG systems are therefore essential (Ridzak 2020).

CEE exhibits a unique model of capitalism (Grabiński and Wójtowicz 2022). Moreover, CEE markets demonstrate great disparity as preferred destinations for cross-border investments and vary regarding capital market international integration and alignment with mature Western EU markets - due to the heterogeneity of local qualities and individual characteristics (Ridzak 2020; Heilbronn 2020; Badea 2020; Bhatia et al. 2019). The sophistication of capital market products, their availability, and liquidity segment CEE into Big New 4 Countries - Czechia,

Romania, Hungary, Poland; contrasting with the rest, much smaller (Singer 2020). The degree of international integration of the CEE local stock exchanges differs, more sizable attracting cross-border investments. The deeper international integration and assimilation within are opportunities to capitalize on, as bringing mature investors, incl. Western EU, to the region is a condition for its internationalization (Ridzak 2020; Januszewski 2020; Gazic 2020). International collaboration with MMs may tackle unique challenges they encounter and foster advantages from unity (Heilbronn 2020). MMs have been successfully converging since the 90s, while EMs are only later gradually moving toward convergence, as the world globalizes (Bekaert and Harvey 2014). Capital market liberalization (inward, outward restrictionless FEI (Bekaert and Harvey 2003)) influences EMs returns and their associations with the GCM (Bae et al. 2004). EMs exhibit various degrees regarding integration with the GCM and world-leading markets, e.g., the U.S. (Bekaert 1995a; Casanova and Miroux 2019; Donadelli 2013; La Torre and Schmukler 2012). Regardless of the global decrease in FMS, it remains substantial on the EMs (Bekaert et al. 2011). The FML paths vary significantly among the EMs (see (Bekaert et al. 2003; Bekaert and Harvey 2000b, 1995a). There is a migration of ideas from MMs to EMs, incl. transitional ones, regarding CD and CG ideas and best practices, however, they encounter local, specific political, socio-economic, and cultural contexts (Ezzamel and Xiao 2011). Local considerations are profoundly influential to equity markets, segmenting them (Dhaliwal et al. 2019; Bekaert et al. 2011). The local price of risk surpasses the global price of risk (Bekaert and Harvey 2000b; Errunza and Miller 2000; Henry 2000b). FI and EI are only partial (Benston et al. 2006; Dhaliwal et al. 2019), EMs are notably lesser integrated into GCM and thus should still be regarded as a separate asset class (Bekaert et al. 2011; Bekaert and Harvey 1995b, 2000b).

EMs are neither completely segmented nor fully integrated with GCM (Errunza et al. 1992; Buckberg 1995), rather ranging from mildly to almost fully segmented (Errunza and Losq 1985; Henry 2000b). They exhibit particular domestic barriers to investment, EMs' country-specific risks, and risk-return characteristics affecting transparency, stability, investability, diversification opportunities, and asset pricing (Bekaert 1995a; Donadelli 2013; Laeven and Perotti 2001; Laeven 2014). Thus financial liberalization is doubtfully enough to bring “full and complete integration” of any of EM into the GCM (Bekaert and Harvey 2003). Yet liberalization limits the cost of capital on EMs as well, though the estimated magnitudes differ significantly (Henry 2000b; Han Kim and Singal 2000) (Bekaert and Harvey 2000b). The trend of a globalizing world is increasing allocations to EMs, as risk and expected return characteristics of EMs alter over time, yet still being significantly different than the “developed

market bucket" (Bekaert and Harvey 2014). EMs equities exhibit divergent characteristics from mature ones, with most fundamental features being unlike (Bekaert and Harvey 1997). Returns on EMs versus MMs have vastly dissimilar characteristics (Bekaert 1995b; Bekaert and Harvey 2000b). Volatility varies across EMs, differentiating them (Bekaert and Harvey 1997). The convergence between EMs and MMs is occurring, yet risk-return distance and implicit investment barriers prevail, sustaining them as distinct asset classes (Eun and Lee 2010; Carrieri et al. 2013). There are direct and indirect market integration mechanisms, in which introduction and usage vary among EMs (Bekaert and Harvey 1997; Bekaert et al. 2002).Considerable discrepancies exist also within indicators regarding CG, CD, political risks, and country-specific financial regulations (Bekaert and Harvey 2014). The greater degree of segmentation of EMs vs. MMs is also mirrored by the dominance of country factors being much more influential than industry factors (the country effect, nonexistent on MMs) (Bekaert and Harvey 2014; Eun and Lee 2010). Regardless of advancing equity globalization, in the EMs contrary to the MMs, global and industry effects are still overpowered by the country effects (Phylaktis and Xia 2006). Also, EMs have various industrial mixes (Bekaert and Harvey 2000b). EMs need capital market legal and structural reforms to limit segmentation, to underpin development via global capital market integration (Bekaert and Harvey 2000a). There is great cross-sectional heterogeneity of EMs and powerful changes they have undergone over time, making each of them unique, regarding market microstructure, as it affects the quality of the equity market substantially (Bekaert and Harvey 2003).

Market microstructure partially determines EMs' success and security pricing, as it affects transaction costs and liquidity. Thus, high diversity in this area across EMs was found to be among the factors explaining why some of them are more attractive, with diverse asset prices tendencies and market participation (Glen 1994; Cho et al. 2003). Patterns in capital flows can reveal information about the FML of a given EM (Bekaert and Harvey 2000a). Capital flow management and experience in the area differ significantly among EMs, so do its costs and benefits (Carrasco et al. 2014). Not only do its patterns differ in the equity cross EMs, but on bond markets too, with correlations between those flows, also being country-specific (Bekaert and Harvey 2000a). EMs equity development and openness are locally defined, as are elements of broader country-level liberalization reform sets (Henry 2000b; Bekaert and Harvey 2000b). Enhancements in transparency on EMs contribute to a higher degree of their global integration (Carrieri et al. 2013). Transitional EMs' international convergence is also limited by the lack of "European company law", as its EU harmonization has established only some minimum standards and covered only some areas, also only partially (Bux and Maciejewski

2021; Directive (EU) 2017/1132 2017). It disadvantages infant EU transitional capital markets as their securities and corporate environments are lagged (Bhatia et al. 2019; Grela et al. 2017; Spasova 2019; Motusic 2017; Albu et al. 2014). EMs exhibit different considerations than MMs on sharing of information, its perceived quality and its dynamics, performative characteristics (Albu and Flyverbom 2019), CG and CD challenges (Albu et al. 2012; Badu and Appiah 2018; Bae et al. 2004). The quality of private and public information differs significantly between transitional EMs and the Western EU (private is higher for CEE companies, while, public, opposingly) (Djatej et al. 2011). The unintegrated and underprovided CD is one of the obstacles to the realization of the CMU; it causes insufficient corporate transparency, incl. unsatisfactory access to the EU-wide PTCs data, specifically on its less developed CEE markets (Bhatia et al. 2019; Thomsen 2019; Albu et al. 2012). Although for market participants, regardless of domicile, it is critical, also for reaching a fully-fledged, homogenous CMU (HLF on the CMU 2020; SWD/2021/344 final 2021).

2.2.3 Trust in the Stock Market: Credible, Reliable Corporate Information and Investor Confidence

The economic framework for investor confidence decompounds two domains (Ko 2017): optimism concerning the risk and expected return inherent to securities issued by PTCs (Veld and Veld-Merkoulova 2008; Vlaev et al. 2009; Kapteyn and Teppa 2011; Hoffmann et al. 2015; Hoffmann and Post 2017; Greenwood and Shleifer 2014); ii) trust in protections against potential losses from possible expropriations and advantage- exploitations by other market participants (Siering et al. 2017b; Damodaran 2002; Albuquerque et al. 2002). Particularly, exerting them to generate profits from deceitful acts, deceiving other market participants (Leinweber and Madhavan 2001; Comerton-Forde and Putniņš 2011; Akhigbe et al. 2005). A "loss of welfare" can arise from a disparity between i) investor trust vs. the true level of protections against expropriations, or ii) investor optimism vs. the true level of fundamental risk and return (Ko 2017). They shape market participation (Giannetti and Wang 2016; Guiso and Jappelli 2005; Guiso et al. 2008; Siering et al. 2017b; Georgarakos and Pasini 2011). Thus, the principal objective of securities regulation and enforcement is attaining the viability and robustness of capital markets, achieved principally by legally imposing formal requirements on disclosures and governance, to ensure transparency and confidence (Friedman 2019; Hazen 2017; IOSCO 2017, 2010). Deficient thereof distorts and limits capital market participation (Guiso et al. 2008). Markets' advancement and investors' confidence in a high-

quality CD are interrelated (Friedman 2019). Markets are transforming into investors-oriented (SEC 2017; AICPA 1994), i.e., CD users-oriented (Young 2006; Jenkins and AICPA 1993).

Equity market development is contingent on aggregate actions undertaken by its participants, rooted in their beliefs, incl. opinions on the CD's reliability (Friedman 2019). Once, as the main driver of investors' confidence and participation, perceived CD's reliability, and credibility evaporates (FASB 2013; Levitt 1997; Ball 2016), market viability disappears, disabling the whole economy (European Commission 2009; Rezaee 2004; Jain and Rezaee 2006; Rezaee 2005). Measurement and dynamics of investor trust are common on the market and amid regulators as they redound to investor behavior (Ko 2017). Public trust is a fundamental precondition for any economic transaction and activity (Dupont and Karpoff 2017). It performs a critical role in organizational functioning, allows for exchanges among parties, improves cooperation, and coordination, and provides for effective relationships in the market (Kramer and Tyler 1996). It concerns institutional and personal levels and organizational and exchange relationships (Li and Betts 2011). It is critical for organizational governance (Powell 1996) and is crucial to effective, long-term business-world relationships (Morgan and Hunt 1994; Sirdeshmukh et al. 2002), though its role in business relationships arouses disagreements (Shapiro et al. 1992).

Trust is an essential social force (Lewis and Weigert 1985), allows for cooperative behavior (Gambetta 1988), and endorses adaptive organizational schemes (Miles and Snow 1992), reduces transaction costs (Meyerson et al. 1996), fosters and improves strategic partnerships, reduces monitoring behavior, and superior swiftness in decision-making (Shapiro et al. 1992), also delivers a significant mechanism for control (Noteboom et al. 1997). Trust results in a reduction or lack of control, as some power is transferred, shifted, or given up to the party who is trusted, it is a continuous process, not a medium, climate, or resource, it must be firstly initiated, then maintained, sometimes restored, and incessantly authenticated (Flores and Solomon 1998). On capital markets, trust is "the subjective probability individuals attribute to the possibility of being cheated" (Guiso et al. 2008, p. 2557). An agent weighs or evaluates the probability that another agent (or a collectivity of agents) would perform a particular action (Gambetta 1988, p. 217). This subjective probability is fractionally founded on objective features of the financial system, indicative of the likelihood of corporate financial frauds, and subjective features of the person trusting and trusted - particularly investors (ownership) versus corporate insiders (control) and gatekeepers (reputational intermediary) (Guiso et al. 2008; Coffee 2002). Trust in a considerable share explains differences in capital market participation across countries and individuals (Guiso et al. 2008). There is a cause-effect relationship

between confidence in the reliability of CD and market strength (Friedman 2019), CD system, and market participation and development (Brown et al. 2014; ESMA 2014; Jackson and Roe 2009).

Public confidence in the reliability, and credibility of CD is an expectancy towards PTCs to provide sufficiently much or enough information that is robust, superb, or "better" (Friedman 2019), is highly accurate or very limitedly biased, at most, accrediting market participants reasonably expect lower future uncertainty and AoI (Dari-Mattiacci et al. 2021). It is expected, via this mechanism, to observe an increase in market participants' willingness to involve in information-sensitive financial transactions ("trusting the capital/stock market"), decreases the need to price-protect in an ex-ante manner, and fosters incentive provision and monitoring, allowing the separation of ownership and control (Guiso et al. 2008). Trust is a central concept in financial decision-making (Shapiro et al. 1992), as engaging in the capital market necessitates "trust in the fairness of the game and in the reliability of the numbers to invest in it" (Guiso et al. 2008, p. 2557). It is not only i) an assessment or valuation of the risk-return trade-off, taking into account the available, existing data, yet also ii) an act of faith (trust), that CD delivered to the market is decent, credible, reliable, and complete enough, and that iii) overall financial system is lawful and fair (Guiso et al. 2008; Rezaee 2004). The PTC's objective, as a separate legal person, is to endure, if possible, to thrive, where shareholders own only freely tradable rights, the burdens of ownership and duties of management of the corporation's resources are entrusted to the board of directors - this trust is known as a fiduciary duty (Eccles and Youmans 2015). Absent "trusting the stock market", a form of a regulated market issuer, with manifold, dispersed, unrelated owners of freely transactable, formidable in time and amount stock rights, would lose its raison d'etre, nobody willing to participate in such ownership, reluctant to engage with agents exercising control on behalf of those unrelated, heterogeneous owners (Mayer 2008). Manipulations embody a major threat to trust and integrity in the capital (Siering et al. 2017b; Camfferman and Wielhouwer 2019) and past decades were marked by plentiful trust-breaking, big-scale doubtful corporate executive practices (Hogan et al. 2008b; Soltani 2014; Riley and Rezaee 2010), ranging from aggressive earnings management to outright fraud (Amiram et al. 2018; Albrecht 2009). This pressured a general recognition of what CD and CG shall convey to enable risk assessment, informativeness, and monitoring (Wielhouwer 2015; Tardivo et al. 2011; Claessens 2003; Camfferman and Zeff 2018; Camfferman and Wielhouwer 2019).

2.2.4 Boundaries for the Actual International Comparability of Standardized Accounting

Progress in the spread of international trade, multinational operations, global competition, cross-border M&As, and advances in financial technology and the Asian financial crisis prompted the pursuit of a new, shared form of regulation of international accounting (Choi 2000). So the establishment of common ground in business practice, performance, and capital culture became necessary (Carlson 1997), in the form of international consent on a chosen global accounting standard set, with its own issuance body (Choi 2000). National "patchwork of accounting requirements" adjoined costs, complexity, and risks for preparers of CD and its users, hampering the efficiency of economic decisions - as modern economies rely on international transactions, a single set became inevitable (IFRS Foundation 2021e). "Proper accounting is the basis for all economics" (Hoogervorst 2021), thus the effectiveness of its services is translated into market efficiency and the performance of the rest of the economy (White 2001).

The "international financial reporting ecosystem" is a complex network of multiple parties and relations (Accountancy Europe 2021; Tarca 2012), thus the globalization of accounting is followed by convergence in regulation, supervision, enforcement, governance, SROs, and CD related services (e.g., audit) (ESMA 2/6/2019; IOSCO 2010, 2017; Rezaee 2004; Rezaee et al. 1997; Humphrey et al. 2009; OECD 2004). An international accounting harmonization - IAH (Barlev and Haddad 2007, p. 494), its subsequent convergence processes (Chand and Patel 2011, pp. 1–6), aimed at the reduction of cross-countries differences in accounting (Barthe 1989; Iqbal et al. 1997, p. 35), targeting increasing compatibility and agreement on formal standards (Guggiola 2010; Li and Yang 2016; FASB 2013) and practice (Murphy 2000; van der Tas 1988; Vellam 2004). With a general upsurge of global standardization (Jang 2005), accounting was no exception, especially having a "worldwide constituency" of its information (Richardson and Eberlein 2011; Dhaliwal et al. 2019; Camfferman and Zeff 2018), thus aiming to provide the most comparable international data (Barlev and Haddad 2007). With the formal support of the goal of a single set of high-quality accounting standards, it was then established (IFRS Foundation 2021e) Union (FSB 9/25/2015; World Bank; IFRS Foundation 5/12/2017; IOSCO 6/28/2021; FASB 2013; EP; EC 2002; ICAEW 2007), however, as it was evidenced subsequently, this formally adopted set did not guarantee uniformity in actual accounting practice amid adopting countries and their PTCs (Ball 2006a, 2016; Albu et al. 2014; Beresford 1990; Dhaliwal et al. 2019; Brown et al. 2014), up to the concept of "adopting a label" (Daske et al. 2013). Deficient in rigor and discipline, the

standard set conveys opportunities for misinformation (Hoogervorst and Prada 2015), with instances of uneven, and unequal first-time adoption and compliance, interpretation, and supporting the rigorous application and enforcement is necessary (Tarca 2012; Brown et al. 2014; Daske et al. 2014). Commitment to the standard set varies amid countries too (IFRS Foundation 2018a).

CD and accounting measurement are naturally tangled, giving CD its substance, as deficient disclosure, accounting measurement has no useful purpose, correspondingly, disclosure cannot be generated unless business activities were measured earlier (Choi 2000). Information needs are growing, driving a wide range of stakeholders (heterogeneous users, and issuers (Comporek 2020)) to seek information on the effectiveness of PTCs, as CD is the most appropriate source for the data enabling the assessment of its image (Artienwicz et al. 2020). Actual CD practice shapes the content and way of delivering the full portrait of the PTCs to the market (picture, performance, and historical, forward-looking data) (FASB 2010; AICPA 1994). The rationale and benefits of moving towards a global accounting set are evidenced in the literature (Daske et al. 2008; Bhimani 2008; Armstrong et al. 2010; Aharony et al. 2010), however, areas, degrees of benefits vary across time, and across countries, depending on factors defined by local features (Tarca 2012; Ball 2016, 2006a). Cross-country research is not unanimous in identifying its benefits for national capital markets (Tarca 2012; Brown 2011; Daske et al. 2013; Brüggemann et al. 2013; DeFond et al. 2011). Unfavorable, disadvantageous factors and dilemmas were also identified (Kvaal and Nobes 2010, 2012; Lang et al. 2010; Ball 2006b; Gierusz 2015). There are opposing forces to decelerate IAH (Nobes 1989), e.g., nationalism, significant differences in language, capital market structures, political organization, cultural background, and perceived objectives of CD (Beresford 1990, p. 99). Regardless of the momentum for convergence (Bolton 2006), countries are persistently not homogeneous in terms of accounting practices, especially EMs (Albu et al. 2014). Economic and political forces shape actual CD, whereas being local (Ball 2008). Discretion and options allowed under the standard set create room for additional latitude in actual CD practice, even within a country (Ball 2016), and diverse accounting choices and methods permissible under it too (Barlev and Haddad 2007). Divergence in CD practice includes language and translation issues, different enforcement, and supervisory bodies and practices, yet the primary cause is policy options (Nobes 2013). The uneven adoption and implementation across countries, mere convergence instead of adoption, and carving out undesirable elements remain problematic (Ball 2006c, 2016; IFRS Foundation 2012; Hoogervorst 2021). Due to historical, cultural, and societal backgrounds (Barlev and Haddad 2007; Ball 2016, 2006b), there are distinguished

regional accounting systems - Anglo-American, Nordic, Germanic, Latin, and Asian (Radebaugh et al. 2006). Local-specific factors exert a unique contribution to CD practice nationally, impacting its international harmonization, as in a dynamic, complex business environment, accounting information flows in a cross-border manner, thus changing the way it is used in informed decisions (Radebaugh et al. 2006; Ball 2016, 2006a). The perfect cross-country convergence in accounting might not be feasible, as long as social, cultural, and political divergences persist across nations (Hussein 1996).

Formally regulated, governmentally imposed on regulated markets' issuers, CD obligations are designated as the main, most reliable, and credible source of corporate information and communication, available publicly, and equally, for all users, and stakeholders (Eccles and Youmans 2015; Kurek and Górowski 2019; Comporek 2017, 2020; Reg (EU) 596/ 2014; Artienwicz et al. 2020, p. 11; Tarca 2012; FASB 2010). CD is dynamic, evolving with the economies it facilitates (IAASB/IFAC 2011; IFRS Foundation 2020a; C/2020/7535 2020; Eccles et al. 2001; CGMA 2014). It resulted in IFRS Foundation, Standards (Thorell and Whittington 1994; Hopwood 1994b), and recently ISSB's IFRS Sustainability Disclosure Standard (IFRS Foundation 2021d). IFRS Standards are allowed in most jurisdictions (Márquez-Ramos 2011, p. 2; IFRS Foundation 2021b, 2018b), inclusive of a growing number of EMs (IFRS Foundation 2017). IFRS Foundation contributes to the growth of global financial markets and cross-border economic activity (IFRS Foundation 2021a), works in the public interest (Hoogervorst and Prada 2015), and sets a common accounting language (EC 2015), providing usefulness and comparability (FASB 2013; IFRS Foundation 2020a, 2021c). Along with other qualitative characteristics - QCs and objectives – OBs, as outlined in Conceptual Frameworks (FASB 2010; IFRS Foundation 2020a). All are the most significant properties of accounting information (Bushman and Indjejikian 1993; Erb and Pelger 2015). They, as a rule, shall make efficient asset allocation possible through enabling knowledgeable decisions (Kurek and Górowski 2019; Healy and Wahlen 1999; Financial Accounting Foundation 2018; IFRS Foundation 2020b, 2020a). So, market stakeholders have a right to anticipate that the information included in CD possesses established OBs and QCs (IFRS Foundation 2020b, 2020a; Kurek and Górowski 2019), yet massive CD failures and misconducts have proven this expectation to be far from the truth (Amiram et al. 2018; Camfferman and Wielhouwer 2019; Association of Certified Fraud Examiners 2018; Rezaee 2004; Albrecht et al. 2004), calling for improvements, specifically in quality, reliability, and credibility (Peters 2022; Garcia Osma et al. 2020; Camfferman and Wielhouwer 2019; Khan et al. 2015; Rezaee 2004). Usefulness (decision-usefulness) (FASB 2006, 2010; Lennard 2007; Artienwicz et al. 2020), as perceived

as fundamental, is often taken for granted (Pelger 2016). Fiduciary duty regimes and related QCs of materiality and usefulness depend on time horizons and the most significant audience (Significant Audiences and Materiality) (Eccles and Youmans 2015; Eccles et al. 2001). Useful information for the valuation decisions of capital providers shall involve stewardship concerns (Erb and Pelger 2015).

Stewardship is crucial (Pelger 2016, 2020; Zeff 2013), related to valuation (Kuhner and Pelger 2015), and provides a basis for a constructive dialogue between stewards and shareholders (Lennard 2007). Making stewardship a distinct OB would avoid standards allowing the exclusion of information and its presentation in a suboptimal method (Lennard 2007). Stewardship in CD is directly related to stewards' fiduciary duties of PDMRs as it implies CD practice, investors look to CD to access information relating to D&Os stewardship of the PTC, to execute efficient decisions assuming ownership-control separation (EFRAG and European Standard Setters 2007; Anderson et al. 2015; Kuhner and Pelger 2015; O'Connell 2007; Shivakumar 2013), highlights D&Os accountability for economic resources entrusted to their upkeep (Pelger 2020), is inherently linked with CD failures, rooted in managerial reporting misconducts breaking stewardship and trust (Albrecht et al. 2004; Lennard 2007; Donaldson and Davis 1991; Nobes and Stadler 2015; Choo and Tan 2007b; Beasley et al. 2010; Carpenter and Reimers 2005). The stewardship role of accounting (Gjesdal 1981) is so important, that reliability championed CD (Bushman 1993). Reliability is central to accounting, and quality of information that assures that information is reasonably free from error or bias and faithfully represents what it purports to represent (FASB 1980, para(s). 58-97). The correspondence or agreement between a measure or description and the phenomenon (FASB 1980, p. 28) is supported with precision, uncertainty, not intended bias, completeness, verifiability, conservatism (prudence(FASB 1980, p. 35)), relevance (FASB 1980, pp. 63–97). Concerning managerial discretion, the trade-off of relevance-reliability varies for valuation and stewardship aims (Pelger 2020). Accounting information is reliable to the extent that users can depend on it" (FASB 1980, para(s). 58-97). The dependability of accounts is a core concept of its practice (Paton and Littleton 1940, 7,18). Any CD reader shall be able to acquire information on which may rely with confidence, as it must supply "dependable information" (AAA 1948, 329, 334), with objectivity implying its unbiasedness (Erb and Pelger 2015). CD's high-quality, reliability, and credibility remain challenging on transitional EM (Albu et al. 2012; Albu et al. 2014; Albu et al. 2017; Drábková 2018; Zaleśkiewicz 2015; Kurek and Górowski 2019).

2.3 Perspectives on Advantages and Disadvantages of Corporate Disclosure

2.3.1 Culture Dependency and Variance of Corporate Disclosure Behaviors

Corporations and corporate decision-makers around the world and across entities behave differently (Graham et al. 2013; Paisi Lazarescu 2015). An individual heterogeneity of corporate decision-makers matters in corporate finance, CG and CD (Bertrand and Schoar 2003; Malmendier and Tate 2008; Podrug 2011; Akram et al. 2020; Erjavec et al. 2019; Sedliacikova et al. 2021; Vinkenburg et al. 2001). National culture performs a vital role in corporate decision making (DM) (Podrug 2011). Culture shapes dissimilar processing styles, trigger specific judgment schemas, decision strategies, patterns (Weber and Morris 2010). National heterogeneity of corporate bodies can exert (a positive) influence on corporation's performance (Akram et al. 2020). National religious heterogeneity influences CD quality via a channel of social trust, and religious heterogeneity is positively related to mandatory and voluntary CD quality (Oh and Shin 2020). There are also regional specificities of essential behavioral aspects (cognitive, psychological, emotional) affecting managerial DM processes (Sedliacikova et al. 2021). National culture significantly influences both sides of CD and CG, i) CD preparers, CG establishers, i.e. corporations and corporate executives (Podrug 2011; Gierusz and Koleśnik 2019; Zarzeski 1996; Hope 2003b; Haniffa and Cooke 2002), and ii) CD users, CG beneficiaries (corporate outsiders, e.g. investors, analysts) (Akman 2011; Góis et al. 2018; Breuer et al. 2014). Executive behavior, JDM (judgement and decision making) are affected by personal and situational factors (Vinkenburg et al. 2001). Psychological set of traits (personality) performs a role in managerial goal attaining processes (Saunders and Stanton 1976; Paisi Lazarescu 2015). Psychological phenomena were found to have cultural foundation and inter-culture variance (Heine and Ruby 2010). Executives' psychological traits, attitudes vary among countries, also there is a substantial association between executives characteristics and corporation characteristics (Graham et al. 2013). National culture-related aspects can substantially explain differences in D&Os ethical attitudes, behavior, JDM (Jackson 2001). Key factors that lead to the corporate unethical, dubious, fraudulent practices and behaviors are encompassed in co-occurrence (also perceived, relative existence (Albrecht et al. 1984; Vousinas 2019)) of elements described within classical corporate fraud theoretical frameworks or models (Cressey 1973; Wolfe and Hermanson 2004; Dorminey et al. 2012; Dorminey et al. 2011; Kassem and Higson 2012; Albrecht et al. 2012).

Yet, with further development in the field, snowballing fraud incidents (volume, timespan, victims, harm, complexity, sophistication, convolution, cunningness, craftiness), social change,

new breed of corporate offenders - additional individual- and group- level behavioral, personal aspects (psychological, cognitive, emotional) are increasingly acknowledged and included (Vousinas 2019; Albrecht et al. 2004; Stotland 1977; Kranacher and Riley 2019; Carpenter and Reimers 2005; Duffield and Grabosky 2001). Foremostly, i) personality-related (attributes uniquely characterizing an individual, i.e. a corporate executive) (Vousinas 2019; Geis 2011; Stotland 1977; Kranacher et al. 2011; Kranacher and Riley 2019), and ii) national-, group-, organizational-, individual-level cultural-defined environment (incl. values, socially-desirable goals, means of its accomplishment) (Choo and Tan 2007, 2012; Cressey and Moore 1983; Geis 2011; Kranacher et al. 2011; Jackson 2001; Albrecht et al. 2004; Messner and Rosenfeld 2007; Schoepfer and Piquero 2006). Also, iii) ethical setting on abovementioned levels and personal integrity (incl. actual JDM, JDM processes, commitment to ethical JDM) (Albrecht et al. 2004; Albrecht et al. 1984; Kranacher and Riley 2019; Smith and Hume 2005; Albrecht et al. 2006). 'Humans are a cultural species' (Heine and Ruby 2010, p. 254). Human depend critically on cultural learning in all life's aspects, born into immensely complex cultural worlds, with experiences that differs vastly between cultures (Heine and Ruby 2010). Goals, followed by people in all cultures, are done in culturally particular ways (Richerson and Boyd 2006). Consideration of cultural differences in attitudes, values, perceptions, behaviors, beliefs, modes of information processing, is beneficial for economic activity of businesses and individuals (Weber and Hsee 2000). CD and CG practice reflects the underlying environmental impacts, that influence entities and their D&Os, in various countries (Choi and Levich 1990; Adhikari and Tondkar 1992; Archambault and Archambault 2003). Particularly, also culture and its unique effects and contribution to CD practice is emphasized (Radebaugh et al. 2006; Gierusz and Koleśnik 2019). Cultural dimensions are proven to affect CD (Zarzeski 1996; Jaggi and Low 2000; Archambault and Archambault 2003; Hope 2003b; Akman 2011). Under environmental determinism theory of CD, culture is amid most influential factors (Cooke and Wallace 1990).

Cultural-dependent and -shaped concepts of CD, CG, and related behavior of corporate individuals on EMs and TEMs, are evidenced in the literature (Haniffa and Cooke 2005, 2002; Albu et al. 2017a; Albu et al. 2014b; Chow et al. 1995; Gierusz and Koleśnik 2019; Mohd Iskandar and Pourjalali 2000). Culture exerts a substantial effect on CD in Poland, even after the mandatory adoption of IFRS (Gierusz and Koleśnik 2019). The relevancy of national culture to CG, CD, securities laws and regulations (incl. CD) increases (Licht 2001; Chand et al. 2012; Gierusz and Koleśnik 2019; Góis et al. 2018), up to institutional investors recognizing the necessity of adoption of CG principles sensitive to cultural divergences (Licht 2001, p. 150).

Cultural origins are significant in explaining CD practices and investor protection (Hope 2003b). National culture, even after the adoption of uniform global accounting standards, is affecting CD and its quality, thus shall also be accounted for by investors and analysts (Góis et al. 2018; Akman 2011; Gierusz and Koleśnik 2019). Regarding micro-level, i) home culture affects individual risk-taking behavior and influence executive DM significantly (Tse et al. 1988; Graham et al. 2013). Also, ii) managers' values, perceptions, experiences, and behaviors vary amid ethnic, national cultures (Sanyal 2001). The understanding of how culture influences corporate DM is important to an entity's external operation and acknowledgement of culture's impact on executive DM is substantial to the internal conduct of multinational entities (Tse et al. 1988; Sanyal 2001). Executive attitudes and attributes are related to corporate actions, including e.g. risk-aversion, optimism, overconfidence, time preference (Graham et al. 2013). Culture determinants of DM are substantially impactful, also considering individual JDM in organizations (Weber and Hsee 2000). Psychological factors, as deep-rooted in home culture, influence choices, specifically portfolio choice (Breuer et al. 2014). There are cultural impacts on individual JDM, in economic and social domain, assumed in terms of structures in social environments, dynamic constructive processing, that form different processing styles, triggering specific decision strategies, judgment schemas (Weber and Morris 2010).

Variances in attitudes aid to deliver one of possible rationales for divergences in corporations' behavior across countries (Graham et al. 2013). Culture is a collective programming of the mind, differentiating members of one human group from another, individual is truly unique (Hofstede 1984, pp. 15–21). Culture is to a human collectivity, what personality to an individual, also, those two interact (Hofstede 1984, p. 21). Executive DM is driven by cultural values, beliefs and overall cultural-background that influences DM style (Podrug 2011). Values are constructs, customary in every society, mirroring their own preferences and priorities (Licht 2001). Values are cultural elements (Llanos-Gómez et al. 2019). They are standards to guide the selection, evaluation of behavior (Licht 2001). Their basic social function is to control and motivate the behavior of group members (Parsons 1991).They have reference to desirable goals and to the methods, modes of conduct that endorse these goals (Licht 2001, p. 151). Relationships between desirable value, desired and practice have explanatory power for frameworks of human behavior, via interaction between an organization and an individual (Llanos-Gómez et al. 2019). Value judgements are inescapable and the nature of value can be desired and/or desirable (Hofstede 1984) (Schwartz 2012). There are extensive discrepancies between the value orientations in CEE and Western Europe (Kolman et al. 2003). Cultural values are proven to affect actual executive decisions and

executive DM styles (Podrug 2011). Regarding value orientation, there are considerable dissimilarities amid the CEE countries (also comparing neighboring CEE countries, i.e. Poland, Slovakia, Chechia, Hungary) (Kolman et al. 2003). Cultural differences (e.g. in self-perception) are followed by behavioral consequences, in internal and external attribution styles, motivations for self-enhancement, distinctiveness, conformity, primary and secondary controls, approach/avoidance (Heine and Ruby 2010). From the point of view of executive operational and CD JDMs, there are worth noticing cultural-dependent and -variant psychological phenomena, s.a. perceptions of fairness (Henrich et al. 2005), perception of the self (Heine and Ruby 2010), approach-avoidance motivations (Lee et al. 2000), strategies of reasoning (Norenzayan et al. 2002), attention (Chua et al. 2005), need for high self-esteem (Heine et al. 1999), moral reasoning (Miller and Bersoff 1992). Psychological triggers of (economically educated) individuals are proven to affect their accounting options' perception, accounting choices (JDM), creative accounting decisions, behaviors, and attitudes towards creative accounting phenomenon (Bogdan et al. 2018). There are cross-national and cross-regional variances in the perceptions of risk and attitudes towards risk (Teigen et al. 1988; Goszczynska et al. 1991; Portela Maseda et al. 2020). Specifically, with reference to culture schemas (Weber and Morris 2010), confidence (Whitcomb et al. 1995) probability judgment, risk preference, modes of decision making are affected by culture (Weber and Hsee 2000). Particular risk perceptions and concerns are evidenced to be characteristic of individual nations, with different levels and number of idiosyncratic qualities in CEE countries (Goszczynska et al. 1991; Englander et al. 1986). Also, with multitude areas of risk perception in CEE region displaying substantial differences, as compared to the Western EU (Raška 2015).

2.3.2 Corporate Culture and Enterprise Risk Management. CEE Specificities and Experience

Hofstede's cultural dimensions are able to offer explanation in the dissimilarities in CD, CG practices across countries (Chan and Cheung 2012). Cultural discrepancies prevent direct implementation of CG methods and ideologies abroad - established and proven successful to improve CG domestically, were not successful employed in other countries, especially if legal, historical, social dichotomy exists (Andre 1998). Thus, culture-sensitive CG principles are adopted by institutional investors for major markets they invest in (Licht 2001, pp. 153–154). The effect of culture on ethical sensitivity was demonstrated on a cross-country, cross-regional basis, with such an influence eventually determining the CG practices in various regions (Chan

and Cheung 2012). Country-level characteristics explain significant degree of the variation in CG practices (Doidge et al. 2007). There is a junction of culture and emotion, and also cultural variances in individual's cognition, perception, and reasoning (Heine and Ruby 2010). Cultural component in behavior is often tough to realize once embedded in a given culture, it takes an outsider for it to be grasped (Hofstede 1984, p. 23). Western executives tend to neglect cultural divergences present in the CEE region (Kolman et al. 2003). Yet, it evidenced, that there are cultural similarities, but there are extensive differences as well in executive decision-making styles amid CEE countries (Podrug 2011). Organizational culture of given nations exhibit specific tendencies, with Western organizations displaying many opposing relations to representative of the CEE region (Farago 2008, as cited in (Derecskei 2018)). Corporate culture (CC) impose powerful influence on the behavior of corporate executives, officers, it shapes the performance of an entity, through the ways of DM, as based on characteristics of management (Omar et al. 2015; Paisi Lazarescu 2015). Corporate character carries weight, is widely meaningful and persuasive, as employees (individually and collectively- as an organization) are strongly influenced and formed by D&Os (Biggerstaff et al. 2013). The character of D&Os is generally mirrored in the character of the entire corporation (Chatman Thomsen 2006). Also, unethical CC is linked to corporate misbehavior, especially D&Os (executive) misconduct (Biggerstaff et al. 2013). CEE business entities were found to share alike economic and financial risk sources, business environment, concept of risk management within the entity, but divergent from to other European countries, even Balkan (Olah et al. 2019; Hudakova and Masár 2018; Hudakova et al. 2014).

There are specific aspects and qualities of factors affecting ERM (enterprise risk management) and managerial activities related to the field of CEE countries' SMEs (Virglerová et al. 2016; Dvorský et al. 2018; Dankiewicz et al. 2020). CEE representatives are increasingly aware that systematic approach towards ERM fosters obtainment of improved results, and its disregard, compel corporations to solve problems as they appear (Virglerová et al. 2016). Yet, CEE entities are lagged behind advanced countries regarding systematic CFRM (Corporate Fraud Risk Management) approach, being considerably inferior and deficient in ERM solutions and their application (Virglerová et al. 2016; Hudakova et al. 2014; Dankiewicz et al. 2020). CEE countries, apart from needed improvements in ERM institutional setting, call for enhancement regarding managerial actions, behaviors, attitudes associated with ERM (Hudakova and Masár 2018; Dankiewicz et al. 2020; Hudakova et al. 2014). There are CEE-specific core behavioral factors and aspects found to impact executive financial DM processes (Sedliacikova et al. 2021). Managerial inefficiencies were proven to be significant ex-ante

indicators of a corporation's financial risk (Olah et al. 2019). Specific CC characteristics are valuable predictors of effectiveness, performance (Denison and Mishra 1995). CC can influence entity's performance in both directions - improvement or obstruction (Kotter 2014). Structural theory of CG represents deterrence-based approach towards organizational compliance, cost-benefit analysis towards individual compliance, utilizes monitoring, reporting, disclosure, discipline as emphasized enforcement methods, whereas cultural theory of CG represents values-based organizational-, normative individual- compliance, relying on education, training, mediations as mechanisms for its achievement (Baer 2008). As a consequence of massive CD irregularities, governments, embraced both approaches – improved CD, monitoring, enforcement, prosecution, liability, moving power from one group, as well as improving corporate cultural and ethics, risk management, compliance requirements incl. wrongdoing whistleblowing (Bucy 2007; Coffee 2004; Elshandidy and Neri 2015; Campbell et al. 2014; Albrecht et al. 2006). Risk management is a component of the set of methods for creating economic value in a corporation (Crockford 1986). Risk in the CEE corporate world, post-communist, SMEs-dominated, is a complex, multi-factor, quantitated uncertainty, of a specific nature ((Fetisovova et al. 2012) as cited in (Virglerová et al. 2016; Dankiewicz et al. 2020; Hudakova et al. 2014; Hudakova and Masár 2018)).

Regardless divergent corporate environment needs, entities necessitate to implement transformation strategies, to incorporate resilience strategies, s.a. understanding of risks, risk disclosures, risk culture (Agarwal and Ansell 2016). Entities and D&Os handling the complexity, ambiguity, uncertainty are a prime concern on complex contemporary markets, as strategic risk management is a cornerstone of ERM (Agarwal and Ansell 2016)) and CD (Frigo and Anderson 2011). ERM is a significant element of governance risk and compliance (Renn and Walker 2008; Agarwal and Ansell 2016). Specifically, corporate fraud risk management (CFRM) strategies shall be mandated by regulators, established and implemented by business entities (Marzuki et al. 2020), to prevent and detect its occurrence (Albrecht et al. 1982), as most frauds arise, originate from within entities, rather than from external dealings (KPMG 2014; Morgan and Burnside 2014; Biggerstaff et al. 2013). A robust compliance program wards off misconduct and empower ethical employees (Polite 2022). CFRM processes and strategies shall include entity's culture of managing risks, identification of risks, evaluation of risks, determining preventive actions and implementing, reviewing; and foremostly embedded in CC (Marzuki et al. 2020). CD provide useful information and enforcement encourages corporate officers to follow prescribed accounting rules (Hope 2003a). Law structures the responsibility of PTCs for the crimes and intentional torts of their D&Os (Arlen 2012). Yet the allocation of

liability for corporate misconduct between culpable PTC and its culpable agents (foremostly D&Os (Beasley et al. 2010; Beasley et al. 1999; Deloitte Forensic Center 2009)), started to transform in the 90s, outplacing a standard of strict vicarious liability on a corporation for misconduct of theirs agents, with regimes that decrease, reduce or eliminate liability once principals act to deter wrongdoing (a composite regime) (Arlen and Kraakman 1997; Arlen and Kahan 2107). To optimally deter corporate crime, both individual and corporate criminal liability must be incorporated into law (Arlen and Kahan 2107; Arlen 2018b, 2012). This are multifarious sanctions possible to be imposed on the entity (corporate liability) and corporate insiders (individual, personal liability) due to criminal, civil, administrative individual accountability (Klausner et al. 2013; Chatman Thomsen 2006; Yates 2015; Klausner and Hegland 2016, 2018). This creates anti-fraud CC, improve CC, strengthen entities' internal control processes, preventive measures, assign accountability to corporate JDM (KPMG 2014; Yates 2015; U.S. Congress 7/30/2002; Woodcock et al. 2019; Chatman Thomsen 2006). Both liabilities regimes are foremostly intended to deter corporate misconduct, with deterrence being their primary goal, so to foster safeguarding of potential and future victims, simultaneously, to reduce necessity for future punitive interventions (Arlen 2018a). Thus, corporate policing concept was established and acknowledged (Arlen and Kahan 2107), and by its nature, affected corporate conduct, CC, managerial behaviors, compliance (Polite 2022). CC, Corporate compliance, CG regimes has their limitations (Baer 2008).

Irrespective of how many corporate agents demonstrates ethical values consistent with reciprocity theory (Falk and Fischbacher 2006; Kahan 2003), a substantial minority might be better moved by cost-benefit analysis, thus efficient corporate compliance shall encompass values-based approach, along with deterrence-based approach (Baer 2008). The environment of corporate crime is specific, as a corporation can control corporate misconduct intervening ex ante and ex post to deter crime (Arlen 2012; Arlen and Kraakman 1997). Achievements and findings of behavioral ethics and trustworthy, ethical managerial conduct are crucial for establishment of ethical CC (Bazerman and Tenbrunsel 2011; Guiso et al. 2015). There is risk is attached to each corporate actor's choice amid various alternatives and final decisions (Derecskei 2018). As very corporate decision poses multiple risks to a corporation, management is making efforts to decrease the general risk of a market failure of an entity (Virglerová et al. 2016; Dankiewicz et al. 2020; Albrecht et al. 1982). However, there are barriers for effective ERM, moreover, specific and local in nature, also for CEE countries (Hudakova et al. 2014; Olah et al. 2019). Culture is broadly accepted as a pattern of behavior that affects the character of a society (Omar et al. 2015). Yet, there are international variances in work-related values,

emerging as consequences of countries' cultural distinctiveness (Hofstede 1984). CC performs a vital role in CG, CD practice and CD fraud detection (Morgan and Burnside 2014; Guiso et al. 2015). As D&Os try to inculcate certain values in their entities, CC are often perceived as stronger or weaker, better or worse, yet a right kind of culture affect effectiveness of an entity (Schein and Schein 2016, p. 7). Cultural strength or a given kinds of CC is related to efficient economic performance (Denison and Mishra 1995). A holistic view of the concept of culture, CC, ethical conduct, their effect on PTCs and behavior, are crucial to understand corporate JDM regarding initializing, involving, colluding in fraudulent or unethical activities (also concealment, culture of silence) (Omar et al. 2015; Albrecht et al. 1982; Albrecht et al. 2006). The substantial effect of the CC within the perspective of corporate misconduct, provides evidence on CC divergence amid PTCs, and suggests the overall need for improvement (Omar et al. 2015).

2.3.3 Corporate Disclosure Challenges and Quality in the CEE Region

A capital market-related information flow is one of the core features of the market to be classified as developed (MSCI June 2020, 2020). TEMs' stock exchanges were established during early phases of transformation, however were for long deficient in necessary regulatory structures, enforcement mechanisms, corporate information, especially securities commissions, thus adequate accounting, CD, CG practices and solutions were slower to develop and lagged (Exeter and Fries 1998). Thus, the role of adequate CD and CG is specifically significant in CEE countries, thus, as newly-democratized, historically lack practice and tradition of transparency, CD, so discouraging FI, increasing volatility, limiting economic growth (Ding et al. 2009). There is a global pressure towards TEMs, exercised by MMs, global institutions, accounting profession, regarding CD, audit, accounting (Ezzamel and Xiao 2011). Varied approaches to privatization of TEMs, exerted strong impact of the chosen method of privatization on the formation of ownership structures, as schemes of transfers of shares were dissimilar, e.g. via voucher systems, directly or indirectly, to the general population or enterprise insiders or strategic investors, all have long-lasting, significant implications for CG in the post-privatization phases (Exeter and Fries 1998). TEMs, and EMs in general, exhibit geographically spread, divergent historical, socio-economic, cultural and political diversity, consequently, their accounting, CD, CG, auditing differs, further, means of accounting technologies traveling from MMs to TEMs vary, so do processes of their translation into TEMs (Ezzamel and Xiao 2011). Convergence in CD, in a form of a formal adoption of IFRS, requires

EMs to follow the same first-time adoption rules and IFRS-based CD practice, that MMs first-time adopters (Kargin 2013; IFRS Foundation 2018). Yet, problematic areas concerning accounting, are divergent on this unmature, TEMs comparing to MMs (Pasekova et al. 2018). The more, as even formal adoption of uniform IFRS-based CD has not led to uniform CD behavior, practice, even amid MMs (Ball 2016; Daske et al. 2008). There are instances of only formal dedication to it, with continuation of previous, local CD practices (Daske et al. 2013; Kvaal and Nobes 2012). Specifically, as there are substantial historical discrepancies in institutional features between the CEE and the Western EU, suggesting persisting differences in CD practices of corporations from TEMs and developed Europe (Ding et al. 2009). Divergent are also i) costs and benefits of uniform global accounting standards adoption (Ionas¸cu et al. 2007; Homola and Paseková 2020), ii) economic consequences of variations in CD (e.g. stock volatility), as comparing TEMs with mature Europe (Ding et al. 2009). Accordingly to the provisions of Accounting Directive (EP; EC 2002; van Hulle 2005) or IAS Regulation (Brüggemann et al. 2013), TEMs, as EU Members, were obligated, uniformly with the advanced, Old-EU, to mandatory implementation of IFRS for their local regulated markets, regardless stage of local stock market advancement (Honková 2015; Armstrong et al. 2010; Djatej et al. 2011; ICAEW 2007). Inconsiderate of the disadvantageous, inferior development statuses of CEE markets vs. the Old-EU, regarding legal, institutional settings, CD, CG, CC and capital culture in general (as Post-Communist economies being vastly unprepared, underprivileged in these areas) (Ding et al. 2009; Dobija and Klimczak 2010; Procházka 2017). Hence, such an equal EU-wide, EU-to-TEMs top-down IFRS adoption, had spillovers, up to non-listed entities (Procházka 2016b, 2016a). It contrasts with non-EU EMs, being unrestricted to choose whether, and when, to adopt IFRS, having built this decision on particular, country-determined factors, e.g. high economic growth, institutional, legal system, advanced educational level (Zehri and Chouaibi 2013). Under such top-down IFRS adoption, its specifics were identified on TEMs, incl. potential negative outcomes, s.a. adverse, unpredictable or unintended results (Procházka 2017, 2016b, 2016a). On EMs, such results are more severe amid PTCs with weaker CG, and regions with poorer institutions (He et al. 2012).

EMs' IFRS-based CD experience is mixed and diverse, up to disasters, fiascoes (Albu and Albu 2012) (Zaman Mir and Shiraz Rahaman 2005). On EMs, adoption of global accounting standards, may not only fail to produce the intended benefits, but generate new opportunities for intentional shaping of accounting information (He et al. 2012). IFRS itself do not ensure reporting data transparency, as country- and PTC-specific prerequisites must be met to benefit from IFRS-based CD - also reporting incentives, functioning enforcement regime are

crucial factors of the success, and so on EMs, its adoption did not mitigate the initially existing lack of transparency of CD (Ball et al. 2000; Ball et al. 2003). IFRS-based CD has had a changeable level of influence amid EU countries (André 2017), also with post-IFRS adoption evidence on multiculturalism and lack of global transparency (Crowley et al. 2015). Also European national approaches to international accounting standards remain divergent (André 2017). Within the EU, post-Accounting Directive, there are still major disparities amongst countries related to companies transparency and CD practice, ranging from high to low (Crowley et al. 2015). (Crowley et al. 2015) have regarded Poland amid EU "low transparency countries". Moreover, country location (Old-EU), size of a PTC (equity, revenue), cross-border trading, are determining voluntary filing in English (Crowley et al. 2015). Thus, expected unified European entrepreneurial environment is doubtful, additionally regarding prevailing post-IFRS EU capital market (and their supervision) segmentation and fragmentation, enduring post-IAS Regulation, ever distinguishing the CEE and the Old-EU (Bhatia et al. 2019). Likewise, deficient and fragmented oversight (Garcia Osma et al. 2020). Shortcomings prevail in the regulations at the EU institutional and local levels, regardless of IAS regulation, concerning credible CD practice, business ethics, CG; resulting in CD and audit irregularities, unethical D&Os behaviors, (Soltani 2014; Garcia Osma et al. 2020). As accounting system impacts how outsiders perceive and use the company's CD (Bradshaw et al. 2004), CD transparency is of "utmost importance", thus CD issues are especially significant on TEMs, as already lagged in CD transparency comparing to Western (and Northern) Europe (Ding et al. 2009). Limited quality of CD, followed by its poor enforcement, perceived corruption, low investors' protection laws, including poor CC, CG systems with weak shareholders' rights - are institutional features illustrating many transitional EMs (Djankov et al. 2016; Mueller and Peev 2007; Albu and Albu 2014; Filip and Raffournier 2010).

Additionally, there is a research gap in TEMs management accounting and control systems (MACS), where cultural dimensions are strongly influential (Ezzamel and Xiao 2011). TEMs, besides weak CG and legal frameworks, CD infrastructure and enforcement was for long also deficient (Albu et al. 2017a). EMs have poorer accounting infrastructures, different economic and social priorities (Ezzamel and Xiao 2011). On EMs, local culture has a noteworthy effect on the judgments, thus once interpreting and applying IFRS, it comprises uncertainty expressions, that hampers interpretation and application of IFRS on EMs in a consistent manner (Chand et al. 2012). Accounting reforms are the more problematic for TEMs, as besides being a technical exercise, they have a strong political, historical and social connotations (so, the more specific for post-communist countries, as also accounting, attitudes,

meanings of accountability, are historically determined, highly peculiar in post-centrally-planned economies), thus unique and unusual challenges persists for accounting regulation there (Hopper and Hoque 2004). Hence, CD and its enforcement on TEMs prevails in a catching up-phase with Western Europe (Albu et al. 2011; Albu et al. 2020; Nicolae Albu et al. 2021). Also exhibiting persisting gap between the CEE and the Western EU in accounting information quality (Djatej et al. 2011, 2009; Ding et al. 2009). Likewise, there is evidence concerning an audit expectation gap to be deeper on TEMs, than on more advanced markets (Albu et al. 2017a; Mennicken 2008). The more problematic issue becomes, as audit perform a larger governing role in weaker legal environments (Han et al. 2012). Thus, increasing transparency of CD and related areas on TEMs, is one of core means to eliminate additional uncertainties that market participants (foreign, domestic) face on them (Ding et al. 2009). There are specific, local challenges and problems on TEMs regarding IFRS-based CD (Albu et al. 2014a; Albu et al. 2020; Albu et al. 2017b), including influencing true and fair view (Homola and Paseková 2020). Patterns, outcomes, challenges of IFRS-based CD on TEMs, evidence both, regional and countries specificities (Honková 2015; Procházka 2017). Even MMs with the strong investor protections, were immune to swift changeover (Procházka 2017), thus the more problematic it may be on TEMs, with their insufficient investor protections (Albu et al. 2012; Albu et al. 2014a; Narayanaswamy et al. 2017). IFRS-based CD on TEMs did not prove to bring theoretically expected benefits, inclusive of anticipated potential for the reduction of the occurrence of CD misstatements (Homola and Paseková 2020). The level of CD quality (transparency) is lower for TEMs' entities, than for EU MMs' entities - jointly before and after the EU-wide mandatory introduction of IFRS-based CD (Ding et al. 2009). The quality of public information in much higher for the Western-EU, comparing to TEMs (Djatej et al. 2011). On given TEMs, introduction of IFRS-based CD, was followed only by a moderate increase in CD quality, and there is heterogeneity in the degree of compliance across PTCs from a given TEM (Procházka and Zouhar 2019). Accounting quality (AQ) is not imported from the outside, especially, not solely through a transformation of its standards (Leuz et al. 2003). AQ is determined with principles, methods, degree of legislative regulation, and accounting data processing may be further flawed with accounting irregularities (errors, misstatements), thus consequently transported to CD (Pasekova et al. 2018).

As AQ is a function of the institutional framework (Ball et al. 2000; Ball et al. 2003), the more challenging it is for TEMs (Albu et al. 2020; Albu et al. 2014a; Albu and Albu 2014; Albu et al. 2012; Albu and Albu 2012). AQ and its relevance, are determined with its correctness, freedom from irregularities, and perceived possibility of bias due to those

irregularities - thus on TEMs especially, differences in perception of the risk of irregularities occurrence are affecting and defining seemed AQ (Pasekova et al. 2018). AQ and the scope of CD, are particularly important on TEMs, as they establish socio-economic relations between a PTC and its outsiders (Kristofik et al. 2016). AQ is directly affected by accounting irregularities (Pasekova et al. 2018). TEMs exhibit specific factors, determinants, contributing to the occurrence of irregularities (misstatements), regarding CD under IFRS, affecting CD users substantially, and IFRS as such, do not evidence to affect accounting misconduct occurrences on TEMs (Homola and Paseková 2020). On TEMs, most negatively impacting AQ are accounting data and CD misrepresentations, misstatements, failures, frauds, specifically influential are frauds conducted by management (D&Os) (Vlčková and Friebel 2015). On TEMs there are specific problematic areas of CD, perceived as most probable for irregularities occurrence (Pasekova et al. 2018). There, also managerial pressures are proven to substantially affect the occurrence of misconduct (Homola and Paseková 2020; Vlčková and Friebel 2015).

2.3.4 Financial and Non-Financial Information as Two Components of Corporate Value Creation and Corporate Disclosure

Literature uses term ‘sustainability’ as equivalent in meaning to ‘ESG’ – environmental, social, governance issues, incl. fiduciary duties (COM(2021) 188 final 2021), (Brandon and Kruger 2018; Friede et al. 2015; Dimson et al. 2015a). So do institutions, governments, and legal acts content (EBA 2019; COM(2021) 189 final 2022; EFRAG 2022i; Ministerstwo FiPR 2021; Szewc 2021; G20 2018). The concept of ‘sustainability’, ‘inclusiveness’ of economic growth and all economic activities (specifically business, finance), was globally introduced with the UN SDGs (G20 2018; EC; DG FISMA 3/8/2018). This approach ensures, and aims to achieve, that ‘no one is left behind’ (EC; DG FISMA 3/8/2018). Corporate SD (sustainable development) is expected to generate improvements in risk management, financial performance, operational performance (Gangi et al. 2020). CSR (Corporate Social Responsibility) reports issued by entities, enclose data on their policies, activities, accomplishments, regarding specific categories (Yakovleva 2017), e.g. environmental, employees, social matters, respect for human rights, anti-corruption and anti-bribery (Directive 2014/95/EU 2014). Historically, these issues were voluntary, but EU Members were empowered to mandate their disclosure (Directive 2014/95/EU 2014). Thus, European Commission (EC) announced the need for all entities to provide such a disclosure, on a mandatory basis, according to established rules and specific standards (COM(2021) 189 final

2022). Thus, the proposal for a new Directive as of April 2021, on corporate sustainability reporting, was published (CSRD (Corporate Sustainability Reporting Directive)) (EC 2021b). Non-financial reporting is of importance to long-term value creation and as a matter of transparency to investors, stakeholders, society at large (CSRD Proposal, COM(2021) 189 final, par. 4, 1, 2). NFR represents relevant information for proper decision-making, both for corporate executives and corporate outsiders (Ministerstwo FiPR 2021). Sustainability reporting (SR) gained in significance, whereas globally consistent and comparable SR standards are increasingly expected by investors, corporations, other stakeholders (COM(2021) 189 final 2022). Lack of consistency, comparability in non-financial reporting (NFR), sustainability information provided by PTCs, prevent adequate determination of their risks, impacts, opportunities (EC 2021b). EU expects to meet these needs, with adoption of CSRD and standards for SR, developed by EFRAG (European Financial Reporting Advisory Group) (EC 2021b; EFRAG 2022i). Sustainability is largely determined by CC, and CC influences the quality of SR (Jankalová and Jankal 2017). IFRS Foundation created International Sustainability Standards Board (ISSB), to enforce globally consistent, comparable sustainability disclosures, and assist investors, other market participants (IFRS Foundation 2022). As CD has a direct impact on a corporation's value and its ability to create value, it comprises both financial and non-financial disclosures (IFS 2020; EC 2021b). Thus, an entity, through non-financial disclosures, shall provide an overview of its development, performance, position and the impact of its activity, regarding social, environmental and human rights issues (EC 2021b; COM(2021) 189 final 2022; EP; EC 2014). Financial statements, are accompanied by non-financial statements, as to provide a coherent, integrated, comprehensive view of PTC's value creation, as CSR is a vital component of value creation (Lindgreen and Swaen 2010). With sustainable corporate value creation (CVC), being based on various types of resources, e.g. physical, financial, human, social, knowledge, natural (CSRD Proposal, COM(2021) 189 final, par. 7, 3, 2021).

The non-financial information (NFI) is communicated primarily via CSR (Corporate Social Responsibility) reports and SR (COM(2021) 189 final 2022; EC 2021b; Directive 2014/95/EU 2014). CSR reporting has been, for long, a significant concern, and a focal point of research for academia, institutions, and the business world (Yakovleva 2017). CSR reporting standards define qualitative characteristics of a relevant, faithful, comparable, verifiable and understandable information (Ministerstwo FiPR 2021). Regarding comparability, reported information must be consistent and also consistent over time (Ministerstwo FiPR 2021). With CSR reporting being standardized, it has a universal, international character (Ministerstwo FiPR

2021). With investors' demand for non-financial reports comparable to financial reports (Deloitte 2021a), its practice is anticipated to develop (Ministerstwo FiPR 2021). CSR refers to an entity's responsibilities for the impact of its activities on society, thus CSR encompasses internal (corporate sustainability) and external (societal sustainability) sustainability, involving both stakeholders and shareholders (EU 2022; EC 2021b). CSR goes beyond regulatory and legal requirements, thus embraces investments in human capital, relations with stakeholders (EC 2021b). NFR, as CSR reporting, is a strategic instrument for monitoring and communicating entity's performance, information on management, improving competitiveness, results of managing the economic, environmental, social impact (EC 2021b). NFR's role of communication is essential, however its role for strategic decision-making is substantial (EC 2021b; Gangi et al. 2020). Also, NFR and financial disclosures are not only complementary, but interdependent, and integrated (Al-Hadi et al. 2017; Sweeney 2009). CSR standards are beneficial for entities, as they ensure enhanced credibility, mitigate asymmetric information, agency problem (Ioannou and Serafeim 2015). NFR is voluntarily reported by corporations, on a global scale, yet its importance was enhanced with a mandatory CSRD (Ministerstwo FiPR 2021). CSRD amendments to NFRD, introduce, inter alia, increased scope, higher credibility of reported information, standards for NFR (Ministerstwo FiPR 2021). Financial and non-financial information (FNI) significantly influences decision-making of corporations, stakeholders, external entities, thus, the CSRD proposal, to extend the scope of NFR to all large entities, and entities listed on regulated markets, to enhance the credibility, audit requirements of NFR (Ministerstwo FiPR 2021).

By European Commission, non-financial reporting is a tool, of social, economic significance, that ensures meeting the European Green Deal sustainability objectives (EC 2021b). Non-financial statements are integral components of corporate reporting (Yakovleva 2017; COM(2021) 189 final 2022). FNI are comprised in corporate reporting packages, e.g. management reports, with CD packages inclusive of MD&A (management discussion and analysis) (EC 2021b; Yakovleva 2017). The management report (or integrated report (IR)) requires an inclusion of financial statements and CSR information in one report (Guthrie et al. 2017). The scope of CD extends beyond financial statements, and is not limited to the IR, as entities provide additional disclosures, with a spectrum of accounting- or CSR-standards applications (Guthrie et al. 2017). In an IR, a company explains how it creates value, its strategy and business model (Deloitte 2021a). IR is recognized as a future of corporate reporting, and SR, CSR reporting are regarded as its vital elements (ACCA 2016; IFRS Foundation 2022; Yakovleva 2017). IR links strategy, governance, performance, and CSR context, so to

demonstrate a short-, medium- and long-term value creation (ACCA 2016). CSR reporting, with financial and non-financial information, interdependence of financial and non-financial factors, positively influences value creation (Deloitte 2021a; Friede et al. 2015). Investors regard ESG information and FNI as having interdependence, impact, while this impact increases over time, on the market with a trend toward a greater appreciation for ESG reporting (Deloitte 2021a; Friede et al. 2015). Investment decisions are made, based on FNI - as FNI affect future value creation, determine the ability to create value in a short-, medium-, long-term perspective (Deloitte 2021a). However, lack of uniform reporting standards for FNI causes problems, thus globally coherent and comparable FNI reporting are demanded by markets (Deloitte 2021a). IASB (International Accounting Standards Board) created a set of IFRS Standards, with relevance to value creation, investor communication (IFS 2020). With IR, as IASB work results on principles for an integrated corporate reporting framework, both financial and non-financial perspectives of value creation are to be met, thus expectations of investors, stakeholders, companies, other users of CD will be met (IFS 2020). Financial statements and other financial information, are crucial for value creation assessment, especially if investor interests are affected by value depletion, via equity, cash flows (IFS 2020). As financial and non-financial perspectives on value creation are a focal point of a globally coherent corporate reporting system, CSR (non-financial) disclosures are crucial for value creation (IFS 2020).

2.3.5 Direct and Indirect Costs and Benefits of Mandatory Corporate Disclosure

There are important insights into the relationship between CD and costs of equity capital, as high level of CD is effective in reducing the cost of equity capital, through decreased information asymmetry, reduced estimation risk, greater stock market liquidity, increased scrutiny from analysts, investors, greater accuracy of analysts' forecasts, increased earnings quality, credibility (Botosan 2006; Iatridis 2013; Botosan 1997; Easley and O'hara 2004; Dhaliwal et al. 2011; Derrien and Kecskés 2007; Lambert et al. 2007; Leuz and Verrecchia 2000; Healy et al. 1999; Kothari et al. 2009; Richardson and Welker 2001). Voluntary CD decreases cost of capital (Feng et al. 2015). CD quantity, quality, timeliness and credibility matter (Pae 2002). CD is related to corporation's information environment (Clinch and Verrecchia 1997). High CD quality increases the value of PTCs, as it reduces information asymmetry (Nagar et al. 2003). CD increases analysts' accuracy (Hope 2003a). Accurate financial statements are beneficial to executives, investors, analysts, other stakeholders, and the general public (Bonsall and Miller 2017). High-quality CD decreases uncertainty about

corporation's future performance, and may affect actual performance and investors' perception of the corporation (Verrecchia 2001). Reliable information increases investors' confidence and their propensity to participate in capital markets, by reducing estimation risk, information asymmetry, directly and indirectly (Lev 1988). Information flow also affects investors willingness to hold a company's stocks, as increased transparency is beneficial (Feng et al. 2015). If investors trust the provided information, they are prone to make investments (Healy et al. 1999). Also, investors may accept a lower rate of return (reduced cost of equity) if they are assured of the PTCs' sustainability, verified by independent, credible auditors (Healy and Palepu 2001; Hope 2003a). The informative role of CD, is to decrease uncertainty about corporation's value (Leuz and Verrecchia 2000). Reducing information asymmetry, CD reduces the risk premium required by investors (Graham et al. 2005). CD improves information environment, particularly for analysts (Hope 2003a). CD improves liquidity, thus attracts investment (Diamond and Verrecchia 1991; Leuz and Verrecchia 2000). Also, by decreasing the information gap, CD increases scrutiny from analysts, investors, that ultimately reduces cost of equity (Botosan 1997; Leuz and Verrecchia 2000; Hope 2003a; Leuz and Schrand 2009). CD benefits executives in their relationships with capital providers, investors (Healy and Palepu 2001). CD affects financial and non-financial stakeholders (Healy and Palepu 2001). A firm's propensity to voluntary CD is positively related to institutional ownership (Derrien and Kecskés 2007). Institutional ownership may increase firm value via improved CD (Healy and Palepu 2001). However, benefits of increased voluntary CD may be offset by the costs of additional disclosure (Verrecchia 1983).

There are various types of costs connected with CD, including preparation, proprietary, litigation, political costs (Healy and Palepu 2001). Also costs associated with increased exposure to scrutiny from analysts, investors, and competitive costs, connected with disclosing information that is useful to rivals (Healy and Palepu 2001). There are direct and indirect costs of CD (Botosan 2006; EC 2021a). Costs of preparing, disseminating the information may be extensive, as CD requires significant resources (Verrecchia 1983). The burden of direct and indirect costs associated with the disclosure requirements is especially heavier for SMEs, compared to larger firms (Matiş et al. 2015). SMEs lack resources for an efficient CD system, with human, technical, and financial resources being insufficient, resulting in competitive disadvantage (Nobre and Sousa 2019). Thus, SMEs are more inclined to withhold certain information, even material (Nobre and Sousa 2019). Also, managers are reluctant to increase CD levels due to costs associated with information preparation (Cormier et al. 2009). Particularly, proprietary costs of CD are relevant, as specific disclosed data, is exploitable by

competitors, causing the corporation's competitive position to deteriorate (Healy and Palepu 2001). Especially relevant on EMs, as those markets present higher informational inefficiencies, higher estimation risk, greater information asymmetries (Yuan Ding et al. 2007). Proprietary costs may prevent PTCs from making voluntary disclosures (Beyer et al. 2010; Healy and Palepu 2001; Botosan 1997). CD has also implications on the corporate information environment (Gomes et al. 2007). CD quality is crucial, to mitigate various costs (Beyer et al. 2010). However, the type of the disclosed information is a significant determinant of costs and benefits of disclosure (Beyer et al. 2010). There is a trade-off between costs and benefits, regarding CD quantity and quality (Beyer et al. 2010). If a firm's proprietary costs are high, the benefit of increased CD may be offset by the costs of additional disclosure (Verrecchia 1983). Nevertheless, the overall effect of CD on the cost of equity is beneficial, particularly on EMs, as enhanced CD reduces information asymmetry, estimation risk, leading to a reduction in the cost of equity (Easley and O'hara 2004; Leuz and Verrecchia 2000). In summary, CD quality improves the information environment, mitigates estimation risk, reduces information asymmetry, increases analysts' forecast accuracy, improves liquidity, and decreases the cost of equity (Beyer et al. 2010; Hope 2003a; Healy and Palepu 2001). CD transparency is paramount, as it reduces the risk premium required by investors, thus ultimately lowering the cost of capital (Easley and O'hara 2004). Consequently, CD is beneficial for both PTCs and investors, enhancing market efficiency, improving corporate governance, and promoting economic growth (Healy and Palepu 2001; Beyer et al. 2010; Leuz and Verrecchia 2000).

Deficient of mandatory, periodic CD ('good disclosure' (Stanga 1976, p. 43) with adequate accuracy of description of elements underlying the 'fundamental accounting equation' (Barrett 2005)), investors and other corporate outsiders, would not be capable of gauging a PTCs' picture, condition, performance, prospects (Barrett 2005; SEC 1989; 2019/980 2019; ESMA 2021). Such a disclosure (or transparency) is especially expected and demanded from issuers whose securities are admitted to trading on regulated markets (Directive 2013/50/EU 2013). Governmental and supervisory institutions, agencies, would persist powerless to i) assess PTCs' economic health, ii) to detect, sanction, deter PTCs' misconduct, iii) to prevent corporate practices misleading investors. Also, information-service providers and accrediting institutions could not credibly inform or give reliable attestation the general public about PTCs economic health or prospects (Barrett 2005). IOSCO's principles address CD from a multi-perspective of issuers, auditors, credit rating agencies, other information service providers (IOSCO 2010, 2017). CD is required to be transparent, full, accurate, timely, enclose financial results (and sustainability issues (IOSCO 2021, 2020)), risk, other information, that may be

material to decisions of finance providers (treated fair, equitably), implementing CD and CG best practice (IOSCO 2010, 2017; Oteh 2016). CD, as inclusive of e.g. MD&A, contains also prospective information (forward-looking) (SEC 1989). Unsatisfactory quality of CD creates an accountability gap, so high quality, reliable CD is crucial for EU CMU and for culture of greater public accountability (EC 2021a). PTCs are subjects to an assortment of obligatory disclosure requirements (legally imposed, stock exchange introduced, sectoral) and engage in various voluntary CD practice (Oberwallner et al. 2021; Li and Yang 2016; Farvaque et al. 2009; Chandler 1997; Romano 2005; Hazen 2017; EFRAG and European Stanard Setters 2007). As a rule, CD of PTCs, is subjected to audit coverage (SEC 1989; EC 2021a; Albrecht and Hoopes 2014b; Bonner et al. 1998). Mandatory assurance, accounting and auditing professionals, and a whole set of legally established norms (inclusive of an entity- and corporate individual- accountability, liability regimes) are a strong basis for reliability and credibility of CD (Rezaee 2004; Jain and Rezaee 2006; Brochet and Srinivasan 2014; Admati and Pfleiderer 2000; DeGeorge et al. 2013). Despite accounting profession's, financial institutions, academic's general consensus on the positive role and importance of obligatory, periodic, standardized CD, and non-financial disclosures, there are views contrary to the idea of mandatory CD. The reasoning is primarily based on cost-benefit analysis, and the assessment of the importance of CD to PTCs and corporate outsiders (inclusive of its transparency), particularity, value creation perspective.

From cost-benefit assessment perspective, CD produces benefits for corporations, investors, markets and economies, but, it has its economic consequences, in the form of indirect, direct costs for issuers (EC 2021a). Obligatory, periodic CD, in the form of reporting, entails the issuer's bearing the costs of data, report preparation, audit coverage, handling the related requirements (EC 2021a; Oberwallner et al. 2021; SEC 2010). The benefits of CD for a particular issuer, must outweigh the costs associated with their preparation and disclosure (Romano 2005; Farvaque et al. 2009). There are also concerns regarding the optimal extent of obligatory CD and best institutional setting for proper incentives of the issuers to produce (high quality) CD. Corporations, therefore, are presumed to publish periodic disclosures, upon the minimum required extent (Oberwallner et al. 2021; Farvaque et al. 2009). From the perspective of CD transparency, critics argue that more detailed, more transparent CD could cause issuers to reveal crucial information, that are beneficial to their rivals, competitors (Admati and Pfleiderer 2000; DeGeorge et al. 2013). This might be particularly relevant to high-tech, research entities, operating in sensitive, technological markets, thus losing their competitive edge. Also, CD and transparency may assist corporations in maintaining strong positions

towards stakeholders and suppliers, as well as investors (DeGeorge et al. 2013; Farvaque et al. 2009; Li and Yang 2016). There is evidence on entities' avoidance of producing public information (DeGeorge et al. 2013). Corporations tend to disclose less transparent, less detailed information to protect their private information and position on the market (Farvaque et al. 2009). On the other hand, the detailed, transparent CD may also result in significant benefits for corporations and corporate outsiders (Oberwallner et al. 2021). CD and transparency may help to mitigate risks associated with information asymmetry, attract long-term investors, improve investors' confidence, reduce cost of equity, and ultimately enhance the market value of the corporation (EC 2021a; Admati and Pfleiderer 2000; Healy and Palepu 2001; Leuz and Verrecchia 2000; Verrecchia 1983). CD and transparency can improve market efficiency, by providing relevant, reliable information to investors, analysts, other stakeholders, fostering an environment of accountability, trust (Healy and Palepu 2001). The balance between the advantages and disadvantages of CD, transparency, lies in optimal level of information provided, ensuring the benefits outweigh the costs, while avoiding the disclosure of sensitive, proprietary information (Romano 2005; Farvaque et al. 2009). Therefore, the optimal CD practice should strike a balance between the extent, quality of information disclosed, the associated costs, benefits (EC 2021a; Farvaque et al. 2009).

A comprehensive review of the benefits and costs of CD, demonstrates the overall positive impact of CD on corporations, investors, markets, and economies (EC 2021a; Farvaque et al. 2009). CD enhances market efficiency, improves corporate governance, promotes transparency, accountability (Healy and Palepu 2001; Leuz and Verrecchia 2000). High-quality CD reduces information asymmetry, increases market liquidity, lowers cost of capital, attracts long-term investors, improves investors' confidence (EC 2021a; Healy and Palepu 2001; Leuz and Verrecchia 2000). CD provides relevant, reliable information to investors, analysts, other stakeholders, fostering an environment of accountability, trust (Healy and Palepu 2001). The benefits of CD, include improved market efficiency, better resource allocation, enhanced corporate governance, increased investor confidence, reduced cost of capital, higher market liquidity (EC 2021a; Leuz and Verrecchia 2000; Farvaque et al. 2009). However, CD also entails costs, including preparation, audit, proprietary, litigation, political costs (Healy and Palepu 2001). The costs of CD may be substantial, particularly for SMEs, which may lack resources for an efficient CD system (Matiș et al. 2015). The burden of direct, indirect costs associated with disclosure requirements is especially heavier for SMEs, compared to larger firms (Nobre and Sousa 2019). Managers may be reluctant to increase CD levels due to costs associated with information preparation, and proprietary costs, as specific disclosed data is

exploitable by competitors (Cormier et al. 2009; Healy and Palepu 2001). The optimal level of CD practice should strike a balance between the extent, quality of information disclosed, the associated costs, benefits, ensuring the benefits outweigh the costs, while avoiding the disclosure of sensitive, proprietary information (Romano 2005; Farvaque et al. 2009). In conclusion, the overall impact of CD is beneficial, particularly in enhancing market efficiency, improving corporate governance, promoting transparency, accountability, reducing information asymmetry, increasing market liquidity, lowering cost of capital, attracting long-term investors, improving investors' confidence (EC 2021a; Healy and Palepu 2001; Leuz and Verrecchia 2000). However, the costs of CD, including preparation, audit, proprietary, litigation, political costs, must be considered, particularly for SMEs, to ensure the optimal level of CD practice, where the benefits outweigh the costs, while avoiding the disclosure of sensitive, proprietary information (Romano 2005; Farvaque et al. 2009).

3 Failure of Corporate Governance and Fiduciary Duties

3.1 Pernicious and Unintended Effects of Corporate Disclosure. Intrapartes Information Gap and Informationally-Disadvantaged Parties

The logical role of accounting ends is triggering and guiding suitable accounting actions as means toward accounting ends (Littleton 2016a). The primary amenity of accounting concepts arises from their relation with relevant accounting actions (Littleton 2016c). The account form adheres to and pursues the precedent of a substance of a given exchange-priced transaction, and autonomous judgments and intentions of plausible benefits to each of the transacting parties are a fundament of requited exchange of corresponding and quantitative consideration (Littleton 2016f). Judgments and decisions exerted by D&Os produce an ongoing and permanent flow of transaction experience (Littleton 2016c). However, public CD sometimes is perceived as of limited quality, thus incentivizing its users to seek the enhanced quality and sources of corporate information, contact corporations directly and use other private CD channels (Holland 1999; Holland 1998), as there are limitations to accounting disclosure issued in financial reports (Benston et al. 2006). Private and public CD, when joined, can establish a knowledge advantage that may be beneficially employed by a PTC's institutional financial stakeholders to diagnose areas of concern in strategy, BoD effectiveness, management quality, and their influence on the entity's performance (Holland 1999). In the classic literature, there were many instances of being guided by the heuristic framework of 'superior disclosure' at that time understood as 'more disclosure is better' (Cerf 1961; Kahl and Belkaoui 1981). Yet, then revisited, and proven untrue (Ball and Foster 1982). CD is driven by i) country- and entity-level factors (Holmstrom and Kaplan 2003; Engel et al. 2007; Wintoki 2007; Doidge et al. 2007; Francis et al. 2008; Ball 2006), and, importantly, also by ii) CD incentives (Burgstahler et al. 2006; Deumes and Knechel 2008; Bushman and Piotroski 2006; Ball et al. 2003). Thus actual benefits and costs of CD vary greatly among countries, entities, over time and regulatory approaches (Farvaque et al. 2011). However, when corporate misconduct and accounting irregularities occur in high magnitude, public confidence and trust in accounting information (CD) and regulated capital market as such, is diminished, and those with financial claims in PTCs are demanding a substantially higher rate of return as accounting for greater overall and specific uncertainty regarding CD's accuracy (Raab 1987, p. 514). An amplified uncertainty might increase short-term market volatility, with stock prices digressing ('overshooting') in either direction (Klarman 2009, p. xv). Also, contemporaneous changes may be a cause of alterations in the behaviors of market participants, especially retail investors, that put together

with the global interconnectedness of capital markets, makes capital market supervisors' incessant risk monitoring and vulnerabilities assessments crucial for stable, fair, orderly markets and economies (Cuervo et al. 2022).

The meaning of 'investor relations' is to persistently make publicly available decision-relevant corporate information to market participants, which is a consequence of either obligatory CD or voluntary (discretionary) disclosure policies (Bassen et al. 2010). In agreement with agency and information risk theories presumptions, improved corporate communications (enhanced IR) mitigate information risk or moderate agency problems triggered by high information asymmetry (Agarwal et al. 2008). Financial analysts provide professional expertise and communication channels for both managers and investors (Lu et al. 2018). PTCs might use information intermediaries to reduce information asymmetry (Bergh et al. 2019). Financial (security) analysts are positioned between the management of a PTC and outside market participants (investors) and are positioned to enable the reduction of information asymmetry between those two groups (Bergh et al. 2019; Feldman et al. 2014). PTCs also can depend on market forces as information arbiters (Bergh et al. 2019), e.g., regarding the acquisition of private corporations versus PTCs (Capron and Shen 2007) or the specificity of services available to parties due to the innate qualities of the Internet (mitigation of transacting costs via decrease of opportunism, asset specificity, some information asymmetry (Ahuja and Yayavaram 2011; Afuah 2003)). Analysts and other information professionals are significant and valuable participants in the capital markets, gathering, processing, compiling and deriving handy, convenient, actionable insights from available data to the market (Lu et al. 2018). Especially, the sell-side analysts perform unique functions in the market (Newsome 2005, p. 453). Analysts and other information professionals protect investors and safeguard their comfort in capital markets (Lu et al. 2018). Yet, there are potentially troublesome aspects in the relationship between professional information and finance providers, information asymmetry on the market, market inefficiencies and CG, and conflicts of interests, e.g., stock analysts, investment banks, brokerage professionals, etc., s.a. evaluating stocks of corporations that are promoted by the very entities that affiliate or employ those analysts and bankers or who seek to execute a given transaction or win a client (Jensen 2000b; Newsome 2005; Chan et al. 2007), or had colluded with, aided, abetted, assisted in PTCs and D&Os in fraudulent activity – that have had their parts in numerous corporate financial scandals over the history (SEC OiA 2005).

Analysts and brokers lacking independence apart from harming their clients, also distort the required qualities of market information and competitiveness, thus broadly affecting market efficiency (Newsome 2005). Analysts' and brokers' unethical behaviors, deficient

independence, distorted integrity or outright collusion in fraud are often rooted in unresolved conflicts of interests (e.g. deficient legal resolutions) (Chan et al. 2007; Newsome 2005; Lu et al. 2018; Veit and Murphy 1996). Recommendations issued by underwriter analysts exhibit substantial bias; moreover, the market is not acknowledging the complete magnitude of this bias (Michaely and Womack 1999). Investors are unsuccessful in considering that analysts' integrity is jeopardized by conflicts of interest and misguided by affiliated analysts (Lu et al. 2018). Also, information processing abilities differ among individuals, also cultural divergences in visual information processing (Boduroglu et al. 2009). Between retail investors (unsophisticated) and sophisticated investors exists a substantial information asymmetry, which is a pervasive friction in the capital market (Kim and Verrecchia 1994; Leuz and Verrecchia 2000; Easley and O'Hara 2004; Amihud and Mendelson 1986). Likewise, retail investors often do not seek and process all corporate information diligently, but rely on professional information providers' coverage (Newsome 2005), whereas forecasts, ratings, and expert opinions are sometimes intentionally biased, as deliberately affected by information providers colluding with a deceitful PTCs, in order to achieve some underlying purposes of dubitable nature (Chan et al. 2007; Newsome 2005; Veit and Murphy 1996; Michaely and Womack 1999). Investment fraud victims possess different characteristics as compared to non-fraud victims, see governmental study (Knutson and Samanez-Larkin 2014). Moreover, there are market-wide effects of corporate reporting activities; however, CD's i) economic efficiency, ii) overall desirability, and iii) aggregate outcomes differ amid countries and users, as there are different regulatory regimes and economic consequences of CD and its regulation (Leuz and Wysocki 2016a, 2016b, 2008). CD settings are always unique and distinctive as numerous corporations interplay and communicate with heterogenic investors in stock markets (Leuz and Wysocki 2008). The broader information setting of the capital market is related to financial analysts' following, institutional investors' activity, and investor participation (Leuz and Wysocki 2016a). The CD is ineffective when it delivers insufficient, incomprehensible, inadequate, or incomplete disclosures (Schwarcz 2011, 2004; Farvaque et al. 2011; Farvaque et al. 2009).

Modern developed markets are governed by a clear legal rule prohibiting selective CD and also encouraging broad public CD, requiring executives to disclose material nonpublic information to all market participants equally at the same time (Jagolinzer 2009; Rose 2008b; SEC 2000). Qualities of patience, discipline, risk aversion might be pre-determined for an investor (a natural person), as after becoming knowledgeable of the value approach, an individual either is able and willing to follow it, exhibiting patience, discipline, or not (Klarman

2009, pp. xvi–xviii) (Buffett 1984, pp. 4–15; Graham et al. 2006). Contrarily to sophisticated institutional investors, who, though, having diverse legal forms and various investment strategies, are legal persons, meaning they are institutions that manage other parties assets (Fitchner 2020). Retail investors are inferiorly informed and possess substandard information processing capabilities compared with institutional ones (Amiram et al. 2016). They have limited assets at their disposal and diversification opportunities (asset indivisibility problem, as the minimum traded unit is finite, lumped with transaction costs, the market portfolio of limitedly wealthy investors tends to be suboptimal, lie below CML (DeGennaro and Robotti 2007, pp. 1–8). Thus, often they are investing in stocks via mutual funds (they constitute over half of the retirement savings (Vereckey 2022, p. 1)), as they are a common and efficient idea for risk diversification for smaller and non-professional investors (Vereckey 2022). There are divergences and dissimilarities regarding investment behaviors and the performance of different clusters (types) of investors (Grinblatt 2000). Institutional investors' superior rate of return performance has been under scrutiny (Barber and Odean 2011), with some evidence for this superior performance (e.g., gross margin) for some of the mutual fund types (Grinblatt and Titman 1989). It has been documented that retail investors (even before accounting for costs) earn low returns, and transaction costs are apparent (evident) reductions for their returns (Barber and Odean 2011, p. 1). Individual decision-makers are especially prone to i) misinterpret available data, ii) misdirect their analyses, iii) reach inaccurate conclusions, iv) employ emotional reasoning, v) view through the short-term lens, vi) be susceptible to exuberance, panic, vii) individuals blending their speculative operations with investment ones (mentally and physically), which is the more true for those employing other than value-investing approaches (Klarman 2009; Graham et al. 2006; Greenblatt 2010; Shiller 2016; Kahneman et al. 1982; Kahneman and Tversky 1979).

Likewise, the ‘complex information economy’ requires individuals to possess a specific mindset that enables them to overcome i) distractions and ii) interruptions; so as to be able to i) make the best use of their intellectual capacity (Newport 2016) and to ii) employ ‘slow thinking’ (smart, logic, considerate, knowledgeable) to enhance decision-making process (Kahneman 2011). Retail investor performance is considered on average or as aggregated as ‘poor’ (Barber and Odean 2011). They hold undiversified portfolios and make narrowly framed decisions (evaluate shares in isolation, not bearing them in mind as a whole portfolio); moreover, their trades are proven to be correlated (D'Hondt and Roger 2017). Modern behavior finance research has evidenced that retail investors who are direct shareholders (hold common stock in a straightforward manner) suffer substantial adverse consequences when they personally trade

actively on the stock markets, mostly due to heuristic driven biases and trading costs (Barber and Odean 2000; Odean 2016; Barber and Odean 2001; Barber et al. 2009). Likewise, whereas individuals have a good intuitive grasp of quantities, they have a poor intuitive grasp (intuition) of probabilities and statistics (Shefrin 2002c; Odean 2016; Barber and Odean 2011). Also, a majority of individuals lack formal training and regular practice of probability-solving problems, therefore, while employing heuristics of availability when assessing the risks of corporate failure and fraud, as surrounded with information of successful PTCs and naturally, it is easier for them to recall numerous successful PTCs over fraudulent and bankrupt, they inaccurately percepts and assessed the probability of successful PTCs (Odean 2016). Another retail investors' disadvantage regards models of personal or subjective probabilities, and subsequently concepts of biased decisions under ambiguity and ignorance (Machina and Siniscalchi 2014)(Mas-Colell et al. 1995, pp. 205–299)(Fox and Tversky 1995). Sentiment investors employ more often system one thinking (S1 automatic, instinctive, affective or 'first impression') rather than system two (S2 effortful, deliberate fact analysis) (D'Hondt and Roger 2017). Whatever risk is investor considering, he creates a mental representation of that risk (Barberis et al. 2016, p. 2). S1 automatic and affective 'first impressions are significant in the decision-making process of retail investors, which makes them more susceptible to investment fraud (Barberis et al. 2013). Moreover there are individual variations in susceptibility to financial fraud, diagnosed via an amalgamation of psychological, historical techniques, along with neurobiological data derived from brain imaging methods (Knutson and Samanez-Larkin 2014).

Individuals' decision-making confidence upsurges with the quantity (volume) of information processed; even if accuracy usually does not, they seek stable and shared estimates in which they could have confidence, plentiful seek social value rather than the certainty of knowledge (March 1994). The last four decades are the period of most intense i) information dissemination and ii) excess information so far, as human attention and cognitive abilities, in general, are limited resources, the information overload is affecting human decision-making heavily (Parra-Medina and Álvarez-Cervera 2021). Thus, the emergence of novel phenomena occurred due to vast and continual fluxes of information, predominantly i) information overload, ii) misinformation, and iii) the persuasive design, which all are potent to influence the information users' cognition negatively (Voinea et al. 2020, p. 2345). The information overload concept describes a situation i) in which the volume and or intensity of information surpasses the individual capacity for cognitive processing (as it is innately limited), and it may lead to dysfunctional effects (Parra-Medina and Álvarez-Cervera 2021, pp. 421–423), ii) when

the information processing demands on an individual's time to carry out interactions and internal calculations surpass the supply and or the capacity of time accessible for such information processing (Schick et al. 1990), iii) ‘amount or intensity of information exceeds the individual’s processing capacity (…) leading to (…) poor decision making, and other undesirable consequence’ (APA 2023, p. 1), iv) ‘an overabundance of information’ overload is not only the amount but also ‘diversity of information,’ ‘when information user fails to process (…) information’ (Hoq 2016, 49, 52, 54), v) ‘ not being able to process the provided quantity of information adequately’ (Eppler 2015, p. 251). There are five clusters of reasons for information overload i) a myriad of, a multiplicity of information sources, ii) excessive or surplus information, iii) difficulties regarding information management or processing, iv) irrelevant and unimportant information, v) time constraints for making information understandable (Eppler and Mengis 2004, 2008). Modern technologies have prompted the acceleration of the pace of information i) generation, ii) issuance, iii) dissemination, iv) sharing, also the existence of a myriad of sources, so consecutive excess of information has become a main concern for information users, issuers and data managers (Hoq 2016). It is of a special pertinence regarding corporate information and communications, financial market and macroeconomic data, financial market participants data environment, such as i) tool-assisted financial information and market insights services or financial analysis and trading software, services, data and solutions , (Thomson Reuters Refinitiv EIKON, S&P Capital IQ Platform/ S&P Global Market Intelligence, Bloomberg Terminal, Sentieo Financial Intelligence, AlphaSense, PitchBook Data, FactSet Research Systems, Factiva by Dow Jones, Clear Investigation Software, Audit Analytics Restatement Database, U.S. GAO Fin. Stat. Restatement Database, SCAC Stanford Securities Class Action Clearinghouse, SeekingAlpha, etc.) ii) market infrastructure repositories, numbering agencies, exchange- and settlement and payment system- statistics (CCPs, CDSs, NNAs- ecosystems), iii) governmental, institutional- data bases and information services (SCAC 2023; U.S. Government Accountability Office 2003; U.S. General Accounting Office 2002) (ESMA 09/20/2021; 2014; Armakolla and Bianchi 2017).

There is a mixture of digital, printed, and visualized information of great volume, and making it understandable for an individual, applicable in his decision-making, and filtering out relevant information to his context is challenging; also, information overload and quality (fitness for the usage of information for its stakeholders) are troubling issues regarding communication (Eppler 2015). Consequently information oversupply or information glut is causing adverse effects for information users, disabling or hindering its efficient usage,

especially quick, convenient search for and analysis of relevant or required information, and consequently brings inability to process information in order to make informative, knowledgeable/conscious decision (Hoq 2016). Information overload's most common symptoms comprising of: i) misperception, misunderstanding, ii) disregarding pieces of information, iii) selectivity while choosing what to read or watch, iv) omission of important pieces of information, v) delayed decision-making, absence of critical evaluation of information (generating gullibility/naivete), vi) deprivation of control over information and superficial analysis of information, vii) devotion of insufficient time to information assimilation, dissent to receive communication, viii) hardships in selection of relevant information, ix) absence of a general perspective, limiting and reducing selection of search sources, x) allocation of a lesser amount of time to each source of information, xi) higher acceptance of errors, anxiety and confusion, stress, cognitive tension, analysis paralysis (incapability to employ information in decision-making), xii) deprivation of differentiation, xiii) misinterpretation of information, incorporating fragmentary information search strategies (Eppler and Mengis 2008, pp. 271–305; Voinea et al. 2020; APA 2023; Hoq 2016). The most significant change in the investment landscape that has happened over the past eight decades is said to be the growing preeminence of institutional investing or the 'rise of institutional investors (Fitchner 2020) (Klarman 2009, p. xxvii; Bebchuk and Hirst 2019). In 2017, the 3 largest global asset managers (Vanguard, BlackRock, State Street) jointly held 20.5 proc. of the shares in S&P 500 and 16.5 proc. in Russell 3000. Their ownership and related voting authority is expected to grow in the foreseeable future (Bebchuk and Hirst 2019. In most PTCs, institutional shareowners, together with big index funds, own a substantial portion of their outstanding shares (Bell et al. 2021; Bebchuk and Hirst 2019).

Institutional investors, investment analysts, and fund managers employ knowledge advances and private access for investment purposes, especially in countries with concentrated ownership (Holland 1999; Holland and Doran 1998). The i) inferior information processing abilities of individual, unsophisticated retail investors (investing public) in comparison to sophisticated, professional, institutional investors (Amiram et al. 2016), and ii) information asymmetry gap (discord) between those two clusters (Amihud and Mendelson 1986; Kim and Verrecchia 1994; Easley and O'Hara 2004) further aggravate the informational advantage of the latter. Also, institutional shareowners vote considerably more often than retail (individual) shareholders do (Bell et al. 2021). Information asymmetries amid investors initiate adverse mechanisms on capital markets (Leuz and Wysocki 2008). Also, as parties (or one party) may have incomplete information at the time of entering a contract, such a contract could

subsequently, in the future, bring inefficient outcomes (Hermalin and Katz 1993, p. 231). Uninformed and inferiorly informed investors are disadvantaged in transacting compared to privately or superior informed investors, so the first ones use private protection or exit the market, decreasing the liquidity of stocks (Leuz and Wysocki 2008, 2016a). Selective CD, along with analysts wanting to sustain access to D&Os (managerial active guidance for analysts' earnings estimates and models and to attract investment banking to their owners, has led to biased, predisposed earnings forecasts (Hutton 2004). Practices of 'private dialogue' information on earnings communicated expressly or through indirect guidance later were halted on developed capital markets via enforcement rulemaking on fair disclosure, as private or selective CD thwarts analysts' objectivity and established a noteworthy informational advantage of a select few over the rest of the market (Hutton 2004; SEC 2000). There are also other mechanisms and effects present on the primary and secondary stock markets due to the simultaneous existence of and trading between superiorly and inferiorly informed parties (Admati and Pfleiderer 1988) (Leuz and Wysocki 2008; Copeland and Galai 1983; Glosten and Milgrom 1985). Retail investors are affected by their livelihood, employment, and the location of their household, and they are also substantially affected by all sorts of media, also news (Barber and Odean 2011). In general, IA between retail and sophisticated investors is found to be prevalent financial market frictions (FMF) (Amiram et al. 2016; Easley and O'Hara 2004; Kim and Verrecchia 1994). FMF create costs that interfere with or hinder trades that rational individuals make (or would make in case of absenteeism of market frictions) (DeGennaro and Robotti 2007, p. 1); they are categorized into: i) transactions costs, ii) taxes, and regulations (incl. Implicit taxes, privately established regulations or restrictions, e.g., surrender charges in annuity insurances, short-sale restrictions in certain situations imposed by the stock organizer (DeGennaro and Robotti 2007, p. 6)), iii) asset indivisibility, iv) nontraded assets, v) agency and information problems (DeGennaro and Robotti 2007, p. 4) So, while releases of public information (CD) of any type, in general, is evidenced to decrease IA (Kim and Verrecchia 1994), the net effect of IA at the release is dependable on certain factors, there is a period-related IA fluctuation, and information gap between the two groups of investors is prevalent and influential; also there are IA increasing forces present on the market (Amiram et al. 2016). Also, often it is overlooked that even 'publicly 'available' information' is costly to obtain and process by its users (Gilson 1984, p. 553).

Fluctuating over time information category of FMF is also related to the technology available to market participants, while analysts, regulators, and law enforcement are making successful efforts to harness challenges of the analysis of more complex and far larger datasets

and institutions, having available adequate information and computing powers to offset the challenge (DeGennaro and Robotti 2007, p. 3; Grey and Fata 2017; Gray and Fata 2017), retail investors are lacking that degree of information and computing powers, generally having limited information, technology, funds, and being sentiment susceptible (Farvaque et al. 2011; Farvaque et al. 2009; Gao et al. 2022). Investors are subject to sentiment (DeLong et al. 1990), that is as 'a belief about future cash flows and investment risks that is not justified by the facts at hand' (Baker and Wurgler 2007, p. 129). However, real markets and investors are too complex to be condensed by a few selected biases to make simplistic predictions on investor sentiment patterns prices (Daniel et al. 2001)(DeGennaro and Robotti 2007)(Baker and Wurgler 2007). As presented, investors are a heterogenous group; with a great gap seen between small and large investors regarding i) bias-susceptibility, ii) information access and processing, iii) gullibility, iv) inexpertness, and v) naivete, thus 'small investors' are of special concern, and safekeeping of market supervisors and regulators (Fisher and Statman 2000; Levitt 2000; SEC 2005b). The 80s have brought the use of nomenclature of noise traders with regard to individual investors (D'Hondt and Roger 2017), as 'they trade on noise as if it were information' (Black 1986, p. 532). Nonetheless, the reasonability of an investor serves as a signpost for ascertaining liability in securities frauds; e.g., the 'reasonable investor standard' is used to determine if disclosure of information was significant enough to warrant fraud liability (Cornell Law School LII 2022a). For the Supreme Court's expoundation on for when withheld or misrepresented CD is material for a reasonable investor or when it altered the 'total mix' of information made available, see (U.S. Supreme Court 485 U.S. 224 108 S.Ct. 978 99 L.Ed.2d 194 1988). When investors do not have complete information on the appropriateness of distribution of their capital, the crisis environment is able to uncover the inherent weakness in the CG systems (Bae et al. 2012) and expose accounting shenanigans (Albrecht 2009a, 2003) by causing post-crises heightened investors' and regulators' awareness (Albrecht 2009a; Bae et al. 2012; Albrecht et al. 2008b; Albrecht 2003) and awareness-induced post-crisis investors withdrawals (Rajan and Zingales 1998). Altogether this can be perceived as an information-based argument explaining the association between CG and change in PTCs value throughout a crisis period (Bae et al. 2012, pp. 412–413).

3.2 Watchdog Lapdog Syndrome: Integrity and Independence Deficiencies of Public Accounting Professionals

The requirement to deliver complete and true corporate information to all market participants has been a cornerstone of securities public markets regulations on developed markets since the 1930s (Benston 1977, 1973, 1976) '(…) full publicity and information, and that no essentially important element attending the issue shall be concealed from the buying public (…)' (Roosevelt cited in (Benston 1977, p. 30)). Then, Roosevelt's decision on the preference of the concept of 'disclosure' mandated on securities issuers (versus also proposed blue sky laws to require governmental conduct of approval or disapproval of securities of PTCs) has defined for the following centuries the direction of PTCs' mandatory disclosure requirements (Benston 1973, 1976) and introduced caveat emptor principle, requiring truthfulness of disclosure and fair dealing on securities markets (Benston 1977). Fostering investment activity, participation, and protection of the investing public, inclusive of safeguarding the investing public from being defrauded, sits amidst core elements of mandate and values of every framework of securities regulation and securities enforcement worldwide (PH SEC 2022; SEC 2005b; IOSCO 2003, 2017; SFC 2021; FCA 2016). Reliable securities markets are balancing i) corporations' (issuers) thrivingness and prosperity with ii) consumers and investors being enabled to put trust and place confidence in transparent, open markets (FCA 2016; SEC 2005b). CD requirements are foremostly founded on the presumption that investors would be insufficiently served, as deprived of protections of corporate and securities laws, regulations and rulemaking and supervision by the securities authority (s.a. SEC), and most beneficial outcomes are resulting from the existence of these requirements, primarily 'less fraud on investors', oversight of CD (Benston 1977, 1973; Benston et al. 2006; Benston 1976). CG relies on gatekeepers to 'protect the interests of investors and shareholders' via monitoring activities of the behavior of the D&Os (corporate insiders) and by reporting the results of 'corporate performance in an accurate and unbiased fashion' that allows for objective valuations (Coffee 2001, p. 2).

As the aftermath of waves of corporate scandals, of which most encompassed failures of public watchdogs (or gatekeepers), s.a. public accountants and other accounting professionals (accountants, internal and external auditors, financial specialists (analysts, rating agencies, underwriters), financial media, audit committees, disclosure committees, legal and financial consultors, the extensive debate on their i) lack of integrity and independence and ii) gaps in quality and assertion of experts systems of accounting and auditing and weaknesses of

CG mechanisms started, with a prevalent recognition of the failures and inaptness of gatekeepers (Coffee 2001, 2002, 2005, 2019; Levitt 1998, 2000; Jain, Rezaee 2006; Rezaee et al. 2003; Riley, Rezaee 2010; SEC 2001 File No. S7-13-00), also described as ‘acquiescent’ (Coffee 2001) or a ‘lapdogs’ instead of ‘watchdogs’ (Bednar 2012; Barr 1999; Kelly 2002). Gatekeepers ‘whom the market has long trusted to filter, verify and assess complicated financial information’ ‘verification and certification services to investors’ ‘reputational intermediary’ (Coffee 2002, p. 4-6). Such services with regard to PTCs consists of i) CD verification, ii) creditworthiness evaluation, iii) assessment of business, financial prospects, iv) appraisal of the fairness of a transaction, v) landing professional reputation, vi) assessment and vouching for PTCs about itself or certain event/transaction (Coffee 2001, 2002, 2005, 2019). It is both an academic and regulatory concept (Coffee 2002, p. 5; 2001 p. 1-63) (SEC 2001 File No. S7-13-00). The special gatekeeping role lies with accountants and auditors (Coffee 2001, p. 2; Bushman, Smith 2000). Public accountants enjoy trust from the public stemming from the public's acknowledgment of the rigor of CPAs' self-regulatory process; having a 'public responsibility' the profession is founded on public trust, integrity, objectivity, ethics, and competence, with the accounting and auditing being a bedrock of the economy, as ensuring the reliability of CD (Castellano 2002b, p. 56) (Castellano 2002a, p. 101). Accountants' stereotype, image, and role has been restationed from prudent 'bean counters' to hyper-modern 'extreme accountants' (Baldvinsdottir et al. 2009) or 'bean counters' to "value-adding business partner' (Samanthi and Gooneratne 2022), to 'criminally inclined expert' (Richardson et al. 2015). That portrays the degree of the shift from AICPA's public accounting profession image and reputation based on the highest sense of integrity" in "the public interest" (Rogers et al. 2005). This shift echoed changes in broader social practice, with accountants constructed as i) 70/80s responsible and rational, ii) 90s an instructed action, iii) post-90s as a hyper-modernity, a more hedonistic person (Baldvinsdottir et al. 2009). Nonetheless, the fact of a change in the role and image of an accountant is a settled, common consensus (Samanthi and Gooneratne 2022; Yazdifar and Tsamenyi 2005).

The goal of the standard setting and oversight in CD and audit is the establishment of such an oversight that expresses a proactive investor engagement, with investor protection as its mission and that benefits investors and the general public, and exert proactive, innovative, and data-driven standard-setting and enforcement actions targeting audit violations, that commonly expose investors to greatest risk (Thompson 2021; Williams 2021). The conceptual framework, encompassing the accountant's traits, characteristics, and accounting task functionality, has classified perceptions of four stereotypical subtypes (bean counter,

entrepreneur – negative types; scorekeeper, guardian- positive types), with i.a. ethics as one of its primary constructing dimensions (Richardson et al. 2015). There are also other views on the contemporary role of an accountant, s.a., strategic decision-maker, value-adding business partner, cross-functional team member, or data scientist (Samanthi and Gooneratne 2022). The change has detached self-discipline and fairness from the image of an accounting person, which has, in turn, brought consequences for the trustworthiness of the whole accounting profession (Baldvinsdottir et al. 2009), as well as accounting/auditing scandals and their effects on the public practice of accounting and auditing, including ethical and identity crisis (Rezaee 2004; Richardson et al. 2015; Rogers et al. 2005). Due to their input to sustainability information management, expertise, and power in corporate structures, accountants may act as gatekeepers of sustainability information (Schaltegger and Zvezdov 2015). It is the more accurate at present, as recent EU legislation has equaled non-financial/sustainability information with financial information as binal components of corporate value creation and mandatory disclosure (Deloitte 2021; COM(2021) 188 final 2021; EC; DG FISMA 3/8/2021, 2021; EFRAG 2022c) (EFRAG 2022b). Formal requirements for their correspondence, interference, interrelation, and interconnectedness have been established (COM(2021) 189 final 2022; GPW and EBRD 2021; VRF/IIRC et al. 2020; ESMA 2022; Biernacki 2021; Kinderman 2020) due to their reciprocal correspondence (Eccles et al. 2001; Eccles and Youmans 2015; Eccles et al. 2014; Barnabè et al. 2019; WEF et al. 2020) and double materiality union of impact materiality and financial materiality (EFRAG 2022a). Likewise, forthcoming EU legislation on the requirement of mandatory external audit of SCD (limited assurance, then reasonable assurance engagements) (COM(2021) 189 final 2022; Accountancy Europe 2021; ICAEW 2022) supports this role of accountants. The ISAE 3000 Revised turned out (in the European practice) to be the standard most commonly used when approaching sustainability information (SCD) assurance. However, there is no legal requirement to employ ISAE 3000 at European level. Also other ISAEs are applied, s.a. ISAE 3410 (Accountancy Europe 2021; IAASB 2013). Ethics are a guide, a directory, landmarks that navigate people's reasoning and, in consequence, behaviors that they employ to ensure their behavior is morally right; the value of ethics in the business context is growing in significance, especially when considering the hazards of unethical actions and the business benefits of corporate culture and ethical behaviors (Donahue 2021). Accounting professionals face numerous ethical and professional matters, and they give rise to ethical considerations in decision-making, ethical dilemmas, and moral reasoning; also professional obligations of accountants (CPAs) are considered; in all circumstances, accounting professionals shall advocate for the ethical commitment required to safeguard that their actions

meet the highest standards of i) integrity, ii) independence, iii) objectivity. (Mintz and Morris 2022) (Mintz and Morris 2020b). Accounting duties arising in more commonplace roles as internal auditors and external auditors require integrity and ethical behaviors to prevent and counteract fraud, cheating in the environment of abused confidentiality, dubious contingent fees, and illusive or entirely deficient auditor independence (Klein 2016). So-called 'professional judgment' and ethics in accounting are critical in contemporary public markets, where there are deficiencies in organizational ethics, dishonest, rotten corporate culture, and CG practices are doubtful (Mintz and Morris 2022) (Mintz and Morris 2020b).

The mission of accounting is disclosed by its conceptual objectives, like servicing the necessity individuals ‘have to review the prior transaction experiences of enterprises’ (Littleton 2016b, pp. 169–174). The information content perspective is an accounting theory that presumes accounting data are regarded as information carriers that shall facilitate informed, knowledgeable decision-making (Christensen and Demski 2002). Accounting data alone, however significant and mirroring explicit and evident transactions of a given entity, cannot be sufficient as a foundation for decisions (Littleton 2016d, pp. 165–168). The information content perspective offers a partially divergent approach as compared to more traditional yet contemporary accounting theories (Riahi-Belkaoui 2004; Hendriksen 1977) and varies greatly from classical accounting theories, where accounting reports were limited solely to information that may be expressed in monetary terms (Littleton 1962). The Communicational Model Of Accounting CMA presents an accounting communication approach based on a presumption that the ‘process of accounting’ (Karrenbrock and Simons 1958, p. 117) or accounting cycle (Finney and Miller 1957, p. 50) may be related and explained by the generalized model of the communication process (Toler 1963, pp. 107–137). The CMA defines elements of the accounting process: source, event, originator, encoder, message, channel, receiver, decoder, and feedback (Toler 1963, pp. 111–131). There is an integrity of the account and the transaction event that shall not be violated (Littleton 2016d). The readers of CD, i.e., the investing public, the general public, inclusive of unsophisticated investors, used to be addressed in accounting literature as ‘layman readers’ (Clapp 1948). ‘The accountants' technical vocabulary also comprises a group of words (…) which (…) may cause layman readers (…) trouble. These are words which are used today by everyone, but to which the (…) accounting profession attaches special meaning’ (Clapp 1948, p. 29). The concept of education of accountants and users of CD was addressed as an approach towards accounting words be assisted with mental quotes and to paying attention to the choice of words in CD (Toler 1963, pp. 104–106), in the sense of an advanced ‘word-consciousness (…) and pay attention in (…) choice of words, to the mental

habits of layman readers' (Clapp 1948, p. 37). Suppose in accounting information; the given word is acknowledged to be misleading. In that case, a suitable substitute shall be used, and attention shall be paid to inadequacies of accounting language, also considering that a language per se is 'an abstracting process and no statement can ever be final,' which is specifically true in accounting (Toler 1963, pp. 104–105). Though the CMA and earlier and concurrent concepts related to accounting information communication to its users (investing public) have been deliberated already decades ago (Toler 1963; Clapp 1948; Littleton and Persson 2016; Finney and Miller 1957; Karrenbrock and Simons 1958; Watts and Zimmerman 1979, 1986), communication with CD users remains a contemporary and unresolved issue that needs further attention and resolutions and thus is being addressed by the IFRS, Accountancy Europe, academia and other stakeholders (Hoogervorst 2021; Hoogervorst and Prada 2015). Despite assuming a risk-neutral valuation environment and assuming an identical set of information, accounting and market measures often diverge from each other, as diverse kinds of information processing are operated and employed (Christensen and Demski 2002). The attest function of the professional accountant does not embrace a requirement to interpret the importance and significance that the account data may have for numerous diverse users and cannot attest to the effect price-level fluctuations will have on the certified statement (Littleton 2016e, pp. 153–158). Non-accounting information is an additional information source to be combined with accounting information, so information content is settled dependently on what was previously known from other information sources, highlighting the significance of when information is released (Christensen and Demski 2002). To be informative and useful to its users, the quality of disclosure of risks made CRD by PTCs (Ibrahim et al. 2022) is essential; however, while measuring the quality of CRD, not only the volume of CRD shall be scrutinized, but also how it is disclosed ('how'), along with the disclosure content ('what') (Beretta and Bozzolan 2004). CRD distribution of the ongoing and potential risks that PTCs encounter that may influence their continuity so is recognized as a critical matter to stakeholders (Elamer et al. 2020; Elamer et al. 2019), thus positing to stakeholders one of the most significant CD categories (Ibrahim et al. 2022). Therefore, most CG codes address risk management, disclosure (Ntim et al. 2013), accounting standards, and CD regulations (Filzen 2015; Elzahar and Hussainey 2012). Among others, mandated risk factor update delivers investors timely information on potential future negative events (Filzen 2015). For an elaboration on CRD, see (Elzahar and Hussainey 2012) (Beretta and Bozzolan 2004) and low level of compliance with mandatory CRD requirements in emerging markets (Said Mokhtar and Mellett 2013) and CRD inter-country variance (Ibrahim et al. 2022).

3.3 The Failure of Experts Systems of Accounting and Auditing Consequences

There is an increasing interest in organizational trust within socioeconomic sciences, behavioral finance, and economic psychology research; the trust concept is assessed within the framework for asserting a level of trust that is optimal for cooperation, also the question of whether the trust is an efficient remedy for agency relationship persists; likewise low levels of trust disrupt opportunities to exchange, generating forgone opportunities (Ensminger 2001, p. 188). According to the rational self-interest approach, an individual puts trust in another individual, considering having adequate reasons to be assured that it would be in this other party's interest to be trustworthy, in a relevant way, at a relevant time; trust is enabled when the first party possesses sufficient knowledge of the other's party motivations and incentive structure and competence to be confident that the other party would fulfill the expected behavior (Coleman 1998) (Russell, Hardin 2001 p. 505). It is also addressed as 'knowledge-based trust,' which is built upon possessed information on the party, its competence, reputation, and intent (Yamagishi and Yamagishi 1994). There is also general trust, understood as a cognitive bias, founded on a belief in goodwill and the benign intent of the second party (Yamagishi and Yamagishi 1994, p. 136). People trust as they are able to allocate probabilities to expected gains from cooperation (Ensminger 2001 p. 189), e.g., estimation of risk as being translated into the estimation of trust in certain another party (Hardin 1993, p.516). Coleman Hardin's sense of risk can be contrasted with Yamagishi-Yamagishi's approach, where trust includes an overestimate that is not prudent nor warranted grounded on the available information, where suitable probability evaluations are not available (Ensminger 2001 p. 189), termed trust-under-social-uncertainty (Yamagishi, Yamagishi 1994, p. 136), as knowledge solely could never cause people to trust, trust outbursts where rational calculations experience limitations or end (Lewis, Weigert 1985). Bounded rationality, IA problems are not resolved via collective responsibility, shared leadership, and intrinsic rewards; people are not omnipotent and unlikely to be perfect stewards/agents prior to or afterward joining an organization; thus, stewardship theory must be improved by incorporating presumptions about bounded rationality (access and process of information) and pre-employment considerations (Chrisman 2019 p.1053). Investors depend on Expert Systems, s.a. accounting and auditing systems, for truthful and accurate corporate information; since investors trust that such systems predominantly work as they are designed to, they put trust in the stocks and systems that provide corporate information (Wielhuver 2015, p.2).

The argument of broken trust is in connection with the valuation of shares, as being implicitly grounded on an underlying level of trust in accounting and auditing systems, accounting regularities damage trust and cause market-wide negative effects, s.a. negative abnormal returns (Wielhuver 2015, p.2). According to the general theory of trust in expert systems, trust can be considered confidence in the reliability of a system or a person (Giddens 1990). There is an association between accounting frauds/irregularities, market effects, and regulatory response, accordingly where persons are BoD, auditors and systems are accounting, auditing, and NASs, in place to generate CD (Unerman, O' Dwyer 2004). Accounting rules are becoming a solely symbolic behavior when deficient compliance, which is continuously monitored, and in circumstances of any incompliance, there are (previously established) sanctions that are to be imposed (Walker 1992). There are values at the bottom of the integrity and ethical stance of the accounting profession; critical for the accounting community are reputation and the institution of accountability (Raar 2009), which in turn is dependent on honesty and trust (Lee, 1995). Trust in expert systems is in part grounded on i) current and ii) past experiences, according to the concept of reflexivity (Giddens 1990). Investors, via reflexivity, reevaluate the risks linked with the expert systems that generate CDs so that these instances are perceived as apparently less reliable on the whole (Unerman, O' Dwyer 2004). The issue of alteration of perceived risk is what can be referred to as broken trust and post-accounting irregularities, and after scandals, an outburst increase of apparent risks are observed, as such scandals affect trust put in accounting/auditing systems and distorted investors' perception of their reliability, so investors' perceived risk of trustworthiness and dependability of accounting/auditing systems and persons is diminished not only on a given fraudulent PTC-level but overall, market-wide (Wielhuver 2015). The restoration and enhancement of market participants' trust (primarily investors') in financial markets is a primary justification for proactive regulation of CD in the wake of CD scandals that occur amid PTCs with solid CD reputations (Ball 2009; Rezaee 2005; Riotto 2008; Benston 1973). Regarding trust in auditing and accounting systems and persons, trust is not equal to confidence, as 'trust presupposes a situation of risk that one can avoid taking' (Wielhuver 2015, p.2). Likewise, negative abnormal returns follow restatement announcements (Anderson, Yohn 2002; Palmrose et al. 2004), also auditor failures (Chaney, Philipich 2002), Weber, Willenborg, Zhang 2008).

\CD-related misconduct not only distorts market trust but also exerts wide-ranging indirect trust-related spillover effects; recently, there were attempts performed to evaluate the general market effects of broken trust, i.e., when trust has in fact, been broken, is it meritorious to strengthen CD regulation as considering the broken-trust argument, with a conclusion, that

in fact, market-wide price effects that can be accredited to broken trust are observed in response to CD irregularities (Wielhouwer 2015). Share prices mirror the degree of investors' trust in the systems of accounting and auditing (Giddens 1990, Unerman, O'Dwyer 2004), trust is closely related to the risk concerning corporate information especially (Wielhuver 2015 p. 5), the decision to invest is grounded on trust that the current data are reliable, trustworthy, dependable (Guiso, Sapienza, Zingales, 2008) when investors decide to engage in the stock market, they place trust in accounting and auditing systems and persons, however, are aware that there is the risk that those systems are not entirely flawless and persons omniscient (Luhmann 2000). However, CD irregularities are proven to result in a withdrawal of trust (Unerman, O'Dwyer 2004) from the market and from accounting and auditing systems to perform as they should (Giddens 1990), experiencing and observing errors of these systems negatively affect investors' perception of risk, that goes far beyond PTC-specific and industry-specific, to general market (Wielhuver 2015). There has been responsibility ascribed to 'accountants (…) or appraiser or any persons whose profession gives authority to a statement made by him (…) ' that has been imposed legally from the birth of capital market laws (since the introduction of the Securities Act of 1933), false or misleading i) statements in CD or ii) for omissions that render statements made in CD misleading, or ii) having prepared or certified any part of CD (incl. valuations) falsely, misleadingly or with omissions (AICPA and ASB 1981, pp. 1–2). In order to maintain satisfactory audit quality and reliability, and strengthen the responsibilities and requirements, when there is a change of auditor or a divided responsibility for the audit, there were formal rules and guidance provided on required communication between successor (who is considering accepting an engagement) and predecessor auditors (who reported on the most recent audited, or was engaged to perform but did not complete) or which occurs whenever a change of auditors is in process or has taken place and in cases of multi-tier audits, where there is a lead audit who shares responsibility for audit with other auditors, and there are referred-to-auditors (first other, second other, etc.) (AICPA 1998; PCAOB 2023).

Audit oversight bodies and capital market supervisors identified a need to increase and improve the lead auditor's involvement in and evaluation of the other auditors' work and the aptitude to communicate and prevent or detect deficiencies in that work so as to enhance the quality of audits involving other auditors and promote investor protection (PCAOB 2022b, pp. 2–4). A 'reaudit' is an activity of a successor auditor, he is asked to audit and report on CD that have been previously audited and reported on, he might consider inquiring the predecessor and review his report and 'working papers', however the audit activities performed and the conclusions reached in the reaudit are exclusively the responsibility of the successor auditor

(AICPA 1998, pp. 1714–1715). The lead auditor is the audit company that issues the auditor's report, there have been deficiencies in rulemaking discovered (via audit inspections and enforcement cases) on responsibilities of lead auditor, as regarding planning and supervising audit 'that involves work of other auditors' (PCAOB 2022b, pp. 4–5), so the novel approach is aiming at strengthening requirements for and responsibilities of lead auditors in audits that involve other auditors and 'referred-to auditors' (lead auditor divides responsibility for an audit with another accounting company p.3), as to enhance audit quality and to protect investors (PCAOB 2022b). Numerous parties make initial detection of corporate financial fraud 'occupational fraud'; however, external auditors' activities are less than five out of every hundred cases (ACFE 2010). Although, auditors are the only party (of course except for law enforcement agencies, who nevertheless, firstly have to formally initiate law enforcement action -civil, criminal, administrative- as to get access to all data anyway (SEC Manual 2017; SEC OiA 2005)) granted access to client's-PTC's i) non-public, operational, internal corporate information, data, incl. trade secrets, ii) corporate personnel interviews, iv) cross-contact with PTC's contractors and providers, v) physical examination within the corporation, still and on placing it among the least successful detection methods or sources (ACFE 2010). One of the underlying reasons is auditor's employment of mere skepticism (often deficient or insufficient), not followed by the adequate verification mechanisms (Marks 2011). Often, contracting parties may be involved in fraudulent activities of a PTC and or its D&Os. Apart from colluding corporations or own subsidiaries, especially financial providers and consultors (banks, investment funds, broker-dealers, financial specialists) as well as auditors, accounting specialists, rating agencies, analysts – might be in collusion with perpetrators (fraudulent PTC and offenders) or might be aiding, abetting or assisting in fraudulent activities (SEC OiA 2005; Albrecht 2009; Albrecht, Hoopes 2014b). Also there are specific employees from those parties involved, likewise employees of a fraudulent PTC, as FRM due to the level, complexity, magnitude of a such a crime it necessities for collusion (SEC OiA 2005; Albrecht et al. 2012; Albrecht 2009; Albrecht, Hoopes 2014a). For example, see Lincoln S&L, Enron, Wirecard. The regulatory environment and law enforcement actions are foundational for strengthening the deterrence of CD misconduct (NCFFR/COSO and AICPA 1987).

Aggressive corporate accounting and aggressive financial reporting approaches and practices, along with external audit failures and numerous instances of financial reporting frauds, and untruly and manipulative CD/communications were all prevalent during the 70s and the 80s, causing legislative and regulatory bodies to target corporate and audits frauds and failure; thereupon, the COSO was established (named after SEC Commissioner James

Treadway), bringing focus to internal controls and risk management, emphasizing such factors as i) integrity and ii) ethical values, and since 1992 COSO's Frameworks has become recognized as standards (Moeller 2007, 2–3, 9-17; NCFFR/COSO and AICPA 1987; COSO 1992). 'Deficiency or combination of deficiencies in audit' occur in the public market; they are usually identified through inspection made by the audit supervisory board for PTCs (e.g., the prominent PCAOB (U.S.)) who i.a., does a review and evaluate deficiencies, and are defined as 'of such significance that (…) [the supervisory body] believes that the firm, at the time it issued its audit report, had not obtained sufficient appropriate audit evidence to support its opinion on the issuer's financial statements and or ICFR(…) [ICFR – Internal Control Over Financial Reporting], may result in disciplinary process or be subject to other law enforcement processes of numerous authorities' (PCAOB 2022b, p. 34); (PCAOB 2022a). The novel supervisory procedures compulsory for the lead auditor's supervision of work performed by other auditors are designed and expected to provide the lead auditor with a basis for concluding whether CD is free of material misstatement (PCAOB 2022b, p. 44). Auditing rules are also providing guidance on communication when possible misstatements are discovered in a CD reported on by a predecessor auditor (AICPA 1998, pp. 1711–1715). To provide the most effective corrective mechanisms that address concerns with the i) supervision of auditors and ii) the sources of information asymmetry, standard Setting was identified as Preferable to Other Policy-Making Approaches, and its highest efficiency is achieved while i) amendment of auditing standards (improving the relevant performance requirements for auditor) is in combination with other measures, ii) interpretive guidance (additional information), iii) inspections and iv) enforcement actions (however usually take place after insufficient audit performance has occurred and thus subsequent potential investor harm has already been done) (PCAOB 2022b, pp. 36–53).

Due to deficiencies in audit quality and its assertion (Rezaee 2004; Hogan et al. 2008), the process of a review of the system of Quality Controls for a CPA company's Accounting and Auditing Practice has been prescribed within the auditing standards and requires quality control policies and procedures to include: i) independence, integrity, and objectivity, ii)Personnel management, iii) Acceptance and continuance of issuer audit engagements, iv) Engagement performance, v) Monitoring (PCAOB 2022a); (PCAOB 1997). The nature and assemblage of labor resources employed by the international audit company while performing external audit services to attain the desired degree of assurance (degree of assurance is the output of mandatory audit services (O'Keefe et al. 1994, p. 241)) that the client's (PTCs') audited financial statements are (reasonably) free of material misstatements are affected by PTCs' characteristics

(O'Keefe et al. 1994). A few external auditors (public accounting companies) that possess most of the PTCs' audit market are called N companies (Hrazdil et al. 2020, p. 347). For long, literature and market practice have commonly seen them as delivering differentially superior audit quality as compared to non-Big-N auditors; enhanced audit quality of Big-N (even assuming comparable technological capabilities) was traditionally attributed to the concept that auditors having large portfolios of clients would be worse off if turning out unsuccessful in reporting a discovered breach in a particular client's (PTC's) records (as they receive 'client-specific quasi-rents' (DeAngelo 1981, p. 183)) as compared to non-Big-N auditors (DeAngelo 1981). Likewise, auditor industry-specialization (specialist fee premium) was examined as a factor potentially able to generate substantial audit fees, i.e., the establishment of industry-specialized expertise enables offering superior-quality audits, thus enhancing auditor reputation and delivering such auditors a substantial fee premium (Craswell et al. 1995). Nonetheless, modern literature has proven that i) Big-N auditors are not homogeneous (in audit pricing/audit free premiums, industry-specialized expertise), thus are 'individual brand names,' rather than the Big-N cluster, that is often employed in research as a dummy variable: Big-N vs. non-Big-N (Hrazdil et al. 2020, p. 348)), ii) classical literature has confused an individual audit company reputational effect with an industry specialist fee premium (Hrazdil et al. 2020). Large auditors are experiencing tough competition with each other, so they regularly are involved in i) developing and maintaining brand name reputation and ii) industry specialization in response to the demand for high-quality auditing services (Craswell et al. 1995). Audit-quality advancement and technological capacity building are at the focus of Big-N auditors; they seek to maintain their market share via i) establishing audit software tools targeting audit quality enhancements, ii) delivering quality audit services to multinational corporations that have complex structures, iii) investing in audit team members' recruitment and professional education, iv) develop global controls for audit quality, v) establish controls over compliance requirements, e.g., independence; that shall improve generalized- and industry-specific-expertise (Hrazdil et al. 2020, p. 348). Although it is a minority, dishonest and deceitful individuals are present in every industry and profession, and therefore there is a 'dishonest minority in public companies' (Albrecht et al. 2008a, p. 2). The etiology of the expectation gap was that society has long presumed that the main gatekeeper, the public watchdog— to protect them from this dishonesty and deceitfulness of minorities in and amid PTCs is the external auditor (United States v. Arthur Young & Co., 1984) (Levitt 2000)

Prevention, detection and relevance of fraudulent and unethical corporate actions and information by auditors, other accounting and market professionals, governmental institutions,

law enforcement, and other corporate control and governance mechanisms and are core elements of this anti-fraud protection that is expected from gatekeepers and public watchdogs, (Rezaee 2004; Coffee 2004, 2019; Cunningham 2004, 2005; Munter 2022). Though there are instances when they fail, sometimes also in high-profile cases, where scandals affect the whole capital market and public trust (Peterson Kramer and Johnson 2009; Bednar 2012; Coffee 2002; Solieri et al. 2009; Miller 2006). Thus the concepts of i)'guiding the gatekeepers,' iii) imposing public oversight on audit, iii) internal controls, fraud risk management, ICFR (Munter 1995; Westhausen 2017; Christ et al. 2015) came to fruition as anti-fraud enablers (Munter 2022) (Public Company Accounting Oversight Board 2004, 9/9/2015). However, mandatory audit is not a fraud audit, fraud examination, or forensic accounting (Albrecht, Hoopes 2014a, 2014b; ACFE Manual 2022, 2023), these concepts will be explained in the further place in this thesis on FRM detection and prevention tools.

3.4 Corporate Governance Fiasco to Control Agency Problems

There are many i) legal and ii) institutional prerequisites for robust securities markets (Black 2001). The weakness of institutions, incompetence, and deception (chicanery) of market professionals was designated by market participants to be blamed for the greatest stock market crash (the Great Depression), and stockholders placed responsibility for their losses on those factors (Benston 1973). There is a specific phenomenon of 'rise and fall' or 'reversal' of equity markets that opposes the commonly shared insight that equity markets are a determined distinctive feature of countries' financial systems (Franks and Mayer 2017; Rajan and Zingales 2003b). Common law doctrine countries appear to possess superior minority investor protections, and moreover, they tend to have much more developed securities markets, also the relation between CG and investor protection underlays divergence in equity market development (breadth, depth) and cross-country divergence in law, legal culture and effectiveness of law enforcement affects investors' guardianship against managerial expropriation (La Porta et al. 2000a; La Porta et al. 1998a; La Porta et al. 1997). Corporate transparency in the formula of disclosures to stockholders is one of the crucial mechanisms enabling the alignment of the interests of managers and stockowners (Hermanson 2000; Bushman and Smith 2001; Healy and Palepu 2001, 2001). CG influences corporate transparency and CD; it does so via CG external mechanisms (e.g., legal and supervisory systems on a country-level and their constructs) and internal CG mechanisms (BoD and its committees, internal ownership, ownership concentration, institutional shareholding, internal

and external audit quality) (Forker 1992; Bushman et al. 2004b). Corporate transparency is referred to as PTC-specific information that is available to the external parties; consequently, the PTC-specific information environment on the country level comprises two factors i) financial transparency (comprehends timeliness, the intensity of CD, and analytics' interpretation and dissemination activities), ii) governance transparency (intensity of CG disclosures that outside investors utilize to hold D&Os accountable (Bushman et al. 2004b, p. 208)) (Bushman et al. 2004b).

The etiology of the English term 'governance' can be traced to the Latin verb gubernare, which means steering; CG relates to the governance of corporations, i) corporations serve to spur entrepreneurial behavior, risk management is central to CG, ii) CG is more than systems and structures, iii) between CG and entrepreneurialism there is a compromise (a trade-off exists), iv) the 'gift of limited liability' was grated to corporations, with the societal entitlement to expect them to be adequately governed, as to contribute to societal goals of the commonwealth (McRitchie 2023; Brennan 2014; Brennan and Solomon 2008). Low-quality CG policies and ineffective control mechanisms were evidenced amid fraudulent PTCs, thus supporting a view that i) management shall not be permitted to make arbitrary decisions regarding public shareholders' wealth for their own interests or for what D&Os subjectively, frivolously believe to be in the corporation's good interests, ii) shareowners are entitled to effective managerial accountability mechanisms (for when they assume or surmise that management is not acting in line with corporation's best interests or is performing unsatisfactorily), iii) there is a need for the amalgamation of ethical tone at the top within a corporation and market-widely to enable such incorporation of control mechanisms as to capable of curbing fraudulent behavior (Soltani 2014b, 2014a). The supremacy of agency theory-based approaches in finance and accounting (Berle and Means 1932; Eisenhardt 1989; Jensen and Meckling 1976; Posner 2019; Bell et al. 2021) consequently has shaped most frameworks for CG studies, affecting agency-based conceptualizations (Brennan and Solomon 2008), s.a. CG definitions and premises amid them D&Os accountability to the shareowners as the dominant stakeholder and shareholder-centric definition of CG, also in the corporate law theories (Hopt 2011, 2000; Fama 1980; Fama and Jensen 1983a, 1983b) (as the process of supervision and control predetermined to safeguard that the PTC's management acts in conformance with the interests of shareholders (Parkinson 1993, p. 159), and corporate law practice (rules and regulations) of protecting and enhancing shareowner wealth (Cadbury 2003; FRC 2003; Dept. of Trade and Industry 2003; Posner 2019; Bell et al. 2021).

The scientific evidence derived from corporate fraud and failures identified the relation of corporate survival, fraud, and CG, drawing conclusions that corporate sustainability is contingent on its CG implementation, not barely acknowledging good CG, but in reality still failing to implement it (Mardjono 2005). Corporate fraud and failures with the mistreatment of CG are recognized as the primary source of corporate scandals and problems in the past two decades (Boyd 2003; Drummond 2002; Zandstra 2002) (Mardjono 2005). Governmental institutions, agencies, and law enforcement are i) upholding the rule of law and ii) building and preserving trust in markets, as they are pronounced core elements of strategic plans in developed markets for the future (DOJ 2022b). There are three sources of tensions within a corporation, i) accountability and adaptability (both are essential for 'corporate well-being' (Gustafson and Johnson 1989, p. 10) that is a prerequisite and a condition with regard to corporate purposes and responsibilities), ii) D&Os' long-term, broad responsibilities and immediate, narrow self-interests of given constituencies, iii) varying or conflicting interests of corporate stakeholders (Gustafson and Johnson 1989). There is a multiplicity of residual claimants of a corporation having diverse control rights, though it is necessary to consider all classes of residual claimants of a corporation together (Black 1999). Also, it gives rise to three commonly discussed in the literature problems: i) explanatory issues regarding this multiplicity (common stockholders, preferred stockholders, creditors – incl. trade creditors, banks, bondholders, employees – incl. employee stock ownership, option holders, a tax collector- the government, suppliers, customers, tort claimants) (Black 1999, pp. 1–28), ii) creditors possessing significant control rights, and iii) strength of control rights is weakly associated with the size of residual interests (Black 1999, pp. 28–42). D&Os are stewards of a corporation and shall employ the approach of long-termism in their decision-making, as it's a determining factor for the well-being of an organization and its constituencies, whereas their self-interested and short-term approach is detrimental to this well-being; also may be further aggrieved with deficiencies in CG mechanisms (Gustafson and Johnson 1989, p. 10). 'The stewardship responsibilities of management extend far beyond mere custodial responsibility for the amounts committed by investors', as they enshrine assets' use and increase, revenue policies, holding gains, and many other elements together, making the total PTC profitability (Thomas 1970, pp. 10–27). The foundation of 'fiduciary accounting' is discovering to what degree the individual (and or an organ or committee) that holds the 'delegated powers' has fulfilled his responsibilities and obligations and to what degree he is still accountable (as the fiduciary accounting equation says, assets equals accountability) (Wixon et al. 1970, section 25).

As CD provides for various aims, goals, and functions, the normative statements about the expected qualities of CD are often challenging and require a balancing of interests or some compromises (Bushman and Indjejikian 1993). Therefore, the perceived and actual usableness and understandableness of CD or its certain elements varies across its instances, and its users (Farvaque et al. 2009; Schwarcz 2011, 2004; Amiram et al. 2016). An accounting information (termed in more contemporary nomenclature CD) has i) decision-making role and ii) stewardship role, however, as evidenced, CD might not provide for (or deliver for) two uses equally well (Gjesdal 1981). Thus, mechanisms to control agency problems in relation to shareowners and management are needed (Agrawal and Knoeber 1996), amid them voting-out (selling shares off or a threat to sell-off) (Admati and Pfleiderer 2009), shareholder activism (Amao and Amaeshi 2008; Bell et al. 2021). There are also bondholders versus shareholders conflicts of interest (Ahmed et al. 2002); thus, the role of accounting information is also crucial in such relations. PTCs with weaker CG suffer more during times of crisis as they experience a deeper dip in their share values (Bae et al. 2012). Likewise, the protection of minority shareholder wealth and interests (Reese and Weisbach 2002; Armour et al. 2009) along with the enforceability of minority shareholders' rights (Cheng et al. 2006; Mallin and Melis 2012) are a significant field of CG and investor protection (La Porta et al. 2006a; La Porta et al. 2000b) and are indicators of market development and investors' participation and confidence (trust) (World Bank 2020c, 2020b, 2020a). The oppression of minority shareholders (Rajak 1972, p. 156) may come into existence as the business entity acts accordingly to the decisions established by the majority of shareholders (entitled and willing to vote), the minority that is dissenting is compelled to acceptance, except if capable of proving that the power vesting with a majority has been exploited, regardless law grounds granting minority shareholders the impeachment of the decisions of the majority,' there is the reluctance of the private law enforcement (courts) to intermeddle regarding internal management of the entity (Rajak 1972). CG is the 'process by which corporations are made responsive to the rights and wishes of stakeholders' (Demb and Neinbauer 1992, p. 9), which means that CG is the matter of corporate accountability, and such corporate accountability is to be achieved most commonly in societies via mechanisms of CG and governance institutions - i) regulations and codes, ii) BoD characteristics, iii) ownership characteristics, iv) direct social pressure (Demb and Neinbauer 1992, pp. 9–12).

The variance of social habits for the exertion of direct pressure on corporations is profoundly embedded in history and culture, and so there is one among CGs' features that are highly country-dependent (national-environment-dependent) and inter-country variant; however, judicial systems in most countries pursue resolutions to numerous issues which are

common for those countries, such as corporate liability (Demb and Neinbauer 1992, pp. 9–12). Among the essential purposes of corporate accounting, there is enabling the monitoring of management and considering management contributory in the production of accounting information, and forasmuch as it is costly to monitor management's behavior in this regard, corporations from time to time report fraudulent accounting information and decision to perpetrate fraud is in general governed by the expected costs and benefits (sensu largo) of those behaviors (Gerety and Lehn 1997). Thus, CG mechanisms are examined to understand and prove relations amid them and numerous i) economic and ii) accounting outcomes (for examples of detailed reviews, see (Schauble 2019, p. 16)). One of the core ideas of investor trust, and confidence, is the significance of investor protection in averting the expropriation of minority shareholders (La Porta et al. 2000b). The academic and institutional literature has illustrated the significance of investor protection in the numerous aspects of capital markets (CM) (Bae et al. 2012; Ko 2017; Klein et al. 2012; U.S. Congress 7/30/2002; SEC 2019; La Porta et al. 2006b; Easterbrook and Fischel 1984). There is a cross-countries variance (significant and systematic) in investor protection against expropriation by insiders, mirrored by i) legal rules, ii) quality of their enforcement (La Porta et al. 1997, p. 1131; La Porta et al. 1998c). Countries with enhanced investor protection, exhibit or experience benefits on macro- and micro-levels, allocated to or dedicated to various market participants' classes (issuers, investors, creditors, regulators, etc.) i) larger and deeper CMs (La Porta et al. 1997; La Porta et al. 1998c), ii) higher valuation of PTCs relative to their assets (La Porta et al. 2002; Claessens et al. 2000), iii) larger quantity of PTCs (La Porta et al. 1997; La Porta et al. 1998c), iv) higher quality of CD (accounting information) (Fan and Wong 2002; Leuz et al. 2003; Ball et al. 2000); v) more extensive use of external finance (La Porta et al. 1998c); vi) greater investments from external funds (Rajan and Zingales 1998; Demirgüç-Kunt and Maksimovic 1998). i)Investor confidence (transparency, low information asymmetry, dependable market infrastructure) and ii) strong institutions (regulation, monitoring, enforcement) are both indispensable constituents of robust investor protections in local markets (Narayanaswamy et al. 2017).

Countries with poor investor protections (in the form of either i) poor laws or ii) poor law enforcement) experience its adverse consequences, as poor investor protections i) engender substantially smaller equity and debt markets (La Porta et al. 1997; La Porta et al. 1998c), ii) are related to limited transparency, high potential for asymmetric information, and there is a diminished interest in local markets by international investors (Narayanaswamy et al. 2017), iii) engender concentrated ownership as an adaptive response to them (while high-quality shareholder protection measures and accounting standards are related to a lower concentration

of ownership) (La Porta et al. 1998c). Such countries were observed to establish substitute mechanisms for poor investor protection i) included in, assimilated into law, or ii) that lie outside the law (La Porta et al. 1998c). Amid outside-law adaptation mechanisms to deficient legal protection of investors can be found ownership structure (ownership patterns), either i) dispersed, as desirable to risk diversification function (Shleifer and Vishny 1997), ii) concentrated, as naturally effective to deliver incentives for managers perform duties (work) well, and large (typically institutional) investors to provide with incentives to monitor D&Os (Shleifer and Vishny 1986). Whereas statutory mechanisms are i.a., remedial rules on mandatory dividends, legal reserves obligations, 'bright line' regulations (legally incorporated obligatory standards for retention and distribution of capital to investors, restraining opportunities for managerial expropriation (La Porta et al. 1998c, p. 6)) (La Porta et al. 1998c). However, for well-functioning markets to exist, it is crucial to provide robust supervisory arrangements to protect investors anchored in frameworks and institutions (Narayanaswamy et al. 2017, p. 3). In general, deficiencies in investor protection are so impactful that they exert adverse consequences on a country's financial development and economic growth (La Porta et al. 1998c; Levine and Zervos 1998). There has been a debate on if and how to regulate the CG, especially regarding i) the balancing of power between corporations and their shareholders ('security holders' (SEC 2003) and ii) the balancing between large shareholders and other shareholders (Donohue 2003; SEC 2003), some perceive relations between management and stockholders as internal affairs of a corporation that would rather be designed within charters or by-laws than governmental regulation, also there are concerns on stock exchange subjective independence standards for the board's and individual director's independence and additional requirements for audit committee members (Donohue 2003; SEC 2003). Legal shareholder (or legal investor) protections or rights are related to the existence of agency relations (especially in consequence of potential agency conflicts) and thus also managerial incentives and monitoring (Burkart and Panunzi 2006).

Academic literature has widely accentuated that there are agency issues generated by the delegation of control to management, however without the assessment of some mechanisms (legal and extralegal) as capable of being the solutions to agency issues, amid them, the voting powers, e.g., one share/one vote security structure concept (Grossman and Hart 1987, p. 2). The machinery of voting 'proxy machinery' was addressed as a mechanism that deprives or separates shareholders of their power instead of being a mechanism for enabling them to exercise power over management (Berle and Means 1932). In numerous corporations, risks are being managed, however often in haphazard, disorganized, fragmented ways, thus many of

them and their organs/bodies and individual D&Os might lose sight of the general and comprehensive picture of a corporation and its undertakings, also insufficiently connecting risk management activities to their corporate strategies (Marks 2018a). There are i) attributes, qualities, and features of corporate structures, that might exert a meaningful contribution to the deeds of fraudulent CD and or to the failure of theirs early, prompt detection, ii) individual-, environmental-, institutional- forces, circumstances, opportunities and conditions that can be partially responsible for, be conducive to, heighten the probability of the occurrence of fraudulent CD, iii) possible, presumed preventive measures, deterrence methods, early detection mechanisms for fraudulent CD instances, iv) legal and law enforcement environment and professional and ethical standards and their execution can give a material impact of fraudulent CD occurrence (NCFFR/COSO and AICPA 1987, pp. 11–86). Agency theory, which is a prevalent underlying assumption for CG research (Brennan and Solomon 2008), may advocate that external CG mechanism (the market for corporate control, financial market analysts, activist ownership) could be a deterrence means for opportunistic managerial actions, however, regarding managerial frauds, it has been proven the opposite (Shi et al. 2017). Cognitive evaluation theory (another name for cognitive appraisal theory elaborates on the effect of extrinsic rewards on intrinsic motivations, also such that have predominantly a controlling aspect, which hampers intrinsic motivation instead of increasing it (Festinger 2023; Kent 2007, 2007; Colman 2003)) as a framework, it was shown that external pressures stemming from abovementioned external CG mechanisms had led managers to lose their intrinsic motivation to act appropriately, heightening the probability of managerial financial fraud (Shi et al. 2017). It is ‘a theory postulating that an individual’s performance will improve or decline depending on his or her attitude about the reward for good performance, that is, about whether it is conferred as a true reward for effective performance or as a means by which the grantor of the reward asserts control over the performer’ (Festinger 2023). It is known under another term of ‘cognitive appraisal theory’ (Colman 2003). For cognitive appraisal, see (Campbell et al. 2013; Folkman et al. 1986). Overall, both internal CG mechanisms and external CG mechanisms are able to affect agency costs (Schauble 2019).

3.5 Corporate Governance as History of Corporate Scandals

The mandatory CD, regardless of how forcefully reinforced with elaborate CG networks, is not a sufficient mechanism (amalgamate of legal measures and market practice) to avoid CD misconduct (Farvaque et al. 2009; Healy and Palepu 2003; DOJ 2022a). There is a

consensus in the literature and anti-fraud profession practice, that inefficient control systems and ineffective monitoring instruments are impactful mechanisms regarding heightened fraud opportunity and its actual occurrence (Beasley 1996; Albrecht and Albrecht 2003; Farber 2005; Ozili 2015). History of CD, CG, and the exploitation of IA can be described as a history of corporate scandals (Coffee 2005b; Coffee 2005a; Reinhart and Rogoff 2009; Hopt 2011) (Mak 2012, 2013, 2014, 2018). Therefore, IA (with its most imperative results relevant to the financial market - moral hazard and adverse selection (Balakrishnan and Koza 1993)) creates a fertile ground for managerial optimism, overconfidence, ethically doubtful behaviors, disadvantageous and unfavorable conduct, short-termism, failure to exercise due diligence, over-riding controls, negligence, breakage of fiduciary duties (duty of care, loyalty, good faith, confidentiality, prudence, disclosure - candor (Cornell Law School LII 2022g)), up to legally illicit behavior, unlawful misconduct, and outright fraud (Schwarcz 2011b, 2010, 2004; Ben-Shahar and Schneider 2010; Farvaque et al. 2009). Such misconducts used to be considered as a piece of evidence on the failure of the given models of CD and CG, which are not sufficient counteract to risks of manipulation of information, inadequate, deficient, not-usable, or misleading disclosures (Farvaque et al. 2009; Ben-Shahar and Schneider 2010; Amiram et al. 2018). For the global and regional annual case-studies on CG failures that resulted in the world-known, impactful corporate financial fraud, see NUS CPA Australia reports (Mak 2012, 2013, 2014, 2018). In business contexts, prevention is much more value-bringing and has a higher net efficiency (lower net monetary and non-monetary costs) as compared to the ‘cure’ (resolution and retrieval of fraud and its consequences once it has already burst out); this fact is especially true and accurate regarding CD frauds (Young 2000, p. 211), also usually sources, root causes, results, side effects and impacts of CD frauds (FRM) are very much alike (Young 2000). Nonetheless, diverse kinds of scandals characterize diverse systems of CG (civil law vs. common law- most of the EU vs. U.S.), thus CG-, other legal- and institutional- measures for prevention and mitigation of CD fraud in PTCs and safeguarding public shareholders may be of different usability and efficiency amid various jurisdictions; thus solutions necessitate meaningful customization; also the usability and the role of gatekeepers differs (Coffee 2005a; Soltani 2014b). However, when the IA increases up to a certain level, the high-quality goods drop out of the market, and only low-quality goods can be traded. This situation is called adverse selection (Tilles, Ferreira, Francisco et al. 2011) (Bigelow 1990; Biglaiser, Fiedman 1999). Although it was introduced three decades ago, the complexity of both the market and human behavior makes it very difficult to build mathematical models that can be applied in

real-world situations (Tilles et al. 2011). For a comprehensive review of research on CG with multidisciplinary perspectives, see (Shleifer and Vishny 1997; Bolton et al. 2002; Huse 2005).

CG research has been traditionally preoccupied in the U.S. literature with 'protecting the investors' stake' (Huse 2005, S65), however more contemporary literature has expanded the focus beyond agency conceptions, especially regarding accountability (Roberts et al. 2005), as directorship accountability is associated with value creation (Cadbury 2003). Theoretical underpinnings of behavioral frameworks (as will be presented in the thesis) have emerged not only regarding executive and managerial agency theories (Sedliacikova et al. 2021; Wiseman and Gomez-Mejia 1998; Pepper and Gore 2015) but also regarding the board of directors (board, directorship) (van Ees et al. 2009) and behavioral perspectives of CG (Huse 2005). There are also behavioral inferences of the property rights that are drafted (specified) in the contracts between shareholders and managers of a corporation (Jensen and Meckling 1976). Traditional, classic CG literature has adopted the classical agency theory approach and been driven by its perspective on resolving agency problems or issues (conflicts of interests) between two classes of actors, shareholders and corporate management (as a consequence of the separation of ownership and control), accounting for agency costs, residual claimants, overall, with the bedrock in the form of agency relations, their antecedents, consequences, and resolutions (Jensen and Meckling 1976; Fama and Jensen 1983a, 1983b). The research on the issue of 'separation of ownership and control' that underlays the theory of the firm and efforts to formulate the theory of the firm have been attempted by many to explain and understand managerial behavior in large companies (Jensen and Meckling 1976, p. 307) (for reviews see footnotes 2nd, 3rd in (Jensen and Meckling 1976, p. 307). The separation of ownership and control is an FMF (financial market friction) since this separation may induce incentive problems that financial contracts cannot resolve at zero cost (DeGennaro and Robotti 2007). There is an array of significant historical research (driven by Coase, Alchian, Demsetz) that contain noteworthy implications for the formulation of the theory of the firm (Coase 1937; Alchian and Demsetz 1972; Alchian 1987; Demsetz 1983), wherein these and subsequent approaches the prime focus are property rights, as specification individual rights control how rewards and costs are to be disposed amid participants within a corporation and the specification of these rights is concluded via contracting (Jensen and Meckling 1976).

Agency relations and the theory of the firm (Fama 1980; Eisenhardt 1989) has been for long been the dominating finance paradigm, also in the CG studies (Brennan and Solomon 2008), as stemming from the classical work on separation of ownership and control of Berle Means (Berle and Means 1932), with other disciplines behaving towards CG similarly (Brennan

and Solomon 2008). The classical theory of agency relationships complements theories of property rights, addressing the pre-Jensen and Meckling ponderations on the theory of the firm (Heckerman 1975). The agency costs are being incurred in agency relations, being a sum of i) monitoring expenditures bore by principal (exceeding direct actions of measuring, observing the behaviors of the agent, including also indirect actions, s.a. setting compensation policies, operating rules (Jensen and Meckling 1976, p. 308)), ii) bonding expenditures by the agent (to ensure restriction of certain actions harmful or potentially harmful to the principal or the corporation as a legal person, when disobeyed, the principal is entitled to seek compensation, or a redress, to recover damages, there are various remedies for breach of duties in the agent relationships) (Jensen and Meckling 1976, p. 308)), iii) residual loss (monetary equivalent of the cutback, reduction of welfare encountered by the principal due to the divergence of actual agent's decisions and most optimal welfare maximizing decisions for the principal, given the optimal monitoring, bonding activities by both parties) (Jensen and Meckling 1976). The concept of 'fiduciary duties' (FDs) or 'fiduciary responsibilities or obligations,' their antecedents, formulas, focal actors, rewards, and resolutions to behaviors of their adherence, negligence, or the outright breach, are the bedrock of agency relationships in a corporation (and in general, any contractual relations and act of joint efforts) (Indjejikian and Matejka 2009; Clark 1991; DeMott 2014). Fiduciary duties are inherently dependent on the corporate purpose and corporate personhood (Johnson 2016), amid them there are of fiduciary duties (duty of care, loyalty, good faith, confidentiality, prudence, disclosure - candor (Cornell Law School LII 2022g). D&Os owe a duty to disclose material information to the shareowners, the recurrent debate on the content, body and extent of fiduciary duties is often brought in relation to the given corporate scandals and D&Os deceptive behaviors that have occurred, e.g. proposed expansion of the officer's duty of care to include internal D&Os communications, in order to facilitate directors with information that would be required by the internal duty of complete candor, as to empower shareholders via such an imposed liability, to successfully bring suits against officers' intentional deceptive behaviors, to seek remedies for the PTC and themselves (German 2009). Within the market-oriented economies (that concurrently are logically inherently of common law origins), legally, the BoD holds the highest authority in the corporation; however, the executives (top management) naturally tend to exercise the corporate power (Demb and Neinbauer 1992, pp. 13–16).

The FD of candor is habitually characterized by the jurisprudence as a duty owed by the BoD to provide information to shareholders, and also if the BoD is proven to have acted in bad faith it is understood that it has breached the FD of loyalty (of good faith) (German 2009). FDs

are the very core of agency relationships and the underlying fundamentals for the contracting in agency relationships, be it managerial/executive contracts, as well as directorship contracting (director (service) agreements) (Christie 1992; Jensen and Meckling 1976; Gelter and Helleringer 2014). The extension of the duty of candor to internal duty of candor is seen as apt to curb deceptive actions of officers, preventing them from willful engagements in such dishonest acts, e.g. option's backdating (German 2009, p. 223). Agency costs occur in any situation that involves 'cooperative effort,' also, contractual relations that give rise to the agency can differ significantly (Jensen and Meckling 1976, p. 309). CFOs take part in corporate decision-making similarly to other executives; however, they also have noteworthy fiduciary responsibilities for PTC's financial accounting and reporting, as CFOs' bonuses are a tradeoff between their decision-making duties and their fiduciary duties over financial reports, it was evidenced that when PTCs placed less emphasis on CFOs incentive compensation, it was an effective reduction mechanism against misreporting (Indjejikian and Matejka 2009). Intentional, deceptive actions undertaken by corporate officers, that are brought to courts, are usually related breaches of FD of loyalty and of disclosure, owed by the BoD to PTC's shareowners (German 2009). CG research and practice are both experiencing a lack of consensus on numerous corporate accountability and corporate power–related themes, i.a., debate on collaborative versus control approaches (Sundaramurthy and Lewis 2003). There are three elements of corporate power, intertwined substantially, i) control, ii) responsibility, iii) influence; CG power amasses from the ability and capability to exercise authority of different sorts at different moments in time, one of the structural tensions or paradoxes is the issue how to permit BoD and the management (one and the other) to maintain effective control, yet absent of the depreciation of the motivation and initiative of the other (Demb and Neinbauer 1992, pp. 12–14).

The Paradox Framework, as there is plurality and change increasingly occurring in organizational settings (Lewis 2000), can be employed in agency and stewardship theories to elaborate on the underlying tensions and highlight the value of both i) monitoring and ii) empowerment (Sundaramurthy and Lewis 2003). There is a lack of consensus related to control versus collaborative CG approaches and their applications, such as i) BoD dominance of knowledgeable insiders vs. detached/independent outsiders, ii) BoD protective measures towards management (from market abuse) versus market forces to discipline managerial excess, iii) directors' role in monitoring executives versus to empower executives (Daily et al. 1998; Sundaramurthy 2000). The organizational literature on power and monitoring and control is vast; however, it presents a multitude of views and applies various approaches (Sundaramurthy

2000; Sundaramurthy and Lewis 2003; Westphal and Zajac 1995) for a review of executive versus BoD power (management control over the BoD vs. corporate boards control over management, decision-making authority, and control mechanisms) see (Westphal and Zajac 1995), for a review of CG paradoxes, contrasting approaches to CG – control vs. collaboration, see (Sundaramurthy and Lewis 2003). Likewise, there has been an ongoing debate over the primacy of the superiorly proper model of CG that is i) shareholder value/orientation, versus ii) the value which is brought to broader groups of interest, that is stakeholders' value/orientation, corporate social responsibility, etc. (Gamble and Kelly 2001; Ball 2004; Fiss and Zajac 2004; Ntim et al. 2012; Posner 2019; Godfrey et al. 2009). The debate is differentiated by countries and local legal frameworks, legal regime origin (common law, state law), and development status (advanced, emerging) (Gamble and Kelly 2001; Fiss and Zajac 2004; Ntim et al. 2012; Papadopoulos and Mishra 2019; Frooman 1997; Fremond and Capaul 2002; Hopt 2011); also it varies over time (Ball 2004; Stout 2013; Posner 2019; Westphal and Zajac 1998), and different stakeholders' groups have contradicting views (e.g., institutional shareholders vs. pro-ES NGOs). The concepts of 'shareholder value' (Grundy 1995; Gamble and Kelly 2001), 'Shareholder value orientation' -EU nomenclature (Fiss and Zajac 2004), 'shareholders primacy' (stockholderism (Johnson 2018 p.24)) - U.S., especially Delaware (Posner 2019; Stout 2013) are being debated. There is a significant variety of CG among countries (Aguilera and Jackson 2003), and there has been a substantial gap identified in research on EMs between high-level cross-country studies, with their indecisive and inconclusive discoveries on good CG indicators (macroeconomic level) and the distinct attempt to create company-level or country-specific CG metrics, commonly based on developed, western patterns (Ararat and Dallas 2011). Despite DMs' significant advancement in CG (including transparency and reliability of CD), especially in the post-scandals era, EMs endure lagging behind in spite of the global efforts to strengthen overall CG (Papadopoulos and Mishra 2019). According to the World Bank research, there is a very serious research gap regarding CG that is focused on EMs, as it amounts to less than one percent of the research papers available (Ararat and Dallas 2011). Comparatist cross-country analyses of CG risks are being conducted, exhibiting variance amid countries not only between DMs and EMs but within those groups (World Bank 2020a, 2016; Transparency International 2019; Getz and Volkema 2001).

On EMs, as capital markets there are still gradually maturing, 'shareholders culture' is often not only scarcely developed, but also not formally embedded in legal systems, with significant deficiencies in legal frameworks regarding shareholder rights and minority shareholders protections (Papadopoulos and Mishra 2019). High-quality, mature legal

protections of shareholders, particularly minority investors, are recognized as a significant indicator of high-quality CD and CG environments and mature securities laws regimes. Shareholder activism in a developing CG institutional context on EMs brings strategic opportunities accompanying shareholders' empowerment (Amaeshi et al. 2006). By comparison, there is limited knowledge about CG practices on EMs (Balasubramanian et al. 2009). The diffusion of corporate practices exists in the markets, also as regards national CG systems in the EU (Fiss and Zajac 2004). EMs exhibit dissimilarities with regard to CG models (Luo et al. 2009), and there are also variations in CG quality amid PTCs listed on EMs (Durnev and Kim 2007). Regardless of globalization trends in CG, CG characteristics, trends, and efficiency on EMs is a separate fields of research (Papadopoulos and Mishra 2019; Durnev and Kim 2007). CG frameworks, models, and mechanisms on EMs are studied with reference to their: i) effectiveness (Refakar and Ravaonorohanta 2020), ii) potential enhancements and developments (Albu et al. 2012), influence on PTCs' financial performance (value, profitability) and others. There are some CG aspects, measures, and indices that are able to be predictors of PTC's performance (including higher market value) of companies from major EMs (Black et al. 2020; Balasubramanian et al. 2009; Black et al. 2012). Amid them, CD, with financial CD particularly, and the board structure, with particularly its independence, affects positively market value of EMs' PTCs, so this aids with the identification of useful fields of interest for investors and regulators concerning their evaluation of CG (Black et al. 2020; Black and Kim 2012). Investors in EMs i) must execute financial decisions on the basis of having incomplete and sometimes conflicting information, ii) have to learn to best use of this imperfect knowledge, iii) shall be aware of underlying CG realities of such markets, as often they enter EMs with misplaced perceptions (Ararat and Dallas 2011). As there are market pressures placed on PTCs stemming from investors' expectations towards enhancement of CG, the D&Os focus on CD with financial CD particularly, and the board structure, with particularly its independence, is advised, as those CG aspects were found predictors for the higher market value of PTCs from major EMs (Black et al. 2020).

CG risk mitigation is a shareholder value-enhancing measure, and such institutions as Institutional Shareholder Services consult shareholders on i) the application of their CG views, ii) diagnosing CG risks, iii) managing their comprehensive proxy voting needs on a global base, iv) provides market intelligence services, v) perform transaction cost analysis (execution quality, market abuse, and pre-trade analysis), vi) fund services (providing transparent, up-to-date, correct information), vii) research and claims filing coverage of SCAs, viii) CD data and data analytics to enable shareholders to make informed, thoughtful strategic decisions (ISS

2023b). However, such solutions are only achievable and feasible for institutional and corporate investors (due to the nature and restraints (e.g., cost) of such services) (ISS 2023a, 2021, pp. 1–10). However, a far-reaching and disproportionate development of securities market finance has been diagnosed as one of the incitements and stimulants for the occurrence of over a decade of crises and corporate scandals in the EU (Bavoso 2017). Also, after the highest-profile corporate scandals on the EU public markets, the EU bodies, and market institutions are considering revisions and enhancements in the quality and reliability of the i) PTCs' CD framework, ii) PTCs' mandatory audits, iii) securities regulators and oversight agencies (watchdogs), iv) audit committees and the boards, v) management conduct, vi) CG in PTCs in the EU (Peters 2022; Garcia Osma et al. 2020; ESMA 2021; Jones 2021).

3.6 The Role and Efficacy Of Public and Private Law Enforcement in the Context of Corporate Fraud

A criminal act or omission in corporate law exists when an individual i) acts in a particular way (voluntarily) or ii) fails to act (omission, willful negligence), iii) brings about a state of affairs (general situation and circumstances (Collins 2022)), or iv) has the required mental element (mens rea) (LexisNexis 2022; Card and Molloy 2016e, 2016a; Nemeth 2012). The essential elements are i) actus reus (omission, prohibited act, consequence, or state of affairs) and ii) mens rea (fault element like intent or recklessness) (Card and Molloy 2016d; Nemeth 2012). Actus reus is the indispensable behavioral element of any offense (LexisNexis 2022). Only when actus reus is satisfied can criminal liability occur (Card and Molloy 2016e). An offense includes the given state of mind, either expressly or impliedly, relating to circumstances and consequences (Card and Molloy 2016f). For criminological theories and fundamentals of criminal law, see (Akers and Sellers 2021; Card and Molly 2016; Herring and Cremona 1998; Nemeth 2012). Crimes can be against i) persons, ii) property, iii) habitations, iv) public morality, and v) inchoate offenses ('incomplete', involving planning or encouraging a crime) (Herring and Cremona 1998, p. 323; Nemeth 2012). Conspiracy to defraud means any agreement to cause economic loss by dishonest means (Sullivan 1988, p. 289), common in securities frauds and financial reporting misconduct, complicating fraud detection through conspiracies (Dai and Handley-Schachler 2015; Albrecht and Hoopes 2014a, 2014b). Large-scale conspiracies were formed on public markets, involving auditors (Dai and Handley-Schachler 2015). Convictions for corporate fraud and related offenses became more common post-2000s, involving D&Os and top management (Filip et al. 2008; Beasley et al. 2010;

Kreiner Ramirez 2010). The moral wrongfulness or preventive function of an act justifies criminal law intervention (Herring and Cremona 1998). Mens rea in inchoate offenses is decisive, intending that the substantive offense be perpetrated, justifying criminal law's interference even before harm is done (Herring and Cremona 1998). Criminal liability arises if i) a statute requires a person to act (statutory duty), ii) a contract requires action (contractual duty), iii) a special status relationship generates a duty (Cornell Law School LII 2022d; LexisNexis 2022; Card and Molloy 2016e, 2016d). Under the law of complicity, an individual can be guilty of another's offense if they have abetted, counseled, aided, or procured it (Card and Molloy 2016c). Vicarious liability is usually limited to regulatory offenses; a corporation can be liable for offenses it perpetrated (Card and Molloy 2016c). Regulatory authorities' impartiality and independence are crucial for effectiveness, but political forces and financial industry stakeholders can affect judgments (Cuervo et al. 2022). There is no precise method to measure the incidence of CD misconduct (Raab 1987). High-profile PTCs' fraud cases have scrutinized the robustness of CD and audits, possibly leading to revised international standards (Cuervo et al. 2022, p. viii). Fraud may involve i) false representation, ii) failure to disclose information, iii) abuse of position, with the defendant acting i) dishonestly, ii) with intent to gain or cause loss (Card and Molloy 2016b). Post-SOX, fraud convictions increased, but SOX was insufficient to prevent fraud, as financial crises created incentives for fraud (Rezaee and Davani 2013, p. 224; Rezaee and Riley 2010b; Beasley et al. 2010). Corporate fraud task forces evolved into dedicated sections for efficient crime inspection and prosecution, requiring constant improvement due to the high costs of large-scale fraud (Kreiner Ramirez 2010). The SOX era brought new perceptions on sentencing, holding wrongdoers personally accountable to restore corporate integrity (Filip et al. 2008, p. iii; Hess 2007; Gottschalk and Rundmo 2014).

Despite ethical conduct claims by high-profile corporations, investors experienced misconduct, losing confidence (Panzner 2008; Reid 2008; Camfferman and Wielhouwer 2019; Toms 2019). Scandalous practices influence subsequent governmental responses (Toms 2019). Governments established regimes to punish financial malfeasance and promote corporate transparency (Filip et al. 2008; Barker et al. 2008; Gottschalk and Rundmo 2014; Dellaportas 2014). Public debate on sentencing policies and modern reforms continues (Barker et al. 2008; Levi 1991; Wheeler et al. 1982; Hess 2007). Criminal deterrence and judicial role will be further elaborated (Gottschalk and Rundmo 2014; Hirsch 1999; Levi 1991). Corporate and securities law may alleviate agency conflicts, but its worth depends on enforcement quality (Dissanaike et al. 2021; La Porta et al. 2006a, 1998b). Declines in fraud investigations often result from insufficient proactive law enforcement (Barker et al. 2008). Enforcement in securities markets

is difficult and uneven, calling for reforms (Carvajal and Elliott 2009). Inadequate law enforcement generates further misconduct incentives (Kreiner Ramirez 2010). Consequences for key managerial personnel vary based on enforcement seriousness (Amiram et al. 2020a, 2020b), with a dismissal rate over 90% in public law enforcement cases (Karpoff et al. 2008b). Shareholders bear significant losses after financial misconduct (Karpoff and Lott 1993; Karpoff et al. 2008a), while corporate wrongdoers face various consequences, including job dismissal, employment bars, personal wealth loss, fines, and criminal charges (Karpoff et al. 2008b). Corporate criminal liability regimes are debated, discussing optimal penalties (Arlen 2012; Arlen and Kraakman 1997; Arlen 2018; Polinsky and Shavell 1993; Jackson and Roe 2009). Enforcement systems aim to provide incentives for law compliance and sanction violators (Segal and Whinston 2006, p. 2).

Assessing private vs. public enforcement of securities obligations is crucial (Djankov et al. 2008; La Porta et al. 2006b, p. 2). Some research links public enforcement and CD to robust capital markets; other research is inconclusive (Jackson and Roe 2009, pp. 21–22). Deterring harmful behaviors involves litigation by private parties or enforcement by public agencies, varying by jurisdiction (Segal and Whinston 2006, p. 1). Contrary to traditional views, common law jurisdictions invest more in public enforcement (Jackson and Roe 2009, 23, 50). Europe relies more on public agency enforcement (Segal and Whinston 2006). Public enforcement may suffer from mixed incentives and poor information (Jackson and Roe 2009, p. 1). Private enforcement faces collective action issues, free-rider effects, inexpert judiciaries, and legal representatives' rent-seeking activities (Jackson and Roe 2009). Shareholder lawsuits impose a heavy burden but offer uncertain benefits (Hopkins 2012, p. 2). Private litigation risk helps regulate securities markets, constraining managerial misconduct (Hopkins 2012). Effective penalties, accurate CD verification, and formal warranties build trust in CD (Alexander 1999; Karpoff and Lott 1993; Helland 2006; Desai et al. 2006; La Porta et al. 2006b, p. 2; Easterbrook and Fischel 1984; Fischel and Ross 1991; Amiram et al. 2018). Exchanges regulate and monitor compliance for listed entities (Benston 1973; Jarosz 2014; GPW 2021; Nasdaq 2023; Financial Conduct Authority 2023). Securities regulation and enforcement are essential to deter cheating investors (La Porta et al. 2006b; Coffee 2002, 1984; Mahoney 1995; Reese and Weisbach 2002). Public regulation can encourage private governance, with responsive regulation applying low intervention levels and escalating if needed (Ayres and Braithwaite 1992; Ubacht 2004). Self-regulation faces coordination and free-riding issues (Suijs and Wielhouwer 2019). Enforcement measures vary in severity, illustrated by enforcement pyramids (Ayres and Braithwaite 1992; Ubacht 2004, p. 223). Regulatory responsiveness involves dialogue to

enhance regulation quality and ease compliance (OECD/PUMA 2000). There are no final solutions to CD misconduct, but substantial mitigation, early detection, and prevention methods are accessible (Munter 1995; Raab 1987). Effective enforcement of securities misconduct is a global priority, with continuous regulatory reforms needed to address evolving challenges (Carvajal and Elliott 2009; Adrian and Surti 2022; Cuervo et al. 2022). Regulatory challenges include debt market expansion, benchmark rate transitions, digitization, ESG, and supervision of intermediaries (Cuervo et al. 2022). Addressing these in forthcoming reforms is crucial for investor trust (Adrian and Surti 2022). IMF's FSAP analysis emphasizes audit quality and CD adequacy, highlighting the need for reformed frameworks (Cuervo et al. 2022). CD regulation saves costs, delivers sanctions, and mitigates agency conflicts (Leuz and Wysocki 2016a, 2008). External interference is justified when parties are asymmetrically informed, externalities affect third parties, or the state has superior remedies (Hermalin and Katz 1993). IMF's survey reveals deficiencies in supervisory resources and techniques, even in advanced markets, lagging behind technologically evolving markets (Cuervo et al. 2022).

3.7 Jurisprudence, Penology and Economics of Corporate Crime

The nature, functions, efficiency, and optimum of securities law and its enforcement have been extensively researched, examining broad and granular aspects (Shavell 1993; Xu and Pistor 2002; Coffee 2007a; Garoupa 1997). Studies cover diverse perspectives, including social and economic viewpoints (Faure et al. 2009), optimal law enforcement theories (Garoupa 1997), the economics of crime and punishment (Becker 1974; Amiram et al. 2020; Carvajal and Elliott 2009; Stewart 2012), and regulation economics (Stigler 1971). Further, research includes theories of financial and corporate criminal behavior (Cohen 1996; Simpson 2002; Desai 2020; Albrecht et al. 1984; Hogan et al. 2008; Agnew 2009; Stewart 2012), penology (Albonetti 1998), white-collar criminals (Benson 1985, 1990; Agnew 2009; Albrecht et al. 2002), the integration of economics and law with socio-legal research (Lodge 2015), responsive regulation (Ayres and Braithwaite 1992), views opposing punitive justice in favor of restorative justice (Braithwaite 2002), cost-benefit analysis of financial regulation (Coates 2014; Cochrane 2014), stock market effects (Christensen et al. 2016), impact on market participants' behaviors (Collver 2007), support mechanisms for law enforcement (Dyck et al. 2010), unintended regulation outcomes (GAO et al. 2009), innovation and technological advancements for more efficient law enforcement (Gray and Fata 2017), and psychological attraction theory of financial regulation (Hirshleifer 2008). Becker's framework posits that crime deterrence relies on the probability

and severity of punishment (Garoupa 1997; Becker 1974). Since the 19th century, legislation has expanded, with governments protecting against violations and establishing punishments (Becker 1974) The likelihood that a perpetrator would be i) detected (discovered) and ii) convicted (held accountable, found guilty), and iii) nature and extent of punishment are diverse and perpetrator- and activity-dependent (Becker 1974, p.2). The UN emphasizes the resilience, reliability, and transparency of judicial and law enforcement institutions to promote a culture of lawfulness (UNDOC 2019, 2021). Stigler's 'protection of the public theory of regulation' suggests regulation benefits the public or a large subclass, countering the premise that regulation only corrects market failures (Stigler 1971; Carrigan and Coglianese 2015). The concept of crime prevention is hard to define, as 'prevention' covers contradictory activities (Brantingham and Faust 1976; Gilling 1997). Law enforcement effectiveness relies on either voluntary compliance or formal coercion (Xu and Pistor 2002). The state's coercive power is unique (Stigler 1971). Punishment's deterrence function is crucial (Becker 1974). Some researchers advocate for a restorative justice system (specifically rooted in a responsive regulatory framework (Ayres and Braithwaite 1992)), proving it is capable of deterring, incapacitating, and rehabilitating more effectively than a well-recognized punitive system (Braithwaite 2002). Punishment serves deterrence, retribution, incapacitation, rehabilitation, and restitution (UNDOC 2019). Financial market law can suffer from deterrence failure without complete law, necessitating both proactive and reactive enforcement (Xu and Pistor 2002). Positive research on financial market regulation focuses on interactions between rational selfish pressure groups and political actors (Hirshleifer 2008; Rajan and Zingales 2003; Kroszner and Strahan 1999). Whereas the behavioral finance novel approach is largely considering regulatory structures as stated (decided) (Hirshleifer 2008), the applications to rules and regulation have primarily been sideways the normative lines, so investigating ways ‘to protect naive investors’ (Sunstein and Thaler 2003). The inherent incompleteness of law shapes the allocation of law-making and law enforcement power (law enforcement institutions) (Xu and Pistor 2002). The innate incompleteness of law is a characteristic of law described as when the law is unsuccessful in unambiguously stating that a particular act or omission (voluntary affirmative act or failure to act in a particular way, causing a proscribed result (Cornell Law School LII 2022d; LexisNexis 2022)) will give rise to liability, a legal regime that relies solely on courts may suffer from the ‘deterrence failure’ (‘the social-welfare loss that results from the regime's inability to deter harmful actions’), so as possible remedy a regulatory regime has been instituted (Xu and Pistor 2002). As there is proactive and reactive enforcement, the latter are courts (established to be ‘reactive law enforcers’ and intervene solely as a consequence of other

parties having brought a case before the court, so commonly ex-post), the first one is regulators (who appeared as a repercussion of the greater demand for 'proactive enforcement agents,' that is such, who are legally empowered to institute law enforcement actions in different moments in time, also even prior the harm has been done) (Xu and Pistor 2002).

Courts are reactive enforcers, while regulators are proactive (Xu and Pistor 2002). Responsive regulation involves dynamic sanctioning, including third-party actors (Ayres and Braithwaite 1992; Lodge 2015). Active deterrence in a dynamic regulatory pyramid is more effective than passive deterrence in current justice systems (Braithwaite 2002). Sentencing grids evaluate sentencing, considering criminal history and offense severity (Watts 2018; Bushway and Piehl 2011; Frase et al. 2015). Sentencing aims for crime-fighting effectiveness, fairness, uniformity, and proportionality (Breyer et al. 2021). Proactive law enforcement reduces deterrence failure but is costly; optimal regime selection is recommended (Xu and Pistor 2002).

Responsive regulation is differentiated from other strategies of market governance in what i) gives rise to a regulatory response and what ii) regulatory response would be employed (Ayres and Braithwaite 1992, p. 4). The perspective of responsiveness (Ayres and Braithwaite 1992) is much like the perspective of inter-activeness (Sigler and Murphy 1988); however, models have dissimilarities. Effective and reliable markets ensure corporate business models, activities, controls, and behavior uphold market trust and do not generate or permit market abuse, systemic risk, or corporate financial crime (FCA 2016). The common law and the civil law doctrines and countries hold differing opinions on law enforcement (Coffee 2007b). The influence of high-intensity enforcement is seen as breeding both costs and benefits (Coffee 2007b). The costs of fraudulent CD preventive activities and mechanisms amount to billions of dollars annually (Humpherys et al. 2011; Chen 2016). For a review of corporate liability regimes and mitigation of corporate misconduct, see (Arlen and Kraakman 1997). Criminal laws effectively impact rational actors; prosecution affects corporate behavior (Bucy 2007). Despite criticisms, corporate criminal liability is necessary due to corporate power and harm caused (Beale 2009). A blended liability system is proposed (Arlen and Kraakman 1997).The execution of liability is a purposeful and necessary activity, especially as corporations on contemporaneous markets i) exercise practically unprecedented power but also ii) are causing severe financial and non-financial losses and serious harm to victims, of which numerous are individuals and society as a whole, not merely other corporate bodies, the impact of corporate wrongdoings is vast and multi-layered, ranging up to long-lasting and macro-level effects, specifically fraudulent accounting practices of large, public companies exert wide-ranging, long-lasting negative consequences, losses and harm (Beale 2009). Prosecutors frequently

make use of pretrial diversion agreements to impose mandates on corporations, forming new duties that change corporations' internal operations or CG structures; DOJ employs such measures regarding corporations that have a deficient compliance program at the time of the crime, such measures are most beneficial when corporate managers i) did not act to deter or ii) failed to report wrongdoing, as they benefited personally from i) accepting or tolerating wrongdoing or from ii) deficient corporate policing (Arlen and Kahan 2017).

Law enforcement responses to financial crime are increasing, driven by complex corporate crime (SEC 2022; DOJ 2022a, 2022b; FBI 2022; Andres et al. 2022). The 2000s governance crisis spurred legislative and enforcement actions (Wang 2004, 2005). Financial crimes range from traditional violations to novel actions (SEC 2022). The novel, current market-circumstances-adequate enforcement responses are established to target misconduct in financial markets and hold culprits accountable (SEC 2022; DOJ 2022a; Yates 2015; Andres et al. 2022; FBI 2008). Ap Civil liability and regulatory oversight are also crucial (Beale 2009). Corporate ethos standards are advocated over criminal liability, emphasizing policy reasons and the organizational structure's impact on unlawful behavior (Bucy 1991, 2007, 2009). Corporate prosecutions can benefit victims and deter future harm but may disrupt businesses and stakeholders (Bucy 2007, 2009). Securities-related enforcement actions, parallel investigations, financial penalties, whistleblower rewards, and individual accountability are key trends (SEC 2022; DOJ 2022a, 2022b; FBI 2008; Lollar 2014; Yates 2015; Andres et al. 2022). Restitution is a core aspect of criminal justice, compensating victims (U.S. Congress 2012; Goodwin 1998; Lollar 2014). Securities class actions recover fraud losses (ISS 2022, 2023a, 2023b). Enforcement intensity varies by country, affecting capital costs (Coffee 2007b). U.S. federal securities law historically protected investors, but the 21st century brought changes (Council of Institutional Investors 2012). Private actions improve market efficiency and investor confidence (Council of Institutional Investors 2012). The private attorney general concept mixes private and public features in enforcement (Rubenstein 2014; Rabkin 1988). Debates on private enforcement include issues like bounty enforcement and public interest representation (Rose 2008a; Hensler et al. 2000; Coffee 2007b). Class actions can pursue public goals for private gain (Hensler et al. 2000; Helland 2006). Improving judge oversight in class actions can balance public and private interests (Hensler et al. 2000). Market participants recognize greater accountability in class actions than public enforcement alone (Choi and Pritchard 2016). Reforms are needed to balance public and private enforcement, avoiding over-deterrence or under-deterrence of different actors (Rose 2008a). Criminal prosecutions will intensify

prevention of future corporate fraud, using rewards and punishments to uncover wrongdoing (Bucy 2007).

4 Theories of Financial Reporting Misconduct

4.1 Theories of Blind Spots, Slippery Slope, Gradual Erosion, Broken Moral Compass, Tone at the Top, and Ethical Adrift

The Albrecht's Ethics Development Model (presented by Albrecht et al. 2006) provides a hierarchical framework for understanding the progression of ethical maturity in individuals, particularly within the accounting profession. i) At the base of the model is 'Personal Ethical Understanding,' which signifies the foundational ethical knowledge and values that individuals bring to their professional life. ii) As one ascends the model, 'Ethics Applied to Business Situations' highlights the practical application of ethical principles in the workplace. iii) This is followed by 'Ethical Courage,' which involves the willingness to make difficult decisions or take actions based on one's ethical convictions. iv) At the top is 'Ethical Leadership,' representing the influence and responsibility of leading by example and fostering an ethical culture within an organization (Albrecht et al. 2006). Ethical ideologies affect moral behavior and can be evaluated using Forsythe and Berger's Two-dimensional Framework: relativistic versus non-relativistic moral perspectives and idealistic versus pragmatic values (Forsyth and Berger 1982). In Forsythe's Taxonomy of Ethical Ideologies, there are four ethical perspectives: i) situationism, advocating for a contextual examination of morally ambiguous actions; ii) absolutism, applying unchangeable, universal ethical standards to derive moral verdicts; iii) subjectivism, positing that moral evaluations should be primarily influenced by an individual's personal beliefs ; and iv) exceptionism, recognizing the necessity for occasional deviations from moral absolutes (Forsyth 1980). Empirical studies on human subjects through questionnaire assessments revealed that: i) absolutists (non-relativistic and idealistic) exhibited significant self-devaluation; ii) exceptionists (non-relativistic and pragmatic) experienced increased happiness with greater instances of cheating; iii) situationists (relativistic and idealistic) did not show a consistent relationship between their self-assessments and the morality of their actions; and iv) subjectivists (relativistic and pragmatic) demonstrated a fear of being caught. These results indicate that while ethical ideology might influence individual moral judgments, it does not necessarily predict moral behavior (Forsyth and Berger 1982).

Academic research has highlighted i) the critical role of accounting education, fraud-specific training, and professional experience in enhancing the ability to detect asset misappropriation. ii) It was underscored that ethical orientation and personality traits, particularly the trait of intellect and a predominant learning goal orientation among internal auditors, significantly improve the recognition of fraud risk factors. iii) These findings

underscore the importance of integrating ethical considerations and personality assessments into training and development programs to bolster fraud detection capabilities (Achilles 2006). Empirical investigations into a broad targeting theory suggest that i) increased scrutiny might lead to executive misdemeanors, revealing that new CEOs, pressured to meet high expectations, often align their reports with analyst forecasts, a tendency that diminishes upon removing PTCs with EM indicators. ii) It demonstrates that such CEOs are significantly more prone to manipulation, especially when their PTCs report forecast achievements without revising earnings estimates downward (Krieger and Ang 2013). It has been observed that turnovers in CEO and CFO positions correlate with a heightened risk of future financial restatements, especially those initiated by the SEC and auditors (Dao et al. 2014). Such findings align with the hypothesis that management changes contribute to organizational instability (Grusky 1960), distracting new management from enhancing the quality of financial reporting due to operational or financial complications (Files et al. 2014), and subjecting them to intense public pressure, potentially leading to earnings manipulation (Krieger and Ang 2013), thereby increasing the likelihood of necessitating restatements.

The pervasive issue of unethical accounting practices among CFOs and C-suite executives is often exacerbated by "ethical blind spots" (Bazerman and Tenbrunsel 2011) (Dorminey et al. 2010). These occur when cognitive biases prevent individuals from fully recognizing the ethical dimensions of their decisions, potentially leading to unethical behaviors such as earnings manipulation or financial misrepresentation to meet targets (Bazerman and Tenbrunsel 2011). The complexity and opaqueness of financial reporting can further shield these unethical practices, allowing technical knowledge to be misused to justify questionable reporting (Melé and Armengou 2016). It is crucial, therefore, that ethical training and corporate governance reforms are put in place to foster an environment where ethical behavior is the norm, and where decisions are made with consideration to both legal compliance and moral integrity (Bobek et al. 2017) (Trevino and Nelson 2014). These blind spots may lead to the justification of actions like earnings management or even outright financial fraud to meet short-term performance targets or personal incentives, creating significant moral and legal risks for the organization (Bazerman and Tenbrunsel 2011) (Zhang et al. 2007). In the C-suite, where the pressure to deliver shareholder value is intense, executives might unconsciously adopt a narrow focus that prioritizes financial metrics over ethical considerations, a phenomenon supported by the research (Tenbrunsel and Smith-Crowe 2008). This tunnel vision can lead to ‘motivated blindness’, where leaders fail to notice the unethical actions of others when it is against their own best interest to see these actions, thereby perpetuating a culture of unethical

behavior (Moore and Gino 2013) (Zhang et al. 2007). Ethical blind spots can lead to unethical behaviors in accounting and financial reporting, as individuals may overlook the moral implications of their decisions due to a focus on other objectives, such as profit or market share (Bazerman and Tenbrunsel 2011) (Tenbrunsel and Smith-Crowe 2008).

Ethical blind spots in the context of occupational and management fraud represent a significant area of concern within corporate governance and business ethics. Ethical blind spots can lead to occupational fraud when employees rationalize their misappropriation of resources or engage in corrupt practices due to a perceived lack of fair treatment or compensation, often justified by a distorted sense of entitlement (Dorminey et al. 2010). Bazerman and Tenbrunsel attribute such behaviors to a lack of self-awareness and an inability to recognize the ethical implications of one's actions, which can be further obscured by the organizational focus on goals and performance metrics. Ethical blind spots in accounting fraud, management fraud, and FRM especially manifest when individuals within an organization fail to perceive the unethical nature of practices that manipulate financial data to misrepresent a company's performance (Bazerman and Tenbrunsel 2011). They are particularly dangerous in the accounting profession, where they can lead to actions that compromise the integrity of financial reporting or CD in general (Bazerman and Tenbrunsel 2011). Ethical blind spots refer to the psychological phenomena where individuals fail to recognize the ethical implications of their actions or the actions of others, leading to unintentional unethical behavior. These blind spots can arise from cognitive biases, organizational culture, or social and environmental pressures that obscure moral judgment (Bazerman and Tenbrunsel 2011).

There are four main mechanisms that contribute to the development of ethical blind spots: i) Motivated Blindness: This occurs when individuals have a direct incentive to overlook unethical behavior, either in themselves or others. The desire for personal or organizational gain can overshadow ethical considerations, leading to a failure to detect misconduct that is otherwise obvious (Bazerman and Tenbrunsel 2011) (Moore and Gino, 2013); ii) Indirect Blindness: When unethical actions are carried out by third parties, individuals are less likely to see these actions as unethical, especially if they have outsourced work to these parties. This form of blindness is prevalent in complex organizational structures where accountability is diffused (Bazerman and Tenbrunsel 2011); iii) Slippery Slope: This mechanism involves a gradual erosion of ethical behavior that goes unnoticed. Individuals may not recognize unethical behavior if it develops gradually over time, particularly when changes are incremental and subtle (Gino and Bazerman, 2009); iv) Overvaluing Outcomes: When the outcomes of decisions are successful, there is a tendency to overlook the unethical behavior that led to these outcomes.

Success can act as a justification for the unethical decisions and behaviors that contributed to it (Ashforth and Anand 2003). Ethical blind spots in occupational fraud can manifest when employees justify embezzling funds due to perceived unfair treatment or undercompensation, rationalizing their behavior as a form of self-compensation. In management fraud, these blind spots may cause executives to engage in dubious accounting practices to meet or exceed financial benchmarks, often leading to a culture where unethical financial reporting is normalized (Kish-Gephart et al, 2010) (Trevino et al. 1999).

Corporate professionals may engage in occupational unethical conduct through various justifications, such as pressures to meet financial targets, which can induce a state of motivated blindness—a condition where the desire for achieving specific outcomes leads individuals to overlook the unethical means used to achieve them (Moore and Gino, 2013). C-suites and other executives may resort to aggressive accounting techniques not necessarily because they want to deceive, but because they believe they are navigating through temporary operational or financial setbacks, convincing themselves that their actions are for the greater good of the company's longevity (Gino and Bazerman, 2009). The 2002 Sarbanes-Oxley Act introduced reforms, such as stricter control over public accounting practices, to deter deliberate fraudulent activities (Sarbanes-Oxley Act, 2002). Yet, studies suggest these regulations may not address the broader spectrum of unethical behaviors that individuals might inadvertently engage in due to cognitive biases unrecognized by the actors themselves (Bazerman & Banaji, 2004). This type of unethical behavior is considered 'ordinary' as it is believed to be embedded within the fundamental operations of human cognition (Banaji, 2001). Recent developments in experimental psychology have raised questions about the long-held belief that humans are fully conscious actors in their thoughts and actions, highlighting the impact on ethical behavior interpretation (Bazerman & Banaji, 2004, p. 112). Evidence is increasingly showing that our conscious mind's capabilities are limited, while the unconscious mind plays a significant role (Wegner, 2002). This insight into the unconscious influences on our actions provides a new perspective on the roots of unethical behavior (Banaji, 2001; Banaji et al., 2003; Banaji and Bhaskar, 2000).

Not only popular and financial media but academic studies as well have observed that managers and leaders (C-suits) in modern organizations, especially corporations, lack i) strong ethical standards and a moral compass (Andrews, 1989; Longnecker,1985; Molander, 1987; Pitt & Abratt, 1986) and or ii) are ready to abandon or loosen ethical standards or misguide their moral compass in the face of economic or non-economic incentives or market or competitive pressures (Gellerman, 1986; Hosmer, 1987). The problem reaches far beyond

managers, also regarding the whole accounting and auditing profession (described thoroughly in previous chapters) (Gino and Bazerman 2009 p. 708), where accounting firms, tasked with issuing independent financial reports and disclosing client mismanagement, risk alienating clients and forfeiting valuable contracts, leading to instances where "independent" auditors become entangled in their clients' unethical activities (Moore, Tetlock, Tanlu, & Bazerman, 2006; Levitt & Dwyer, 2002). A 'broken moral compass' indicates a significant deviation from ethical norms, often leading to decisions that are unethical or immoral, which may be influenced by organizational pressures or culture (Tenbrunsel & Smith-Crowe, 2008). The normalization of corrupt practices described by Ashforth and Anand (2003) illustrates how unethical behaviors can become standard procedure within an organization, especially when they are indirectly incentivized by the company culture or leadership. This can develop over time through a slippery slope where initially minor deviations from ethical conduct gradually become more significant and more accepted (Kish-Gephart et al., 2010). Management fraud (accounting fraud) ‘slippery slope’ is a recognized phenomenon in academic literature and market practice (Gino and Bazerman 2009; Albrecht 2009). Moore and Gino’s "Ethically Adrift" concept explains how and why other people (in everyday life, but especially in business, in the professional and occupational area) tend to or are capable of pulling other, more moral or ethical people’s moral compass from its right direction (Moore and Gino 2013).

Also, there is a related concept termed the "Gino and Bazerman’s concept of the ‘Acceptability of Gradual Erosion’ in other people’s unprincipled, unethical, dubious attitudes and behaviors" (present in everyday life, but especially in business, in the professional or occupational area) (Gino and Bazerman 2009b). In the research presented by Gino and Bazerman, experiments demonstrate that unethical behavior is more readily accepted when i) it develops gradually rather than ii) abruptly. This research i) introduces the first empirical evidence of the "slippery-slope effect" in ethical judgment and ii) explores how implicit biases contribute to the overlooking of gradual unethical actions (Gino and Bazerman, 2009). The study draws on concepts of psychological phenomena that occur "without conscious awareness," referencing terms like "automatic," "unconscious," and "implicit," as discussed by Blair (the "bread and butter" or "doctor" effect, where the presentation of one concept facilitates the subsequent processing of an associated concept compared with an unassociated concept, can occur without the perceiver’s i) awareness or ii) intention (i.e., implicitly) (Blair 2001, pp. 354–369) and differentiated conceptually (Bargh 1994). Research suggests that the slippery-slope effect involves psychological processes beyond our conscious awareness, influenced by implicit biases (Gino and Bazerman, 2009; Blair, 2001; Bargh, 1994). Hypotheses on how

personal values and accountability influence ethical dilemma resolutions in management were tested by the academia and found that personal values impacted ethical decision-making in management, but this effect diminished when individuals felt accountable to others (accountability alone didn't significantly affect decision-making, a finding preliminarily linked to the vague nature of the accountability cues and the explicitness of the accountability manipulations) (Brief et al. 1991). However, there are individuals who, upon witnessing unethical actions, choose to speak out and report ethical violations (Gino and Bazerman 2009, p.708). For the whistleblowing programs on the U.S. capital markets and their possible incorporation into EMs such as Poland, see (Ogorek 2018, pp. 76–96). Trevino et al. propose that an effective way to mitigate ethical blind spots is through robust ethical training and a strong emphasis on corporate governance, where ethical considerations are integrated into the business strategy and decision-making processes (Trevino et al. 1999). This requires a proactive approach from companies to cultivate a culture where ethical awareness is a priority, and there are clear policies against fraudulent financial activities (Bebchuk and Fried, 2004; Solomon and Soltes, 2015).

The Ethics Position Questionnaire (EPQ), developed by Forsyth (1980, pp. 175-190), measures individual ethical ideologies on two dimensions—relativism and idealism. Relativism examines an individual's disbelief in absolute moral standards, suggesting that moral judgments vary by situation and context (Forsyth, 1980, pp. 176-180). Idealism evaluates a person's belief in the inherent positivity of ethical actions, implying a more optimistic outlook on moral decisions (Forsyth, 1980, pp. 180-185). Subsequent research, including that by Bobek et al. (2017), has applied the EPQ to explore how professionals, like CPAs, perceive ethical climates differently, highlighting variations between those in public accounting versus industry. Analysis indicates that most managers identified by regulators as responsible for misconduct lose their jobs and face significant repercussions. Many are barred by the SEC from future executive roles, lose a substantial portion of their stock value, and incur heavy SEC fines. Additionally, a significant number face criminal charges, with many convicted and sentenced to jail and probation, resulting in severe professional, financial, and legal consequences (Karpoff et al. 2008). COSO instructs upper management and the board of directors to sustain an effective tone at the top by exhibiting a dedication to integrity and ethics (COSO et al. 2013, 2023). It especially directs upper management and the board of directors to establish and maintain i) risk management, ii) compliance risk management, and iii) fraud risk management (COSO and ACFE 2023a; COSO et al. 2020). BODs i) are tasked with consistently overseeing and evaluating a company's culture, while ii) executive management holds the responsibility

for cultivating that culture (KPMG 2019, p. 7). Media channels and the public expect business leaders to be responsible not only for their professional achievements but also for their private behaviors (Christensen et al. 2024, p. 2). A primary responsibility of leadership is to establish and uphold a culture that emphasizes the organization's fundamental principles. Strategy, risk, and culture should be firmly connected, and internal audit should be leveraged to help assess and monitor culture (KPMG 2019). As a result, professional practice now explores whether effective CG should encompass rigorous scrutiny of business leaders' (C-suits, managers, BOD members) personal misbehavior as part of assessing corporate culture and overall atmosphere (Christensen et al. 2024, p. 2). A good corporate culture is based on trust, transparency, and ethics (KPMG 2019, p. 9). Auditors increase fees and are more likely to resign in response to allegations of 'off-the-clock indiscretions' (i.e., private life) among corporate leaders, especially when these involve integrity issues and the audit office has prior experience with a similar case. However, auditor reactions are primarily reactive and more pronounced for economically less significant clients, suggesting that their responses to leadership indiscretions, while mitigating some negative effects on financial reporting quality, are not uniformly applied across all clients (Christensen et al. 2024). BODs also should evaluate whether the CEO and executive team have cultural fluency (KPMG 2019).

It was demonstrated that auditor responses are influenced by CEO personality traits, highlighting their significant impact in audit situations. i) PTCs led by narcissistic CEOs tend to face higher inherent and control risks. ii) To compensate for the increased risk associated with CEO narcissism, auditors need to perform additional work. iii) CEO narcissism significantly increases external audit fees, reflecting the additional effort and potential risk premium charged by auditors. iv) Companies with narcissistic CEOs are more prone to internal control issues, explaining the need for more extensive auditing (Judd et al. 2017). The i) ethical challenges of leadership (moral and ethical aspects of decision-making in leadership, harmfulness and beneficence of the actions undertaken by the leader, ethics, ethical decision-making, moral leadership processes, group and organizational dynamics, the practice of ethics, personal ethics) (Johnson 2012, pp. 235–266) and ii) ethical behavior (that comprises moral sensitivity, moral judgment, moral motivation, and moral character) and iii) ethical decision-making (ethical problem-solving, including tools), iv) establishment of an ethical organizational climate, emotions and affect in ethical behaviors (Johnson 2012) and v) decline in professional ethics and credibility among executives and accounting professionals (Kouzes and Poser 2012; Albrecht et al. 2004), including the corporation's moral compass - gatekeepers (Paton 2008). Regarding managerial misconduct and ethics, there are numerous theories and

concepts present. Among them, the Moral Compass Theory (the misguided moral compass, where other people or a group can negatively influence the moral compass of a given person and recalibrate it) (Moore and Gino 2013), the Ethical Adrift Theory (refers to a gradual 'erosion of ethical standards' (Gino and Bazerman 2009a), often unnoticed by the individuals involved. This phenomenon occurs when people make small, seemingly inconsequential unethical decisions that grow over time, leading them to drift further from their original ethical principles without immediate realization of the extent of their moral changes) (Moore and Gino 2013; Gino and Bazerman 2009a). Also, the Ethical Blind Spots Theory (refers to the cognitive biases that obscure the moral dimensions of one's decisions. This phenomenon arises from limitations in an individual's cognitive processing, which can systematically prevent them from recognizing the ethical consequences of their actions. As a result, individuals may engage in behavior that deviates from their moral standards while maintaining a self-perception of ethical integrity. These blind spots are significant in that they not only lead to unintended ethical lapses but also shape the organizational culture and ethical climate in profound ways, often going unnoticed until substantial ethical breaches become apparent) (Bazerman and Tenbrunsel 2011; Gino and Bazerman 2012). On moral judgment and dishonesty, see (Gino and Bazerman 2012). Bandura's Moral Disengagement Theory describes how individuals rationalize harmful behaviors to avoid the usual guilt associated with unethical actions. This process allows people to engage in negative actions without damaging their self-esteem, by using mechanisms such as justifying their behavior, displacing responsibility, or minimizing the consequences of their actions (Bandura 1999; Bandura 2016). The Slippery Slope Theory suggests that unethical behavior in management often begins with small, seemingly insignificant compromises which gradually become more serious over time. This progression is typically subtle, with each step making the next unethical action easier to justify, leading managers down a path where standards and ethical boundaries are increasingly eroded. The theory highlights how initial minor violations can desensitize individuals to the seriousness of their actions, thereby escalating into more significant ethical breaches (Albrecht et al. 2004; Albrecht 2009b; Rose et al. 2021; Suh et al. 2020).

Tone at The Top refers to the ethical environment that company leadership establishes through their attitudes and behaviors, which is crucial in influencing the broader organizational culture and ethical practices. This tone, set by senior management and board directors, significantly impacts how employees at all levels perceive and engage in ethical decision-making. When leaders demonstrate strong ethical standards, it promotes a culture of integrity and compliance. Conversely, if leaders exhibit unethical behavior, it may encourage misconduct

throughout the organization (Ramamoorti et al. 2009; Gino and Bazerman 2009a; Gino and Bazerman 2012; Marks 2012b; Moore and Gino 2013; Marks 2012a). The Boiling the Frog metaphor used in C-suites fraud describes a situation where a significant change or danger is introduced gradually enough that it goes unnoticed, leading to complacency or inaction until it is too late and there is outright fraud in a corporation (Suh et al. 2020). Also, there are Moral Identity and Moral Hypocrisy theories (Johnson 2012). Overall, the misery caused by unethical leaders has underscored a crucial point: ethics is at the heart of leadership (Johnson 2012, p. xvii). The SEC named the CEO and/or CFO in the AAERs for some degree of involvement in 89 percent of the fraud cases, as noted in the second COSO's FRF study (Beasley et al. 2010), an upsurge from 83 percent revealed in the previous COSO's FRF report for cases across 1987-1997 (Beasley et al. 1999). However, within two years of the completion of the SEC's formal investigation, i) as little as around 20 percent of CEOs or CFOs had been indicted and ii) only about 10 percent had been convicted (Beasley et al. 1999).

4.2 Classifications and Systematization of Corporate Frauds

With regard to fraud and other misconduct of corporate fraud against Market Integrity and Major Frauds (understood as i) corporate fraud sensu largo, complex securities, commodities, cryptocurrency, other financial fraud, and market manipulation cases ii) prosecuted with parallel regulatory partners – enforcement agencies, especially financial market supervisors, the SEC and the CFTC of the FBI (DOJ OPA 2021, 2022)), the DOJ has established a four-cluster classification: i) Securities and commodities fraud, ii) Federal programs and procurement fraud, iii) Consumer and investor fraud, iv) Cryptocurrency fraud (DOJ MIMF 2022; DOJ 2021, 2022). To exemplify what constitutes a major corporate fraud with regard to the aforementioned clusters, the following can be named: i) Boeing corporate fraud (in an effort to be more cost-efficient, one of the C-suites (CTP) allegedly withheld critical information from regulators. The aforementioned case was not only a financial fraud or WCC per se (a violation of the obligation to disseminate true, accurate, and complete information for commercial expediency and/or personal gain), but also these fraudulent acts have undermined public safety due to the industry specificity (DOJ OPA 2021, 2022)). Likewise, not only knowingly and willfully crafting false and fraudulent bookkeeping and accounts to disseminate information that was untrue and inaccurate (untruly and inaccurately presented or reflected transactions, depositions, assets), but also employed such measures to design a scheme to cover and conceal other illegal exchange-related practices, such as separate schemes of fraudulent and

manipulative practices regarding financial instruments, money laundering, corruption, bribery, ICFR, and knowingly and willfully maintained inadequate controls and compliance programs (U.S. DOJ 2021; U.S. District Court E.D. of New York 2021b, 2021a).

These world-known cases may serve as exemplifications that WCC/corporate financial crime exerts a range of harmful effects and victims' span often reach far beyond financial losses for shareholders due to stock pricing, but can go as far as i) violation of public safety, and/or ii) distortion of market competition, iii) engagement in corruption and bribery and/or employment of predatory business practices, iv) defrauding or conspiracy to defraud financial and non-financial regulators, v) infringing rights of market participants, consumers, contractors, vi) causing severe financial and non-financial losses, vii) negatively impacting the whole industry or even other industries, or viii) infracting integrity of publicly traded markets, ix) and contravening exchanges, financial, and commercial rules and economic and social order (Beemsterboer et al. 2021; U.S. DOJ 2023, 2022, 2021; U.S. District Court E.D. of New York 2021b, 2021a). 'Knowingly and willfully failed to implement and maintain a system of internal accounting controls sufficient to provide reasonable assurances regarding the reliability of financial reporting and the execution of transactions (…) which is a measure apt to help or enable the detection and halting of fraudulent behaviors and schemes within the entity' (U.S. District Court E.D. of New York 2021a, p. 4). While cooperating with law enforcement, an allegedly fraudulent entity 'shall truthfully disclose all factual information with respect to its activities, those of its subsidiaries, and affiliates, and those of its present and former directors, officers, employees, agents, and consultants' and 'must at all times provide complete, truthful, and accurate information' (U.S. District Court E.D. of New York 2021b, pp. 8–9). In the 21st century, numerous laws and stock exchange listing requirements were introduced to decrease the incidence of corporate fraud and to increase the reporting (signaling) of financial misconduct, such as SOX and OSG (Organizational Sentencing Guidelines) (Hess 2007). Sentencing and Sentencing Guidelines are crucially important for the i) preventive (general deterrence, specific or individual deterrence) as well as ii) the corrective functions of criminal punishment, and their effectiveness affects perceptions of crimes and criminal behaviors (Anderson et al. 1999; Breyer et al. 2021; Watts 2018).

The standard legal definition of fraud, focused on intent (Black's Law Dictionary, 1979), is considered too narrow (Ramamoorti et al. 2009), underscoring the need for a broader understanding and reevaluation to effectively address and detect fraud, suggesting implications for future legal and criminological approaches (Ramamoorti 2008; Ramamoorti and Olsen 2007; Ramamoorti et al. 2009; Ramamoorti et al. 2016). In the same way that larceny

characterized much of the twentieth century, fraud will likely characterize the twenty-first century (Albanese 2005, p.6). Fraud is generally i) 'a hidden activity' and FRF ii) 'do not always come to light' (Brennan and McGrath 2007, p. 1). It occurs when top managers deliberately distort accounting figures and other CD information. Over time, auditors have crafted tools to expose these distortions, aiming to align financial statements with accepted accounting principles, yet significant fraud cases sometimes or often elude auditor detection (Lenard and Alam 2009). For a historical overview of corporate financial scandals, see Toms (2019), and for a historical perspective on fraud detection, see Lenard and Alam (2009). FRF is i) difficult to detect, ii) motivated by many diverse factors, and iii) achieved in numerous ways (Brennan and McGrath 2007, p. 1). In many jurisdictions, there isn't a distinct crime labeled as FSF/FRF/FRM; instead, individuals involved are typically prosecuted for i) theft or for ii) inadequately maintaining books and records, contingent upon the specifics of the fraud (Brennan and McGrath 2007, p. 1). FRM varies from other frauds in that "fraudulent financial reporting is committed, usually by management, to deceive financial statement users while misappropriation of assets is committed against an entity, most often by employees" (Guy and Pany 1997, p. 4). For the analysis of FRM misconduct (over years and through all allegedly fraudulent public companies), see Beasley et al. (1999, 2010). AICPA, COSO, and other stakeholders crafted a cyclical research report series on FRM, with main findings that fraudulent CD instances are hard to spot by market participants (especially unsophisticated) on a regular basis, and they are often overlooked for a long period.

Investors fail to notice them because the commission of corporate securities fraud is not directly observable (Wang 2013; Wang 2005, 2004). Only detected CD frauds are observed; thus, i) fraud detection and ii) fraud commission (occurrence) are separate concepts, yet related to each other (Wang 2013; Wang 2005, 2004). FRM occurs when a company falsifies these documents for financial gain. By altering financial statements, unscrupulous managers can improve the public appearance of the company (West and Bhattacharya 2015, p. 1). The detection of FRM hinges on critical factors such as i) problem conceptualization or representation, ii) feature selection, and iii) performance metrics determination, with a deep understanding of these elements being vital for effective modeling (algorithmic or statistical solutions) (West and Bhattacharya 2015). The literature explores why different proxies and databases examining FRM may produce divergent outcomes, for an elaboration see (Karpoff et al. 2017b). Each database a) captures a distinct subset of potential FRM observations, also b) four key features in each database significantly impact FRM research: 1. scope of coverage (e.g., AAERs, restatements, lawsuits, SCALa), 2. dates of initial revelation (leading to

discrepancies in identifying when investors first learn about misconduct), 3. identification of fraud (divergent fraud definitions and identification procedures), and 4. omitted or effectively omitted events (resulting in high rates of omission that can affect tests, especially in control samples) (Karpoff et al. 2017b). Earnings management research often analyzes nonrandom samples, such as PTCs that self-select into samples by changing auditors. To mitigate misspecification and minimize the risk of incorrect inferences (i.e., falsely rejecting the null hypothesis), many earnings management studies incorporate control samples to address model misspecification (Kothari et al. 2005a, pp. 1–2).

Limited resources constrain market regulators and/or supervisors, impacting their capacity to uncover and prosecute misstatements. Consequently, they may avoid pursuing cases with ambiguity or low expected success. This suggests, in the case of the SEC, that the AAER sample (FRM PTCs subsample - with AAERs as proxies for FRM) is likely to feature the most severe or egregious misstatements, excluding PTCs engaging in aggressive but GAAP-compliant earnings management (Dechow et al. 2010a) or those cases that are practically unachievable given the collected evidence or otherwise hard to prove in proceedings or before a court of law (Albrecht 2009). Fraud's complexity is reflected in its international scope, layered structure (Huber, 2017), secretive strategies (Kihl et al., 2020), and its broad yet diverse manifestations, which have prompted investigations across numerous academic disciplines, such as sociology, criminology, psychology, and accounting/auditing. Understanding this elaborate socio-economic issue requires an interdisciplinary approach (Cooper et al., 2013; Power, 2013). Research in accounting and auditing on fraud builds upon and extends the foundational studies conducted in criminology (Benson, 2009; Morales et al., 2014). Historically, fraud has been entwined with the advent of systematic record-keeping in early commerce (Basu and Waymire, 2006), proving that it is far from a contemporary phenomenon. “It would be an understatement to assert that contemporary capital markets are preoccupied with issues pertaining to accounting fraud or FRM, inadequate CG, and misconduct in management” (Creutz 2003, p. 2). Financial statement fraud is described as a calculated effort by corporations to deceive or mislead users of public financial statements, including investors and creditors, through the preparation and distribution of significantly erroneous financial statements (Rezaee, 2005). Fraud is described as the act of deceiving someone to illegally gain money or goods (The Oxford Dictionary). It involves various clever methods used by one person to gain an advantage over another through dishonesty or hiding the truth (Black's Law Dictionary 1979). In auditing, it refers to deliberate actions using deceit to achieve an unlawful or unfair benefit (ISA 240). Within accounting, fraud entails intentional deception by

individuals in management, governance, employees, or third parties, leading to inaccuracies in audited financial statements (AICPA 2020).

The elements of fraud were set out by the Court in Pace vs. Parrish (1) That a representation was made; (2) Concerning a presently existing material fact; (3) Which was false; (4) Which the representor either (a) knew to be false, or (b) made recklessly, knowing that he had insufficient knowledge upon which to base such representation; (5) For the purpose of inducing the other party to act upon it; (6) That the other party, acting reasonably and in ignorance of its falsity; (7) Did in fact rely upon it; (8) And was thereby induced to act; (9) To his injury and damage' (Utah Supreme Court 1969, pp. 11–12). Fraud may be i) actual or ii) constructive; where i) 'actual fraud consists of any kind of artifice by which another is deceived' while ii) constructive fraud consists of any act of (a) omission or (b) commission, (1) contrary to legal or (2) equitable duty, trust, or (3) confidence justly reposed, which is contrary to (i) good conscience and ii) operates to the injury of another', also an 'actual fraud implies moral guilt; constructive fraud may be consistent with innocence' (GA Code § 23-2-51 2020). The contemporary legal framework for misrepresentation i) has its roots in three main doctrinal streams that have started to intersect in recent times, and its development is primarily based on the legal action known as the case for deceit; iii) additionally, it has been shaped by the principles of negligence, where it finds significant overlap and integration, especially concerning professional conduct (Fleming and Gray 1977). For an extensive legal discourse on misrepresentation, see Maryland Law Review (Fleming and Gray 1977). 'Under the traditional common law rule, the type of conduct which subjects one to liability for deceit consists of (1) false representations (2) fraudulently made (3) with the intention of inducing another to rely thereon'; misrepresentations i) induce reliance, ii) this reliance is justified and iii) causes damage (Fleming and Gray 1977, p. 289).

The main FR Framework (Financial Reporting Framework) employed worldwide i) is accrual-based accounting (ABA), which necessitates judgments and/or estimates to value numerous items and concepts within FS or even CD sensu largo, ii) under ABA, issuers of financial information hold and execute plenty of discretionary powers, and managers and officers are therefore in a position to engage in earnings management practices (EME), iii) EME influences the desirable, requested, or sought traits of certain financial information and their reception by outside parties, which might give rise to considerable consequence (Serra Coelho 2022, pp. 512–513). CD to convey a manager's information on corporate performance must be provided with an FR framework (standards, etc.) that allows for managerial discretion and judgment in CD. This enables managers to disseminate their knowledge of the corporation and

its opportunities, making CD choices (managerial politics, methods, discretion, judgment, estimation, disclosure - ME&J) that have the potential to increase the value of accounting information (and corporate information sensu largo) as a way of communication (Healy and Wahlen 1999; IASB 2018; SEC 66 FR 6373 2001). Especially pro forma financial information in earnings releases and MD&A convey managerially interpreted or emphasized information, including forecasts. PTCs may want to focus investors' attention on critical components of FS results to provide a meaningful comparison: i) to results for the same period of prior years or ii) to emphasize the results of core operations. This has been the intended function of information in a PTC's MD&A section of its CD. Nonetheless, in the U.S., there is no prohibition preventing PTCs from i) publishing interpretations of their results or ii) publishing summaries of GAAP Financial Statements ((SEC 66 FR 6373 2001; Alles et al. 2021)) \ Managerial earnings guidance and forecasts were very common prior to the implementation of the Fair Disclosure Regulation (Hutton 2004).

Regarding managerial (their information advantage resides at the PTC level) and analytics (which resides on the macroeconomic level) earnings forecasts, once management's actions that influence reported earnings are difficult to anticipate by corporate outsiders, managerial forecasts are superiorly accurate in comparison to analysts'. Their accuracy and bias, as well as intended and unintended consequences, see discussion (Hutton et al. 2012), The Regulation, private managerial earnings guidance, prohibition of selective dissemination of private information, and inequality of the dissemination of corporate information were presented in the previous chapters of the thesis. Opaque corporations are more prone to stock price crashes. This evidenced pattern was consistent with the interpretation that opacity linked to EME has decayed abruptly in the post-SOX era, indicating that EM has diminished or corporations can hide less information in the new regulatory environment (Hutton et al. 2009). EME practices have a spectrum or continuum of undertones (Amiram et al. 2018, p. 88; Ettredge et al. 2010; Healy and Wahlen 1999) EME can convey private information to shareholders (Amiram et al. 2018, p. 88), but there is also evidence that EM practices precede FR restatements. EM can also underlie non-fraudulent restatements as managers use the leeway available within GAAP, as long as such flexibility exists GAAP (Ettredge et al. 2010, p. 333)These are accounting options that are defensible, rationalizable, and justifiable under the grey area of (Ettredge et al. 2010, p. 335). \ The classical literature states two reasons for management to engage in EM: i) external demand for EM to increase the firm's stock price (often from current shareholders, with several sources such as rate of return regulations, debt-covenant restrictions, and accounting-based contracts with other parties, influencing

prospective investors' insights on the corporation's value), and ii) internal demand relating to optimal contracting (expected cost-minimizing contracts that encourage EM) (Dye 1988, p. 195). The fact that management would smooth reported earnings has motivated many academic studies. (Kirschenheiter and Melumad 2022, p. 763). Real income smoothing can be induced by rational behavior that does not rely on myopia or misunderstanding by any part (Lambert 2020; Lambert 1984) Management experiences inducements to choose actions that maximize their expected utility, regardless of whether it may not be in the best interest of shareholders. Managers are incentivized to increase their own welfare through involvement in smoothing behavior (Lambert 1984, p. 604). However, income smoothing may be regarded as misleading or other immoral deeds on the part of corporate managers(Ronen and Sadan 1981). Managers and officers employ judgment in i) FR and ii) structuring transactions to adjust, reshape, and revamp FR to either i) mislead some stakeholders about the underlying economic performance of the company or ii) influence contractual outcomes that depend on reported accounting numbers (Healy and Wahlen 1999, p. 368).

The Model of equilibrium reporting strategy (robust to diverse assumptions about the investors' capability to conclude on the manager's strategy, naïve vs. Sophisticated (Kirschenheiter and Melumad 2022) p.763) includes both big bath phenomena and earnings smoothing phenomena. The claim is that managers sometimes under-report earnings by a large amount for sufficiently bad earnings news, a behavior known as taking a big bath, in the current period to report higher future earnings (Kirschenheiter and Melumad 2022) p.762-3) Even though reported earnings may reflect manipulation, it has been argued that the market rewards management for smoother earnings (Kirschenheiter and Melumad 2022) p.762-3) (Kirschenheiter and Melumad 2022). Real income smoothing could be generated by rational behavior not dependent on myopia or misunderstanding by any party. A number of other studies (for example (Dye and Verrecchia 1995)) analyze earnings smoothing due to discretionary reporting from an optimal contract design perspective, motivating managers to take actions that increase accounting earnings rather than the firm's value (Jensen 1986) as cited in (Stein 1989, p. 655). For a review of EM academic evidence, see Healy and Wahlen (1999), designed to inform regulators, standard setters, and others (AAA, FASB, SEC) to enable them to evaluate the pervasiveness of EM and FR integrity (Healy and Wahlen 1999, p. 365). The ethics of corporate management, competition, and proper behaviors (assurance of fairness) have been widely discussed since the 1900s (Hadley 1907). FR choice, managerial estimates, and judgments (ME&J) are omnipresent in A&AP - most FS items are grounded on estimates. Moreover, some FS items derive from a set of estimates and multiple judgments, e.g., expenses

due to employees' stock options or pensions, influenced by i) objective estimation biases/errors and ii) intentional managerial manipulation, thus damaging the reliability and relevance of CD (Ding et al. 2020). On the right spectrum of EME (Amiram et al. 2018) are 'improper earnings management issues' often found fraudulent by the SEC. These include failures to properly account for, thus materially misstating, financial results to the investing public and in filings, for i) debt prepayment penalties, ii) some employment contracts, iii) earnouts, and iv) a variety of other EMEs s (Zack 2016; SEC Release No. 10081, 77887, 3775 2016).

Business ethics and values have been a vivid subject of academic and market practice interest for the last decades, also in the international dimension (Frederck 1987, 1990; Frederick et al. 1988), The transcultural corporate ethic, regarding moral guidelines for companies, is incorporated into a few multilateral compacts. Such normative guidelines (normative proscriptions and prescriptions) boundaries (Frederck 1991, p. 165)build a framework for classifying crucial moral behaviors expected of MNCs that transcend national and societal differences and boundaries (Frederck 1991, p. 165). Contravening the aforementioned rules is translated as i) unethical and ii) immoral (Frederck 1991). According to the notable ethicist (Frederick 1995), n the corporate world, there are three antagonistic value systems present, which are principally irreconcilable and contradictory, thus in persistent tension: i) the requirement for managers or D&Os to efficiently allocate resources for maximum expected economic outcomes (also short-term CD, such as annual, quarterly items like profits, returns, earnings (Brochet et al. 2015; Donaldson 2005; Levitt 2000; Kraft et al. 2018), For myopia models showing that stock price focus pushes managers to override or outweigh short-term CF at the sacrifice of value-increasing long-term investments, see (Stein 1988, 1989)) and measures derived from them (non-GAAP or IFRS-standardized, non-covered by audit, i.e., adjusted EPS, adjusted EBITDA, Recurring Net Income RNI (Zack 2016; SEC Release No. 10081, 77887, 3775 2016)) , ii) in the quest for the first objective, it is the natural inclination for managers to seek to accumulate power (both managerial incentives, perks, equity, monetary, along with capital market expectations are origins of short-termism (Bushee 1998; Bushee 2001; Kraft et al. 2018; Edmans et al. 2017), also on EMs, local institutional investing short-termism aggravates managerial myopia (Chen et al. 2015)) , iii) iii) wish and quest of the members of a community to establish relationships that would preserve these communities (Frederick 1995).

Insufficient integrity amid C-suites and 'integrity oaths' of CFOs and CEOs (Dutch professional accounting degrees pledge an integrity oath since 2016 due to regulations) were evidenced to enhance corporations' overall FR quality, including i) post-oath period showed a

decrease in income-increasing discretionary accruals, ii) post-oath period displayed a decrease in discretionary expenditures, which was interpreted in the literature as oath-pledged C-suites actually decreasing EME (not merely replacing AEMs with REMs)) (Heese et al. 2023). EM is performed through two channels or strategies, via Real Activities (Real Activities EM) and/or accruals (Accrual-based or accounting-based EM) or accruals manipulation (AM) and real activities manipulation (RAM)) (Kothari et al. 2016, pp. 559–560). There are researched theoretical models and empirical investigations on how managers make choices between REM and AEM. Also, in emerging markets, where PTCs in a less stringent legal environment and double-listed tend towards AEM, and those with inferior CG and higher financial leverage are more likely to engage in REM, Managers interfere in the CD process by using discretion and exerting judgment regarding accounting choices. (Gao et al. 2017). It was shown that earnings manipulations are prevalent among managers, regardless of auditor performance. EM, studied as the absolute value of discretionary accruals, was revealed to be lower when audited by firms with longer industry specialist durations. Yet, such firms are connected to higher levels of REM, known as an unintended consequence of specialist auditors, who are superiorly proficient in curbing AEM of their clients (Lopez and Vega 2019). REM necessitates managers to depart from their 'normal business practices.' Auditors are expected to restrain AEM, while real REM is outside the scope of a mandatory FS audit . (Lopez and Vega 2019, p. 2) .

Investors' capability to spot EM and to evaluate EM consequences for a corporation's future performance was evidenced to decrease more severely when RAM is the foundation for EME (Kothari et al. 2016). Amiram et al 's FR Choices Spectrum (Amiram et al. 2018): has three cornerstones: i) EM on the left hindsight, a) it conveys private information to stakeholders, b) it resides in the 'grey area,' c) with high probability of c1) potential restatements, c2) potential class action lawsuits, c3) derivatives lawsuits; and towards the right side of the spectrum, the doubtfulness, unethicality, aggressiveness of accounting, and reporting practices increase. There are two following cornerstones: ii) 'financial misrepresentation' (Amiram et al. 2018, p. 734) and 'financial misreporting,' a) part of them still may be perceived as doubtful and highly aggressive, in general contravening legal norms, but a part of them may still reside within the grey area, decided and punished through enforcement actions: a judicial process in the courtroom, administrative, civil, criminal proceedings of the supervisory agencies and governmental departments, SCALs, restatements (SEC 2003)), b) however, they are all illicit, they transgress legal norms; iii) 'financial reporting fraud' decided and punished as the previous one (Karpoff et al. 2017c). Jurisprudence in case law legal regimes has established that fraud can arise, notwithstanding FS compliance with the accounting standards (Amiram et al. 2018,

p. 88). The FRM literature is rich in diverse terms for FRM, e.g., financial statement: fraud (ACFE 2009, 2017, 2019; Albrecht and Hoopes 2014b; Albizri et al. 2019; Chen 2014; Brazel et al. 2015), misconduct, irregularities, misreporting, misrepresentation (Burns and Kedia 2006; Hopkins 2018; Rose et al. 2021; Samuels et al. 2018; Schrand and Zechman 2012; HOBSON et al. 2012; Allee et al. 2021). .

However, they all designate alike events of FRM, yet FRM per se is not a standardized, clear-cut, explicit, unambiguous, categorical, homogeneous, uniform concept, arduous and uneasy i) to be legally defined, ii) to be identified ex ante or ex post, iii) is situational, legally-interpretable, and circumstantial; nonetheless, jurisprudence (laws and rulings) in defining the FRM concept has established an amalgamation of common qualities (an assembly of elements) of fraud (Amiram et al. 2018, p. 733)Moreover, it is related to a multitude of research areas and numerous insights from diverse points of view from various scientific disciplines (Albizri et al. 2019), it exhibits both international and local features (Brennan and McGRATH 2007) It can relate to a single entity (PTC) or a business group(Chen et al. 2019). CD items and indices or measures derived from them that are non-GAAP or IFRS-standardized or pretended to be compliant with, but in reality, are intentionally departed from GAAP or IFRS and/or non-covered by audit, are a rapidly emerging fraudulent FR threat (Zack 2016). Fraudulent or improper accounting in public FS, i) to the market and its participants, ii) to the supervisory body, as corporations do involve in schemes to manage reported financial results to predetermined targets (e.g., Adjusted EBITDA)) (SEC Release No. 10081, 77887, 3775 2016). Managerial myopia is more probable to occur when corporations experienced prior earnings decline, and thus managers attempt to reverse earnings (Chen et al. 2015, pp. 845–846). In the EU, lawmakers attempted several times to lessen short-term pressure on managers via regulating quarterly CD (Kraft et al. 2018, p. 1), as greater and frequent CD might induce managers to execute myopic investment choices (Hermalin and Weisbach 2012; Gigler et al. 2014), However, others see it as a measure to i) enhance monitoring, ii) improve disciplining of managers, iii) alleviate agency problems , (Kraft et al. 2018). There has been an upsurge observed in the usage of pro forma earnings (pro forma financial information in earnings releases (Alles et al. 2021, p. 5) , in which the GAAP FS are disseminated by PTCs together with unaudited FS whose content is entirely chosen by the PTC (PTCs present to the public their earnings and results of operations on methodologies other than GAAP) (SEC 66 FR 6373 2001, p. 63732; Alles et al. 2021), that under certain circumstances, can mislead market participants if it obscures GAAP results, especially i) regarding period-over-period or inter-corporations and PTCs shall be mindful of their duty not to mislead the public when such

information, ii) dissemination of financial results that is addressed to a limited feature of a PTC's overall financial results, or that sets forth calculations of financial results on a basis other than legally prescribed accounting standards (GAAP), as the statement misleads the public when the PTC does not fully and transparently disclose the basis of its presentation, iii) materiality issues, as statements about a PTC's financial results that are literally true however might be misleading if they omit material information, iv) may not be considered misleading solely due to its deviation from GAAP if the PTC in the same public statement discloses in plain English how it has deviated from GAAP and the amounts of each of those deviations (SEC 66 FR 6373 2001). Non-GAAP FR by PTCs are also often related to accounting misstatements resulting in restatements, corporations with core restatements recurring (normal earnings from primary operations (Palmrose and Scholz 2000; Palmrose et al. 2001; Palmrose and Scholz 2004)) were found to have greater frequencies for i) intentional misstatements, i.e., fraud and consequent ii) bankruptcy or iii) delisting, also iv) more material misstatements, v) more negative security price reactions to the announcements of the restatements, vi) more negative security price alterations over a given period preceding and following those announcements (Palmrose and Scholz 2004).

Restatements are: i) technical (non-related to core recurring items, e.g., goodwill, IPR&D, restructuring charges, also doubtful eligibility of certain practices, such as combinations pooling vs. Purchase (Palmrose and Scholz 2000, pp. 7–8)), , ii) economic, regards transactions and accounts related to core recurring earnings (Palmrose and Scholz 2000, pp. 6–7)(core earnings are utterly crucial for FS users) often involve misstatement of IS and BS, especially accounts such as revenue, receivables, COGS, OpEx, incl. PP&E; transactions can be either i) completed or ii) uncompleted (e.g., credit sales), iii) illegitimate or fictitious, non-existent, iv) legitimate yet recording is moved in time (premature, delayed) (Palmrose and Scholz 2000, p. 7). More severe reactions are related to indications of management fraud, more material dollar effects, and restatements that are attributed to auditors, the negative signal associated with fraud and auditor-initiated restatements is associated with an increase in investors' expected monitoring costs, while higher materiality is associated with greater revisions of future performance expectations (Palmrose et al. 2001). Auditors' litigation is significantly more likely to occur regarding economic restatements than technical ones as the first ones are linked to more severe conditions as measured by i) fraud, ii) materiality, iii) bankruptcy or delisting, iv) security price reaction (Palmrose and Scholz 2000) management fraud (Palmrose 1987), fraud window-dressing and negligence in FS (Kellogg and Kellogg 1991-), risk-management lessons from Enron fraud (Clauss et al. 2009), searching for suitable

co-offenders (Tremblay 1993), separating facts from forecasts in FS (Glover et al. 2005). Auditors' litigation classically comprises a process: firstly, initial detection or discovery of potentially misleading or false FS, secondly, there is a lawsuit filed (such as class action lawsuit against auditor (Kellogg 1984)), thirdly litigation occurs (or a lawsuit is found non-meritorious), fourthly, eventual resolution is reached; litigation activity can be used to make quality differentiation among auditors (audit service quality) (Palmrose 1988a, 1988b).

Financial Reporting Choices Figure or Schema was proposed as an effect of the collaboration of the FRM leading and world-known academic experts Amiram D., Bozanic C., Cox J., Dupont Q., Karpoff J.M., Sloan R. to illustrate the range or spectrum of financial reporting choices, with a special emphasis on FRM. It does not include clusters of conservative, prudent, and neutral accounting, as e.g. the Albrecht's Accounting Spectrum does (Albrecht 2009a). The Amiram et al. spectrum arrays from Earnings Management (left side of the figure) to outright Financial Reporting Misconduct (right side) (Amiram et al. 2018). Potential DOJ and SEC Enforcement Actions (can be prosecuted separately or with parallel regulatory partners – enforcement agencies, especially financial market supervisors the SEC and the CFTC) (DOJ MIMF 2022; DOJ 2021, 2022). For Market Integrity and Major Corporate Frauds, see DOJ Corporate Enforcement Actions (DOJ MIMF 2023, 2022).

4.3 Proxies for Financial Reporting Misconduct for Research and Market Practice

In legal studies, CG, and corporate law research, corporate misconduct is denoted as 'corporate crime' and 'corporate financial misdealing' (Arlen 2018), and 'corporate misconduct' (Arlen and Kraakman 1997). Legal system components and law enforcement practice term corporate misconduct as 'corporate wrongdoing' (Yates 2015). Due to the lack of consensus and a unified perspective on FRM, the discretionary nature of choices and behaviors in both operational and accounting domains contributes significantly to the existence of a wide "gray reporting area" containing "doubtful practices" (Amiram et al., 2018, pp. 734-740). Also, the legal standpoint remains influential on what may be legally labeled fraud versus alleged fraud. Thus, academia in research practice often omits the term "alleged" and uses the term "fraud" directly. Although some cases have concluded with established instances of fraud, the majority of settlements involved financial compensation without any acknowledgment of culpability. Consequently, from a legal standpoint, these cases continue to be considered allegations, yet from the practical, academic, and market standpoint, they are regarded as fraud (Dyck et al. 2007). From the perspective of methodology in the research area of financial fraud,

attention must be given to several specific characteristics that significantly influence the selection of research methods. Financial fraud, especially the category of "FRM," is inherently difficult to detect early on, particularly during its initial stages when the negative effects can still be mitigated and the costs minimized for stakeholders and the market (Higson and Kassem 2012, p. 191). Unlike errors in financial reporting or accountancy, financial fraud is associated with intensive practices of concealment and is itself unobservable. Only its symptoms (also referred to as indicators, predictors, signals, anomalies, or generally, red flags, cues) can be directly observed (Albrecht et al., 2015, pp. 123-137).

The occurrence of errors is not related to the fundamental features of actions or omissions in the context of FRM: misrepresentation, misstatement, or omission that is material and intentional or knowingly or recklessly misleading, false, inaccurate representation (not reflecting the true picture) or material and deliberate omission, with knowledge or the ability to have it or when one should have it (due diligence, contractual obligation, position-function duty, etc.) (Amiram et al., 2018). The concept has been thoroughly discussed later, as its divergent definitions may affect (and do affect) the determination of the scope of research and its results, and conclusions, which often vary or are ambiguous, heterogeneous precisely due to definitional discrepancies, disparities in the scope of data used in databases, and the heterogeneity of the sample's nature, among other factors (Amiram et al., 2018). Frauds related to corporate reporting (Corporate Reporting Fraud) and other forms of breaching information obligations (Financial Reporting Misconduct) ultimately result in the distortion of the "true economic picture of the entity" (Healy and Palepu 2012). Since FRM may involve the manipulation of financial statements by various economic agents in capital markets under a specific legal regime, the development of literature is most likely achievable through an interdisciplinary approach - the integration of knowledge resources and the utilization of perspectives from multiple scientific disciplines (law, accounting, and finance) (Amiram et al. 2018). Research indicates that company shareholders suffer significant losses when their PTCs face allegations of misconduct (FRM, aggressive EM) (Feroz et al. 1991; Desai et al. 2006a), however, there is scant proof that the individuals responsible for misconduct incur direct costs, which raises significant considerations for public policy and CG; evidence that these perpetrators face personal repercussions would endorse the effectiveness of existing corporate governance, managerial labor markets, and regulatory frameworks in curbing illegal activities (Karpoff et al. 2008).

Furthermore, apart from the prospect of losing their positions and/or jobs (more than nine out of ten (Karpoff et al. 2008, p. 193)), culpable managers face a variety of potential

penalties imposed by i) the capital market supervisor and ii) the judicial system (components collectively administer, enforce, and oversee the application of laws and the legal process in the country, ensuring that justice is served), and iii) private lawsuits. i) There are monetary penalties (criminal and civil) and ii) non-monetary penalties imposed by enforcement agencies and judicial system components, ranging from relatively minor sanctions such as orders to cease-and-desist from the activity to more severe consequences like probation and jail time (nonetheless criminal charges and penalties are a sizeable minority, below one third of the cases (Karpoff et al. 2008, p. 193)) (Karpoff et al. 2008). Summaries of the discussions on the penalization of C-suites and PTCs for financial misconduct can be found in the previous chapters of this thesis. Some data indicate that the governance of most firms fails to prevent managerial misconduct, which supports the case for more regulatory oversight (Karpoff et al. 2008). Brief discussions on the topic are found in (Arlen 2018) (Arlen 2012) (Jackson and Roe 2009); for an argument from a capital market law enforcer advocating for more reliance on individual penalties rather than PTC-level penalties, see (Yates 2015) the Non-prosecution approach (Arlen and Kahan 2017). For insights into enforcement regimes around the world, see (La Porta et al. 2006). Discussions on the optimal mix of individual and firm-level penalties and corporate liability are presented in the previous chapter of this thesis. Also, for the liability regimes base (e.g., harm to the victim versus gain to the injurer), see (Polinsky and Shavell 1993) (Arlen and Kraakman 1997).

The underlying three-pronged base for further discussion on white-collar crime and FRM specifically frameworks is that i) trust is developed based on the prior belief that one's counterpart will face repercussions for opportunistic or fraudulent actions (Dupont and Karpoff 2017) (Dupont and Karpoff 2019), ii) the purpose of enforcement is to motivate compliance among market participants by identifying infractions, penalizing offenders, and serving as a deterrent (Batz 2021), and iii) as breaching securities laws is one of the six potential causes of corporate collapse (Soltani 2010), thus the legal framework is crucial for protecting investors (La Porta et al. 2000). Whenever there are no direct methods or feasible possibilities for a complete and unanimous identification of given concepts or events, proxies are established and employed for them to be empirically researched, such as in the field of of FRM (among them AAERs, SCALs, restatements, other lawsuits, media insights (Karpoff et al. 2017a; U.S. Government Accountability Office 2003; U.S. General Accounting Office 2002; Ettredge et al. 2010; Dyck et al. 2010)) (Karpoff et al. 2017a). For an extensive review, published by the AAA, of FRM proxies in U.S. FRM research, see (Karpoff et al. 2017a). In the U.S., researchers use specific four databases (databases allow for the identification of a proxy for such events and to

gather a sample of FRM, i.e., misreporting, misconduct fraud (Karpoff et al. 2017a, p. 129)) (separately or in given combinations and with chosen criteria and filters) to identify FRM in empirical tests (Karpoff et al. 2017a, p. 130). This notion is accordingly followed after suitable adjustments (local databases and forms of data storage and collections) by other less developed markets research (SEC – capital market supervisor and regulator and AAERs – enforcement releases, as equivalents from other countries (Kanapickienė and Grundienė 2015; Yendrawati et al. 2019; Kirkos et al. 2007; Jan 2018)).

On mature markets, there are databases established by diverse actors, both public and private, encapsulating a diverse range and classes of data such as restatements, SCLAs, criminal litigations, administrative actions, other agencies' law enforcement, e.g., i) the Government Accountability Office (GAO), ii) Audit Analytics (AA) databases of restatement announcements, iii) the Stanford Securities Class Action Clearinghouse (SCAC) database of securities class action lawsuits, and iv) the Securities and Exchange Commission's (SEC) Accounting and Auditing Enforcement Releases, most recently as compiled by the University of California, Berkeley's Center for Financial Reporting and Management (CFRM) (U.S. Government Accountability Office 2003; U.S. General Accounting Office 2002; SCAC 2023; Audit Analytics 2023a; SEC 2023; Haas School of Business, University of California, Berkeley 2023). AAERs databases encompass detailed information about SEC enforcement actions against i) public (PTCs) and private companies, ii) auditors (CPAs, firms), iii) law firms, and iv) individuals (including C-suites, D&Os, and market professionals such as analysts, brokers/dealers). They embrace enforcement actions related to FR regarding i) civil lawsuits brought by the SEC in federal court, ii) notices, and iii) orders concerning the institution and/or settlement of administrative proceedings (SEC 2023; Haas School of Business, University of California, Berkeley 2023; Audit Analytics 2023a, 2023b). They include such outcomes as i) Respondent Orders, ii) financial penalty amounts, iii) and bars, iv) prohibitions, v) suspensions, and vi) reinstatements. They cover and categorize i) Violations, ii) Issues, iii) Respondents, iv) Respondent Orders, and v) Related Parties (Audit Analytics 2023a; SEC 2023). There are also extended databases that include other forms of oversight regarding CD, accounting, auditing, and the regulatory environment. They are in the form of a set of databases, such as an interactive amalgamate of i) AAERs, ii) Accounting Quality Risk Matrix (Recognize signs of earnings manipulation or concerns regarding the quality of accounting, with critical data elements encompassing red Flags, warning signs related to a firm's external auditor, financial disclosures, oversight mechanisms, stakeholders, legal disputes, and internal stakeholders), iii) Auditor Ratification (shareholder voting results for the ratification of independent auditors), iv)

Changes in Accounting Estimates (material disclosed changes in accounting estimates for PTCs as disclosed in annual and quarterly filings), v) Critical Audit Matters (landscapes Critical Audit Matters disclosed by independent auditors of PTCs), vi) cybersecurity, vii) firm events, viii) impairments (impairments as disclosed by PTCs in XBRL Annual Filings and 8-Ks, Critical data elements consist of I, ii) reasons and characteristics of impairment, iii) impact on pretax income, iii) impairment text), ix) Out of Period Adjustments (landscapes corrections of errors in prior FS that do not materially affect past or present FS), x) PCAOB Inspection Reports, xi) restatements, xii) auditor's characteristics and activities (Audit Analytics 2023b, pp. 1–2, 2023a). Also, recently such databases encompass audit, regulatory, and disclosure intelligence (Audit Analytics 2023b, p. 2, 2023a).

A multitude of databases and their only partial overlapping allows for i) picking the proxy and the database that are most suitable and fitting for given research topics and research applications, also ii) the choice is able to influence robustness and specification of empirical research about FRM, iii) as they are numerous databases and proxies, outcomes of empirical tests may be sensitive to the academic's choice of FRM proxy/proxies and database/databases (Karpoff et al. 2017a, p. 130). Around the end of the 90s and throughout the 2000s, the volume of CD restatements surged substantially. Financial statement restatements are of compelling consideration, as they lead to significant consequences: i) restating PTCs lost billions of dollars in market capitalization ('shareholder losses'), ii) negatively affecting investor confidence, iii) increasing the number of investigations related to accounting irregularities, and iv) indicating a need for further reforms to curb accounting irregularities (U.S. General Accounting Office 2002, pp. 9–73; U.S. Government Accountability Office 2003; Gleason et al. 2008; Palmrose et al. 2004). Restatements reflect low-quality previously issued CDs (Kinnunen et al. 2000, p. 561). Due to CD restatements, investors lost trust and confidence in CD and auditing, which has been documented in numerous studies and governmental reports on restatements and accounting irregularities, such as those by the U.S. GAO (Wielhouwer 2015, p. 133). Restatements are employed in research on deficiencies in reporting and internal and external auditing practices as proxies for (or metrics of similar or related functions) accounting and auditing irregularities and failures. This spectrum ranges from dubious, potentially harmful reporting practices, through unethical decisions and material weaknesses and deficiencies in internal controls, especially over financial reporting, through aggressive accounting, up to outright fraud with completely fictitious data, deficiencies in internal and external audit quality, independence, and assurance. PTCs, under numerous norms stated in corporate and securities laws, are obligated to publicly issue corrections of previously issued CDs (especially financial

statements) if it is discovered (by the company itself or other parties such as auditors, media, or the market supervisor) that any CD (a filing) or its elements or statements were i) inaccurate, ii) misleading, or iii) incomplete (Palmrose et al. 2004). This duty of mandatory public issuance of the correction—the restatement (an announcement of this fact and the full corrections of any statement)—is entrusted to the management of the restating PTC. If such statements, subsequently after disclosure, were found to have been false, misleading from the beginning, and continued to be so (confusing, disingenuous from the outset), the issuer should have known or known that parties were continuing to rely on or put trust in the statement or any material portion of the statement (Palmrose et al. 2004; Skinner 1997).

Apart from CD-associated criminal, civil, and administrative proceedings (U.S. Congress 7/30/2002; U.S. General Accounting Office 2002; DOJ 2022; Filip et al. 2008; Yates 2015), stockholder litigation is another primary concern regarding CD. This involves not only traditional backward-looking CD (with its numerous considerations and qualities, e.g., the content (good vs. bad news (Skinner 1995)), timing of the release (less vs. more timely CD—the latter—lower settlement amounts (Skinner 1997)), the tone of the information (optimistic vs. pessimistic language—the latter—lower litigation risk (Rogers et al. 2009)), and other circumstances) but also forward-looking information, due to the reason of CD (or its elements, statements) potentially bearing the possibility of being misleading or inaccurate (Skinner 1997; Rogers et al. 2009; Hensler et al. 2000; Skinner 1995). Restatements adversely influence shareholder wealth and also exhibit an 'accounting contagion effect' to peer PTCs (industry), as evidenced when investors re-evaluate previous CD information of non-restating PTCs (Gleason et al. 2008). Underlying causes are many, amidst i) similarity of accounting practices and ii) similarity of business transactions (Wielhouwer 2015, p. 133). Subsequent research has shown that the spillover effects of restatements are far more extensive and general, up to costs of broken public trust (Gleason et al. 2008). PTCs (D&Os) financial fraud and restatements ascribed to external auditors are linked with more negative returns, which align with weakened PTC prospects and increased risk (heightened uncertainty) (Palmrose et al. 2004). The U.S. GAO has conducted an analysis of initial restatement announcements due to accounting irregularities (U.S. Government Accountability Office 2003; U.S. General Accounting Office 2002). When categorized by reason of the restatement, the following were ascribed (in descending order): i) revenue (almost four out of every ten cases), ii) costs/expenses (one-quarter of cases), iii) asset/inventory/restructuring (almost one-quarter of cases), iv) acquisition/merger (M&A), v) securities-related, vi) reclassification, vii) IPR&D, viii) related-party transactions, ix) other (inadequate loan or loss delinquencies, write-offs, reserves, bad

loans) (U.S. General Accounting Office 2002, pp. 19, 21–22; Wu 2002, p. 10; U.S. Government Accountability Office 2003, p. 6), in general affecting bottom lines and elements that are used to calculate certain popular market-observed metrics (U.S. General Accounting Office 2002, pp. 19–40; Richardson et al. 2002).

More negative market reactions (market-adjusted abnormal returns) to restatements were documented regarding i) the occurrence of fraudulent activities, ii) the impact on or bearing repercussions for more accounts, iii) those ascribed to management or external auditors, and iv) when they resulted in reported income cutbacks (Palmrose et al. 2004). Most revenue recognition misstatements (analyzed within the GAO database) were restated as a result of PTC's sooner or later recognition than allowed under U.S. GAAPs or recognizing questionable, premature, or even fictitious revenue. Expense or cost-related restated misstatements were multifarious improprieties from the field, e.g., improprieties regarding operation expenses that in effect caused alterations in net income. Restated related-party transactions occurred as a consequence of improper or inadequate disclosure and/or accounting (debts, assets, expenses, revenues) involving relationships or transactions with such parties. Reclassifications (e.g., debt payments as investments), assets (improper write-downs timing, treatment of investments, goodwill), securities-related (inappropriate accounting for securities), and M&A (not accounting for or incorrect accounting, alterations of statements for gains/losses related to M&A) were other categories (U.S. General Accounting Office 2002, pp. 3–74). A variety of parties can prompt financial statement restatements; apart from the restating company itself, there are external parties, such as external independent auditors, market supervisors such as the SEC (civil actions and/or administrative proceedings or settlements (U.S. General Accounting Office 2002, p. 56) (Kinney et al. 2004)) or other federal agencies, the media, or others (U.S. General Accounting Office 2002, pp. 23–24). The SEC enforcement process has two (promising leads may open an investigation straightforwardly) or three stages: i) Leads (obtained from various sources—enforcement sources, complaints, media, etc.), ii) Inquiry (evaluation of gathered information and evidence and assessment of whether to open an investigation), and iii) Investigation (informal, formal investigation, witnesses, data, etc.) (U.S. General Accounting Office 2002, pp. 44–52). Primary sanctions vary accordingly to whether a civil action or administrative procedure was undertaken (U.S. General Accounting Office 2002, p. 47). Importantly, in only about half of the cases, the PTC itself was the party to recognize the previous misstatements; however, the rest of the cases are attributed to external parties or unspecified parties involved in uncovering these misstatements, even if the PTCs might not

have delivered clear information on this fact in their restatements and/or filings (U.S. General Accounting Office 2002, p. 23).

The percentage of PTCs that were restating (measured over 1997–2002 on the U.S. public markets, such as NYSE, Nasdaq, Amex) was determined by the GAO research to reach up to 4.0 percent (U.S. General Accounting Office 2002, p. 19). A retributively rationalized punishment and justification of the penal reaction, compensatory justice as proportional to the crime committed, and punishment adequate to/corresponding with the seriousness of the crime should be in proportion to the amount of damage caused by the crime in the social dimension. It is intended to compensate for the discrepancy caused by the crime and restore the order of justice and law (Ciepły 2006). The general public, market, and Congress have contested the perceived inadequacy of punishments and the deficient severity of numerous sanctions imposed, considering the level (seriousness, extent, and impact) of investor harm done. Additionally, given that monetary penalties are often paid by the D&Os' insurance policies or are considered insignificant relative to the violation, there is public pressure on enforcement to pursue more D&Os bars and impose other punitive measures with adequate severity as according to the misdeed perpetrated (‘retributive rationalized punishment’) (U.S. General Accounting Office 2002, p. 50). Market participants (investors) in surveys have emphasized the need for i) strict prison sentences for D&Os who perpetrate financial fraud, ii) new regulations to target questionable and doubtful accounting practices, and iii) new governmental guidelines for ethical standards/codes amid D&Os (U.S. General Accounting Office 2002, p. 35). Since the 1980s, there has been a sharp increase in the number of restatements observed, with short-term negative market responses, substantial downward trends in periods leading up to the restatement announcements (in months), and negative post-announcement drift (in months) occurring. Research has evidenced the implied loss of investors’ confidence in restating PTCs (Wu 2002; Desai et al. 2006b). Negative spillovers of investors’ confidence decline prior to the 2000s (as a result of restatements) regarding the wide market or industry or similar PTCs did not happen often (Wu 2002; Richardson et al. 2002). However, contemporary negative spillover effects (direct and indirect exposure) of damaged trust and lost confidence due to accounting irregularities are substantial; they are the ‘public cost of broken trust’ and other spillover costs in general (Wielhouwer 2015). PTCs have lost the credibility of their earnings due to restatements. The market reaction observed indicated the decline or loss of trust in the PTCs’ CD, especially regarding earnings. Also, investors’ loss of confidence was documented. Thus, the severity of the repercussions of restatements of earnings is described as substantial and extensive, also concerning the deterioration of trust in corporate management and

accounting/auditing professions, as the investing public contested the quality of CD it receives. This ultimately contributed (via the mechanism of perceived unreliability of CD and increased risk) to the stock market's increase in volatility and stock market declines (Wu 2002; U.S. General Accounting Office 2002, pp. 37–39; Wielhouwer 2015). Only truthful CD aids in building and maintaining investors' trust in public markets (Alchian and Demsetx 1972).

The practical and novel Trust Triangle for securities (three roles of parties enforcement) markets was developed (Amiram et al. 2018) based on trust as a foundation of exchange activities (Dupont and Karpoff 2017). Its three corners represent i) the role of third-party enforcement via legal institutions – laws, institutions, regulations, and supervisors (La Porta et al. 1998) – all forms of public and private enforcement; ii) first-party enforcement: the role of culture, social norms, and personal values, ethics as a foundation of trust in financial markets (especially relevant in light of recent evidence on the impact of culture and managerial traits on the occurrence and impact of FRM (Amiram et al. 2018, p. 755)); and iii) related-party enforcement: the role of financial markets and reputation in advocating trust – market forces, reputational capital, and market discipline for FRM (Klein and Leffler 1981; Karpoff and Lott 1993). Overall, it reflects paths by which counter-agent trust is formed and enforced (Amiram et al. 2018, pp. 755-757). The significance of earnings restatements is apparent through the strong market reactions to the announcement that a PTC intends (or is obligated to) restate previously released CD information, especially earnings. This results in i) lost market value, ii) costly lawsuits, iii) loss of investor confidence and trust, and iv) negative spillover effects in general and public costs of broken trust (Wielhouwer 2015; U.S. General Accounting Office 2002. Investors attitude indices are calculated amid institutional and individual investors (calculated separately, and one can notice their attitudes somewhat differ when looking at the data; during some periods, discrepancies are highly considerable (Yale ICF 2023a). e). There are One-Year Confidence Index, Crash Confidence Index, Buy-on-Dips Confidence Index, and Valuation Confidence Index (Yale ICF 2023b). However, as these indices regard the Dow Jones Industrial Average (thirty most prominent PTCs), they may present a relatively positive view, expressing investors' belief that the Dow PTCs are relatively free of restatements and thus are confident about only this subset of the market (U.S. General Accounting Office 2002, pp. 37, 38).

Restatements and accounting issues appear to have negatively impacted investor confidence (U.S. General Accounting Office 2002, pp. 32–33). The UBS and Gallup Organisation Poll measures Investor Optimism Index (UBS/Gallup 1996–2007) (Cornell University 2015). Nowadays, there is the UBS Investor Sentiment survey (UBS 2022). It has

shown the negative influence of accounting concerns on investor confidence in the stock market after the 2000s (a period of accounting failures). It revealed that investors, as a causative factor of the deterioration of the Investor Optimism Index, pointed to i) the effect of questionable accounting practices on the market, addressing it as a significant concern with seriousness dependent on the measures period, ii) believing accounting issues were widespread, and iii) being less likely to invest in equities due to those concerns, also corporate earnings and conflicts of interest (U.S. General Accounting Office 2002, pp. 33-34, 36; Jacobe and Moore 2003). Additionally, there were indicators determined for earnings manipulation that eventually led to the restatement; thus, CD users might attain considerable value from careful consideration of information in CD (Richardson et al. 2002). Restatements were found to include both i) management pressing, pushing, and exceeding the boundaries 'of reasonable accounting interpretations' of accounting principles (Richardson et al. 2002, pp. 1–2) (U.S. General Accounting Office 2002, p. 39) and ii) evident auditor agreement and even direct participation in the CD/reporting choices that in due course required restatement (U.S. General Accounting Office 2002, p. 39).

4.4 The Institutional Anomie, General Strain Theory, and Theory of Reasoned Action

The ramifications of FRM extend far beyond monetary values, significantly impacting market efficiency, trust among participants and stakeholders, and the effective allocation of assets (IFRS, 2018). Detection of FRM remains a focal point for numerous entities (ACFE, 2018; Albrecht et al., 2014). Motivations for engaging in FRM can be broadly categorized into two groups: (i) capital market incentives, which include enhancing the value of stock-based compensation, securing favorable terms for new corporate financing, and capitalizing on gains from insider trading, (ii) contracting-related, which revolves around contracting incentives, such as manipulating accounting-based bonus contracts and avoiding violations of accounting-based debt covenants (Amiram et al. 2018). Surveys of PTCs that were clients of auditors revealed that higher organizational profitability is associated with an increased likelihood of fraud, and consistent, experienced, and target-focused PTCs show a stronger correlation with fraudulent activities (Groot and Hernandez 2007). This notion was labeled by Groot and Hernandez as a "pursuit of profits" and was presented to the European Accounting Association (Groot and Hernandez 2007, 1,53). It also underscored the critical role of senior management (or C-suits) ethics in mitigating corporate fraud, highlighting potential issues stemming from the pursuit of profits and the implementation of target-driven management strategies (Groot and

Hernandez 2007). Analysis indicates that most managers identified by regulators as responsible for misconduct lose their jobs and face significant repercussions. Many are barred by the SEC from future executive roles, lose a substantial portion of their stock value, and incur heavy SEC fines. Additionally, a significant number face criminal charges, with many convicted and sentenced to jail and probation, resulting in severe professional, financial, and legal consequences (Karpoff et al. 2008).

Research in the US on managerial incentives highlights a trend towards demonstrating increasing profits (Degeorge et al. 1999). In line with other studies, managers who consistently meet their targets might be participating in fraudulent or untruthful behaviors (Jensen 2003). Specifically, managers committed to achieving regular targets within profitable organizations may experience increased pressure to undertake questionable actions, either to protect their reputations, potentially leading to hubris, or because they believe these actions serve the company's best interests by ensuring steady performance (Groot and Hernandez 2007). Auditors identify senior management's ethical concerns as a crucial risk factor linked to corporate fraud (Hernandez and Groot 2006a) (Hernandez and Groot 2006b) (Deshmukh and Talluru 1998). Moreover, (i) the extent of senior management's transparency and honesty with external auditors is also seen as a significant factor directly related to the risk of fraud, (ii) other critical factors that auditors believe affect fraud risk include compensation pressures on managers and the experience and competence of senior management, (iii) preventive control may lower the risk of fraud, and (iv) trust fortifies external auditor risk assessment related to fraud (Groot and Hernandez 2007) (Hernandez and Groot 2006a). Imperfect accounting and reporting biases are affecting CD quality, as elaborated in Chapter 2 and 3, but also create a fertile ground for fraud occurrence. While errors discourage bias by lowering the value relevance of accounting, they can also facilitate bias by providing camouflage and concealment. There is a hump-shaped relation between a PTC’s propensity to engage in intentional misstatement (FRM) and the prevalence of unintentional misstatements in the PTC’s industry. For the whole economy and a majority of the industries, when errors are more prevalent, the market reacts less to firms’ earnings surprises, and bias is more difficult to detect (FANG et al. 2017). As proxies for the quantification of the magnitude of bias and errors can be employed (i) the measure derived from the restatement amount in net income, (ii) the number of items in FS, and exposure to complex accounting rules (FANG et al. 2017). Management possesses a distinctive capability to engage in fraudulent activities, especially FRM, given its (i) frequent access to (a) directly or (b) indirectly manipulate accounting records and (ii) present misleading

financial information. Also, instances of FRM commonly (iii) entail the management's overriding of controls, which may else seem to be functioning effectively (Lessambo 2014).

Managerial inclination towards FRM has been extensively explored, scrutinized, and recorded in numerous research studies. However, despite a broad consensus on several factors, each perspective or scholarly approach provides distinct insights into their composition and magnitude. (Groot and Hernandez 2007) representing an Amsterdam view, proposed that managerial inclination to FRM can be explained by such dimensions as (i) integrity and ethics (tone at the top, code of conduct), (ii) incentives for FRM (achievability of goals, compensation structures, pressures, opportunities), (iii) past performance (track record, adaptability), (iv) profitability (margins, crisis management), (v) audit relationship (committee work, communication, attitude towards audit findings), and (vi) management depth (depth adequacy) (Groot and Hernandez 2007, pp. 3–51). Also, in the evaluation of fraud risk, audit partners give the highest priority to the manager's (i) integrity, (ii) honesty, and (iii) ethical behavior. Additionally, auditor perceptions of fraud risk are notably affected by an organization's aggressive practices in (i) revenue recognition and (ii) accounting estimates (Hernandez and Groot 2006a). Scholars have recorded a phenomenon wherein managers are driven to avoid surpassing their budget targets out of concern that it might lead to a lasting elevation of their future targets (Leone and Rock 2002; Guidry et al. 1999). Similarly, investigations have revealed that corporations facing (allegations of) fraud exhibited stronger motivations to artificially inflate their stock prices compared to executives of non-fraudulent firms (Denis et al. 2006; Johnson et al. 2003). Managers striving to meet (i) consistent targets and who work in (ii) profitable firms may feel compelled to engage in questionable, doubtful actions, potentially due to a desire to (i) safeguard their reputations or (ii) demonstrate steady performance (mitigating earnings volatility). Ultimately, these factors indicate a higher risk of fraud, related to managerial behaviors to manage earnings volatility (Groot and Hernandez 2007). Auditors consider senior management's ethical concerns to be the foremost risk factor linked to corporate fraud and FRM especially (Deshmukh et al. 1997; Deshmukh and Talluru 1998). Internal controls that avert fraud necessitate targeting (i) ethical and (ii) goals and target concerns as matters of first priority regarding fraud prevention (Groot and Hernandez 2007; Hernandez and Groot 2006a, 2006a).

The notion of the ‘pursuit of profits’ addresses the issue of how corporate ethics and corporate targets influence corporate fraud (Groot and Hernandez 2007). (i) Inadequate profits and (ii) pressures from goals and targets have been found to be related to FRM (Bell and Carcello 2000; Loebbecke 1989). Empirical evidence substantiates the higher levels of fraud

risk in organizations characterized by (i) low profit margins and a (ii) consistent track record of achieving performance targets. Also, research that explores managerial incentives portrays a rising profit trend (to meet or exceed targets especially) (Degeorge et al. 1999). At the highest levels of fraud propensity, manager hubris might play a more significant role in contributing to fraud than the pressure of incentive compensation (greed) (Groot and Hernandez 2007; Hernandez and Groot 2006a, 2006a). Empirical analysis of auditors' observations reveals the following: (1) organizations demonstrating higher profitability levels tend to be associated with a heightened susceptibility to fraud; (2) organizations projecting an image of consistency, experience, and performance-oriented focus exhibit a stronger correlation with fraudulent activities; and (3) the ethical concerns of senior management are of paramount importance concerning corporate fraud (affirming the apprehensions articulated in (Jensen 2003)) (Groot and Hernandez 2007; Hernandez and Groot 2006a). For a graphical presentation of the structural equation models, see (Groot and Hernandez 2007, pp. 27–35). They suggest that a combination of manager predisposition, ethical behavior, and compensation pressures contribute equally to fraud risk, whereas a target-focused environment is more likely to increase the likelihood of fraud. In the high fraud risk model, ethical manager conduct remains the most influential factor in fraud risk (Groot and Hernandez 2007, p. 33).

The research on FRM is (i) rather wide, yet (ii) it reveals mixed outcomes, also in the empirical context of capital market motivations, including motivations related to equity-based compensation, obtaining new financing, and generating profits from insider trading (covenants) (Amiram et al. 2018, p. 749). Specifically, equity-based compensation motivations for FRM have been explored by scholars like (Beneish 1999b), (Burns and Kedia 2006), (Efendi et al. 2007), (Johnson et al. 2009), (Armstrong et al. 2010), and (Call et al. 2016). Additionally, research on FRM related to raising, obtaining, or acquiring new financing, especially on more favorable terms, has been conducted by (Dechow et al. 1996), (Beneish 1999b), (Kedia 2006), and (Erickson et al. 2006). Furthermore, studies on motivations for FRM related to generating profits from insider trading, based on the knowledge that the equity price is temporarily boosted due to misconduct, have been explored by (Dechow et al. 1996), (Beneish 1999b), and (Peng and Röell 2008). Contracting motivations in FRM involve the manipulation of financial information to exploit contracts reliant on accounting figures. Yet, empirical research in this domain is limited and yields mixed, sometimes weak, evidence, which can be attributed to research design constraints, such as tests with a focus on formal bonus plans specified in proxy statements lacking power or using age-based control samples versus the size-based control samples (Amiram et al. 2018). The specific motivations within this category include (i)

motivations linked to earnings-based compensation contracts (Healy 1985; Dechow et al. 1995), and (ii) motivation to avoid covenant violations in debt contracts based on accounting numbers, as highlighted by (Beneish 1999b), (Dechow et al. 1996), and (Burns and Kedia 2006). Institutional features play a significant role in facilitating financial reporting misconduct, as discussed in detail by (Amiram et al. 2018). Notably, PTCs with a higher proportion of insiders on the board of directors, as identified by (Beasley 1996) and (Dechow et al. 1996), tend to exhibit increased instances of FRM. Additionally, the occurrence of FRM tends to decrease with director stock ownership and director tenure but increases with the number of outside directorships held (Beasley 1996). The adoption of good corporate governance practices, as observed in (Fich and Shivdasani 2007) and (Zhao and Chen 2008), is associated with a decrease in FRM. Moreover, internal controls play a significant role in mitigating the incidence of FRM, as indicated by (Beasley et al. 2000), (Coram et al. 2008), and (Faber 2005). Other variables linked to financial reporting misconduct (FRM) are demonstrated by a substantial body of research, where numerous studies indicate that diverse financial characteristics are consistently correlated with instances of FRM. In certain instances, (i) these financial characteristics are believed to represent the method by which the FRM is carried out (e.g., abnormal accruals models), while in other cases, (ii) they are hypothesized to represent circumstances that create incentives for engaging in FRM (e.g., slowing sales growth) (Amiram et al. 2018).

The success of principles-based accounting standards relies on the presence of ethical actors in the market, and those principles are effective only when applied by individuals with integrity (auditors and CD users should not anticipate success when dealing with unscrupulous participants). Ultimately, the key factors are integrity and conduct. So, in essence, fraud is fundamentally a human action (act) (Ramamoorti and Epstein, Barry, Jay 2016). Existing literature presents evidence of auditor changes raising ethical conflicts for auditors, jeopardizing their independence and objectivity. A correlation exists between the financial performance of PTCs and their decisions to switch accounting firms for auditing their CD. Findings indicate that PTCs, particularly those whose reported earnings narrowly fall short of analysts' expectations (just miss analysts' expectations), demonstrate a higher propensity to suspect change their auditors (Lohwasser and Zhou 2023). Prior research has investigated companies engaging in opportunistic auditor changes, seeking auditors likely to offer (i) favorable evaluations of internal controls (Newton et al., 2016), (ii) goodwill (Ayres et al., 2019), and (iii) going concern conditions (Carcello & Neal, 2000; Chen et al., 2016; Chung et al., 2019; Lennox, 2000). PTCs experiencing just-missed-earnings events (JMPTCs) tend to

perceive their auditor as a constraint on earnings management, prompting opportunistic changes in auditors (Lohwasser and Zhou 2023).

Similarly, akin to points (i), (ii), and (iii), the phenomenon of "auditor shopping" occurs when JMPTCs, possessing the intent and capability to surpass analysts' forecasts through earnings management, seek auditors who inhibit upward earnings manipulation and discourage successful MET behavior (e.g., Reichelt & Wang 2010; Eshleman & Guo, 2014; Lim & Tan, 2008). This inclination leads JMPTCs to replace their existing auditor. Recent findings indicate that (i) JMPTCs are more inclined to change auditors than other PTCS, and (ii) these JMPTCs demonstrate diminished earnings quality with their successor auditor following this opportunistic change (Lohwasser and Zhou 2023). Analysis of performance-matched discretionary accruals (e.g., on ROA, industry, vs. traditional measures, s.a. Jones Model (Kothari et al. 2005b)) revealed a decrease in earnings quality following the change in auditors, and this was supported by additional tests assessing earnings quality, such as the financial statement divergence score (FSD score) (Lohwasser and Zhou 2023). The extensive practice in examining earnings management and market efficiency involves the utilization of discretionary accruals (DeFond and Jiambalvo 1994; TEOH et al. 1998) and earnings management academic research inspects if ‘managers act as if they believe users of financial reporting data can be misled into interpreting reported accounting earnings as equivalent to economic profitability’ (Fields et al. 2001, p. 279). The findings indicate that auditors, serving as a primary defense against earnings management (Reichelt & Wang 2010), are more likely to face dismissal when restricting MET behavior (Lohwasser and Zhou 2023). There are concerns expressed by regulators and CD users regarding factors influencing auditor independence and objectivity, thereby diminishing auditors’ capacity to safeguard the public interest (Coffee, 2019; AICPA 2020; Malsch et al., 2022). For elaboration, see Chapter 3. Auditor independence forms the foundation of audit quality, the audit profession, and audit practice (Guo et al., 2021; Kouakou et al., 2013). For elaboration, see Chapter 3. However, auditors confront an inherent ethical dilemma as they are engaged by clients to express opinions on the fairness of the clients' own CD (Ashbaugh, 2004; Guo et al., 2021).

In developed markets, regulators mandate PTCs to disclose auditor disagreements, specifying the reasons for auditor changes (SEC, 2004). Research explores opportunism in auditor changes through (i) auditor–client disagreements, (ii) reported events, and (iii) disclosed reasons (Archambeault & DeZoort, 2001; Hackenbrack & Hogan, 2002; Sankaraguruswamy & Whisenant, 2004; Chang et al., 2010). Yet not all PTcs disclose reasons, creating challenges in understanding motivations (Chang et al., 2010; Hackenbrack & Hogan, 2002;

Sankaraguruswamy & Whisenant, 2004), e.g., they (i) intentionally obscure motives (Archambeault & DeZoort, 2001), (ii) employ boilerplate language (Calderon & Ofobike, 2008; Norris, 2006), and (iii) emphasize positive news (Sankaraguruswamy & Whisenant, 2004). MET BEHAVIOUR and „Valuation Treadmill" and „Duality of C-suites motives" (personal and pro-organisation i.e. PTC) and Albrecht's three points of aggressive accounting in companies' life, when earnings are i) near zero, ii) need to be sustained previous year- at least as good as the previous year, iii) shall be meeting analysts' forecasts) present a framework for FRM (Albrecht 2009) (Park 2023). Regulators voice apprehension about how quantitatively immaterial misstatements assist companies in achieving or surpassing earnings targets (Libby and Kinney, 2000). The SEC underscored the significance of taking into account investors' needs and interests when evaluating the materiality of accounting misstatements and issuing restatements, both Big R and little r (Munter 2022a). To mitigate auditor opinion shopping, among other measures, s.a. Audit Committee, there is mandatory public CD following an auditor change (Archambeault and DeZoort 2001). PTCs undergoing auditor switches seek auditors who are compliant and willing to accommodate opportunistic accounting practices aligning with management's reporting goals (DeFond et al. 2018). Literature offers insights into managerial successful shopping for auditors with their goal to be permitted to employ questionable accounting practices (Archambeault and DeZoort 2001; Chung et al. 2019). There is also evidence of increased levels of accounting estimates aimed at boosting income (discretionary income-increasing alterations in accounting estimates) after changes in auditors, both in (i) frequency and (ii) magnitude (DeFond et al. 2018). When a material error is identified in previously issued financial statements, it requires correction through restating prior-period financial statements, colloquially known as a 'Big R' restatement. Yet, if the error is not material to previous statements but would be material to the current period, the registrant must correct it. It is termed a 'little r' restatement, which allows correction without restating prior period information but requires disclosure of the error (Munter 2022a).

Per the oversight by the capital market regulator, the SEC, even a minor quantitative misstatement may have qualitative significance for investors when it conceals management's inability to meet analysts' forecasts (SEC 1999). Existing research indicates that PTCs engage in earnings management strategies to either meet or surpass analysts' forecasts (Dhaliwal et al., 2004; Gupta et al., 2016; Payne and Robb, 2000). This opportunistic behavior involves (i) the manipulation of accounting accruals or (ii) discretionary expenditures, enabling managers to (i) achieve short-term earnings benchmarks and (ii) derive personal benefits (financial or other personal, non-financial benefits, s.a. recognition, awards,) or (iii) derive other than short-term

earnings benchmarks pro-PTC benefits (for the PTC), often at the expense of shareholders (Jensen, 2005; Bhojraj et al., 2009; Nekhili et al., 2022). The phenomenon of companies prioritizing meeting earnings targets, referred to as "MET behavior," has garnered significant attention and concern from diverse stakeholders over recent decades (Lohwasser and Zhou 2023). This MET behavior is rooted in agency conflicts between management and shareholders, characterized by information asymmetry and divergent interests (Jensen, 2005; Jensen and Meckling, 1976). External auditors play a crucial role in monitoring, serving as a safeguard against management opportunism and ensuring the reliability of financial statements (Watts & Zimmerman, 1983). Previous studies have utilized auditors' capacity to restrain MET behavior as an indicator of higher auditor quality. Simultaneously, instances where clients merely meet or narrowly exceed analysts' forecasts are considered proxies for lower audit quality (Reicheit and Wang, 2010; Eshleman and Guo, 2014; Lim and Tan, 2008). The manipulation of earnings by D&Os to meet or exceed benchmarks is deemed qualitatively material, as it imparts misleading signals that can significantly influence the perspectives and decisions of reasonable investors (Lohwasser and Zhou 2023). It fails (i) to offer objective and reliable financial information and (ii) undermines the integrity of the capital market system, eroding investor confidence (Nekhili et al., 2022). On this point, see Chapter 2 and 3. Consequently, meeting or beating benchmarks is frequently utilized as an indicator of earnings management (e.g., Dhole et al., 2016; Frankel et al., 2002; Lim and Tan, 2008; Reichelt and Wang, 2010).

Achieving or surpassing earnings expectations serves as a compelling and trustworthy measure of earnings management compared to other proxies (Dechow et al. 2010) (Lohwasser and Zhou 2023). Data points: are selected (i) based on the proximity of PTCs' pre-accrual EPS to analysts' forecast EPS within specified thresholds (expressed as a percentage of total assets, e.g., 3,5,7) and additionally, the focus is narrowed to (ii) PTCs that either just meet or just miss earnings expectations, aiming to compare PTCs with more similar performance (Lohwasser and Zhou 2023). Imperfect accounting and reporting biases are affecting CD quality, as elaborated in Chapter 2 and 3, but also create a fertile ground for fraud occurrence. While errors discourage bias by lowering the value relevance of accounting, they can also facilitate bias by providing camouflage and concealment. There is a hump-shaped relation between a PTC’s propensity to engage in intentional misstatement (FRM) and the prevalence of unintentional misstatements in the PTC’s industry. As evidenced via the usage of accounting estimates, PTCs altering external auditor companies seek auditors who comply and permit the use of opportunistic accounting that is aligned with management's reporting goals and objectives (DeFond et al. 2018). As proxies for the quantification of the magnitude of bias and errors can be employed

(i) the measure derived from the restatement amount in net income, (ii) the number of items in FS, and exposure to complex accounting rules (FANG et al. 2017). The 'Financial statement Bloat' 'a pattern of aggressive accounting can be detected several years prior to clearly identified fraud' (Ettredge et al. 2010, p. 4). Extensive investigation spanning decades into the factors and outcomes of earnings management has been conducted (refer to comprehensive reviews by Fields et al., 2001; Dechow and Schrand, 2004; Ronen and Yaari, 2008; and Dechow et al., 2010). It was examined 'within-GAAP' earnings management preceding 'without-GAAP' reporting via a model of the likelihood of firms restating financial statements, linking it to working capital and controls, and it was revealed that a consistent positive association between working capital and restating irregularities, a weaker link with errors in core operating accounts, and no association with errors in noncore accounts, which can be interpreted as intentional earnings overstatement within GAAP, progressing to GAAP violations when flexibility is depleted. (Ettredge et al. 2010). In subsequent years, the tendency to revise reported figures becomes evident, and numerous studies have explored various managerial motivations for inflating earnings (Healy and Wahlen, 1999; McNichols, 2000).

The literature indicates that managers face pressures to conceal financial distress (Argenti, 1976; Summers and Sweeney, 1998; Rosner, 2003), avoid breaches of debt covenants (Chen and Wei, 1993; DeFond and Jiambalvo, 1994; Beatty and Weber, 2003), secure low-cost external financing (Dechow et al., 1996), and meet analyst earnings projections (Burgstahler and Dichev, 1997; Bartov et al., 2002; Graham et al., 2005). Additionally, some managers may overstate earnings to bolster their external reputations (Bartov et al., 2002; Farrell and Whidbee, 2003; Feng, 2004; Francis et al., 2004; Desai et al., 2006) or to influence stock-based compensation (Healy, 1985; Beneish, 1999; Matsunaga and Park, 2001; Crocker and Slemrod, 2005). Internal performance targets, such as bonus objectives and budget forecasts, further contribute to the incentives for income exaggeration (Healy, 1985; Merchant, 1990; Guidry et al., 1999; Leone and Rock, 2002; Fisher et al., 2006). Financial statement users place significant emphasis on core earnings, as highlighted by previous studies (Previts et al., 1994; Palmrose et al., 2004; Palmrose and Scholz, 2004; Gleason et al., 2008; Salavei et al., 2009). Therefore, managers seeking to shape investor perceptions are likely to employ core earnings as a strategic means to achieve this goal (Ettredge et al., 2010). To assess the impact of income-increasing earnings management on the balance sheet, we focus on measuring bloat in working capital accounts. Evidence suggests that changes in working capital are employed to boost earnings (Burgstahler and Dichev 1997). Similarly, studies indicate that working capital is more likely to be used for earnings management compared to other components of net operating assets

(Kreutzfeldt and Wallace 1986) (DeFond and Jiambalvo 1994). Studies primarily use accrual-based net assets in operations, with the working capital component being a significant factor in their reported results Barton and Simko (2002).

Earnings are manipulated within GAAP limits as long as balance sheet flexibility allows income-increasing choices; accrual effects accumulate in working capital accounts. As economic conditions fail to align with reported earnings, balance sheet constraints are eventually reached, rendering GAAP-compliant earnings management unfeasible. Despite incentives to avoid non-GAAP territory, some managers inadvertently or intentionally cross the line, leading to the issuance of materially misstated financial statements, which may necessitate restatement upon discovery (Ettredge et al. 2010). For a more extensive view of the causes of EM, especially improper EM, see (Barton 2010). Major theoretical perspectives on crime include: (i) Biosocial Theory, (ii) Psychological Theories, (iii) Rational Choice and Routine Activities Theory, (iv) Social Disorganization Theory, (v) Economic Deprivation, (vi) Strain Theories, (vii) Social Learning Theories, (viii) The Subculture of Crime, (ix) Social Learning, the Media and Crime, (x) Perceptions of Injustice, Crime and Violence, (xi) Social Control and Self-Control Theories, (xii) Integrated Life Course Theories, (xiii) Critical Perspectives on Crime (Wortley et al. 2008, pp. 7–226). Historically, some of the earliest criminologists, such as Lombroso, Garofalo, and Ferri, posited that certain physical traits could indicate a predisposition to criminal behavior (Ellis 2005) (Fishbein 2001). Researchers have long sought to understand the biological factors influencing crime and violence (Wortley et al. 2008). Modern biosocial theorists, however, argue that criminal behaviors are not solely determined by biological attributes. Instead, they suggest that biological, environmental, and social factors intricately interact to shape human behavior (see (Ellis 2005) (Fishbein 2001).

Human crime is a significant subject in the field of psychology. Similar to its treatment by biosocial theorists, psychologists examine how personal traits interact with social environments to potentially result in crime. Instead of a biological focus, psychologists study the influence of mental processes on tendencies toward crime. They frequently explore how learning, intelligence, and personality traits correlate with criminal behavior. The theories often used to analyze these relationships include psychodynamic, behavioral, cognitive, and personality theories (Wortley et al. 2008, pp. 25–40). Routine activities theory, a branch of rational choice theory formulated by Cohen and Felson, posits that three elements are necessary for a crime to occur: (i) a motivated offender with criminal intent and capacity, (ii) a vulnerable target, and (iii) the lack of a capable guardian to prevent the crime. Also, these elements must coincide (i) spatially and (ii) temporally for a crime to take place (Cohen and Felson 1979).

Rational choice theory is (i) based on the utilitarian idea that actions stem from a deliberate evaluation of their benefits. (ii) It views crime as a personal decision, reflecting individual reasoning processes where offenders assess the potential gains against the risks of their actions and make a calculated decision to commit a crime. (iii) This approach holds individuals accountable for their criminal behaviors (Wortley et al. 2008, pp. 41–46). For a comprehensive review of criminological theories and their applications, see Akers and Sellers world-known, multi-edition criminological workbook (Akers et al. 2021).

The relationship between economic conditions and crime has been investigated through various theories. These include economic theories of crime (Becker 1968) (Becker 1974) (Becker and Landes 1974), relative deprivation theory (Crosby 1976), strain theory (Agnew 1995; Agnew 2012) (Agnew 1992) (Agnew 1999) (Agnew 2001) (Agnew et al. 2002) (Merton 1938) (Merton 1968), social disorganization theory (Cullen 2017), opportunity theories (Cantor and Land 1985), subcultural theories (Cloward and Ohlin 1998), and conflict theory (Taylor 1973). These perspectives examine, either directly or indirectly, how economic variables influence criminal behavior. Merton points out that many societies highly value economic wealth and social advancement for their members (Merton 1968) theory (Messner and Rosenfeld 1994, 2007). In such a cultural context, the threat of not achieving success may drive individuals to employ strategies outside the boundaries of law and morality to attain 'success'. Thus, according to Merton's theory, this intense cultural pressure to succeed can prompt individuals to engage in crime as an innovative response to expectations (McMurtry and Curling 2008, pp. 70–71). Anomie describes scenarios in which societal norms—shared regulatory codes—fail to control the behaviors and ambitions of individuals, leading to unstable cooperation, widespread dissatisfaction, and increased crime rates (Bernburg 2002, p. 729). Sociologists identify several key drivers of anomie in contemporary society, including (i) the erosion of traditional institutions like the family, religion, and government, (ii) the predominance of economic values that prioritize individual success, (iii) disparities in opportunities coupled with significant inequality, and (iv) sudden social changes. Anomie influences both macro- and micro-level criminological studies. At the macro level, anomie is used to pinpoint societal conditions that foster high crime rates; at the micro level, it helps explain individual variations in delinquent behavior (Bernburg 2002) (Bernburg 2018). Etymologically, the concept of 'anomie' originates from the Greek word 'anomia', which incorporates the root 'nomos', meaning a lack of law, deregulation, or normlessness. Introduced during Greek antiquity, 'anomie' not only described a factual condition of disorder but also implied an ethical judgment on the undesirability of such a state (Deflem 2015, p. 718). For the

history of anomie, see (Deflem 2015). Merton's structural strain is one way to explain why deviance occurs in the context of anomie (Featherstone and Deflem 2003, p. 472). Merton acknowledges the ongoing development of his thoughts on anomie and deviance by referring to his concept as the "evolving idea of anomie-and-opportunity-structures" (Merton 1997, pp. 517–525).

Using a concept first introduced sociologically by Durkheim (Durkheim 1997 (1897)), Merton incorporates the idea of anomie into his argument against biological explanations for deviant behavior as insufficient for understanding social reality. He proposes that structural conditions should be examined as potential causes for deviations from established norms of behavior (Merton 1938) (Merton 1968). Merton's most accurate, though not always consistently applied, definition of anomie describes it as a "literal demoralization, or a deinstitutionalization, of the means." This results from a disconnect between cultural goals and institutional norms (Merton 1968, p. 190). Merton's definition of anomie points to a particular imbalance where cultural goals are excessively prioritized over institutionalized means. He uses the notion of anomie very generally to refer to any sort of imbalance between cultural goals and institutionalized means (Merton 1968) (Merton 1997). Anomie describes a specific misalignment between means and goals, occurring when society emphasizes achieving cultural goals without equally stressing the legitimate means to reach those goals, leading to a deinstitutionalization of the means (Merton 1968). When society emphasizes the attainment of culturally valued goals—regardless of their nature—without correspondingly emphasizing the legitimate norms that regulate the means to achieve these goals, it results in a state of anomie. Merton's broad understanding of anomie focuses on the imbalance between the importance placed on cultural goals and the institutionalized means to achieve them (Featherstone and Deflem 2003, pp. 478–479). As for Merton's Strain Theory, it elucidates the concept of anomie at a structural or macro level. After describing anomie in relation to the unique cultural structure of the United States, Merton examines how individuals adapt to the configurations of goals and means through one of five distinct approaches (Merton 1968) (Merton 1938, 1997). Merton categorizes responses to anomie as "modes of individual adaptation," which reflect the influence of social structure (Merton 1968, p. 194). The most prevalent adaptation is (i) conformity, where both cultural goals and institutional means are accepted. Deviant responses include (ii) retreatism, where both goals and means are rejected, and (iii) rebellion, which involves rejecting and actively replacing societal goals and means. (iv) Ritualism occurs when individuals continue to follow the means even when the goals are unattainable or abandoned. (v) Lastly, innovation involves embracing the goals but discarding the traditional means to

achieve them (Merton 1968). In his social-structure-and-anomie paradigm, Merton formulated two distinct theories: (i) firstly, he offers a theory of anomie suggesting that a mismatch between cultural goals and socially accepted means leads to a weakening of legitimate means. (ii) Secondly, he proposes that social barriers linked to the socioeconomic structure prevent individuals from reaching societal cultural goals, thereby pushing many towards deviant behavior as a response to these strains (Featherstone and Deflem 2003, p. 485) (Merton 1997)

In recent years, the concept of anomie has experienced a revival (McMurtry and Curling 2008, pp. 80–94). Institutional Anomie Theory and Crime and American Dream Theory (Messner and Rosenfeld 2007) (Messner and Rosenfeld 1997) (Messner and Rosenfeld 2013), and General Strain Theory (Agnew et al. 2002) (Agnew 1995) have expanded and updated traditional theories regarding anomie. Additionally, anomie has been applied to new domains, including white-collar crime (Cohen 2020; Waring et al. 2020). Anomie and organizational culture have been shown to impact corporate ethics and corporate crime (Cohen 2020). There are four main or general theories typically grouped under "strain theories" include anomie theory (Merton, 1938), institutional anomie theory (Messner and Rosenfeld 1994, 2007), general strain theory (Agnew 1999) (Agnew et al. 2002) (Agnew 2012) (AGNEW et al. 2002), and relative deprivation theory (Crosby 1976). Each theory posits that strain generates pressures and motivations for individuals to resort to crime as a way to cope with the experienced strain. However, they vary in identifying the primary sources of this strain (McMurtry and Curling 2008). General Strain Theory was then further built on (Agnew 2001). Later it was reviewed and named Revised General Strain Theory of Delinquency (Agnew 2012) and further subsequently extended, especially in relation to the personality traits of offenders and renamed as Extended General Strain Theory (Agnew et al. 2002). American Dream Theory argues that pressures, both cultural and structural, to obtain monetary gains, along with lax oversight from non-economic social institutions, lead to high rates of instrumental crime theory (Messner and Rosenfeld 1994, 2007).

Merton created two main theories regarding the social-structure-and-anomie paradigm: a strain theory and an anomie theory (Featherstone and Deflem 2003, pp. 471–489). Echoing Merton, IAT and modern theory on Crime and the American Dream argue that Western, capitalistic, financial market-centered culture excessively prioritizes goals of material success. It also agrees with Merton in suggesting that the inherent contradictions within the prevailing value system generate intense pressures to use the most effective means available for achieving these goals (Messner and Rosenfeld 2007) (Messner and Rosenfeld 1997) (Messner and Rosenfeld 2013). Messner and Rosenfeld argue (Messner and Rosenfeld 1994, pp. 103–108)

that (i) the cultural obsession with financial gains has become so pervasive that (ii) key social institutions such as politics, religion, education, and family are weakened in their ability to govern desires and behaviors. (iii) Instead, these institutions largely endorse the pursuit of material success, epitomized by the American Dream. (iv) Their IAT posits that culturally induced pressures to acquire monetary success and rewards, combined with lax oversight by non-economic social institutions, lead to elevated levels of instrumental criminal activity (Messner and Rosenfeld 2007) (Messner and Rosenfeld 1997) (Messner and Rosenfeld 2013). The general definition of the broad concept of the 'American Dream' appeared (as a definition, commonly quoted) in a 1931 acknowledged history book authored by James Truslow Adams (Twyman-Ghoshal and Rousseau 2010, pp. 76–77). Western capitalistic culture is marked by a significant focus on (i) achieving financial success and (ii) a lesser concern for the legitimacy of the methods used to attain it. (iii) This mix of intense pressure to succeed financially and (iv) minimal constraints on the methods chosen is central to the prevailing cultural ethos, the American Dream. (v) The American Dream directly influences crime by motivating individuals to use unlawful methods to achieve socially endorsed goals. (vi) This perspective suggests that viewing the American Dream as a cause of crime has important theoretical and policy implications (Messner and Rosenfeld 1994) (Messner and Rosenfeld 2007) (Gross et al. 2018) (Hovermann and Messner 2021). The widespread cultural chase of the American Dream, which promotes the aim of material success through individual competition for all, serves as a catalyst for crime. The theory argues that American values endorse success by "any means necessary," and in the absence of robust opposing forces from social institutions like family, government, and education, conditions of anomie are likely to emerge (Bernburg 2018, pp. 1–3). In the literature, Institutional Anomie Theory (IAT) (Piquero 1998) (Schoepfer and Piquero 2006) was applied to explore factors influencing delinquency at both individual and organizational levels (Gross et al. 2018). The concept of a 'marketized mentality (MM)' (for MM, see (Baron 2022) (Gross et al. 2018) (HÖVERMANN and Messner 2021)) was introduced as a predictor of delinquent behaviors, complemented by the presence of an egoistic and competitive culture within an organization's community. It was found that there are strong correlations between a marketized mentality and various forms of delinquency at the individual level, as well as with the prevailing egoistic and competitive culture (Gross et al. 2018).

Studies have indicated that the social-psychological concept of MM could act as a crucial connector for conducting multilevel analyses underpinned by IAT, a macro-sociological theory of crime, and it suggests potential benefits of creating an integrated micro-macro approach to studying criminological phenomena by including MM within the IAT analytical

framework (Hovermann and Messner 2021). The impact of adopting the American Dream, particularly through the globalization of the 20th century, is examined in literature that outlines the evolution of this fundamentally virtuous concept to a deleterious one (Twyman-Ghoshal and Rousseau 2010). For the concept of Global Anomie, see (Passas 2000b), Global Anomie Theory, see (Passas 2018). Academic works reveal that instead of achieving its intended benefits, the American Dream has often been interpreted in harmful and unforeseen ways. Additionally, literature explores how the dream has been disseminated and applied globally through media and international markets (Twyman-Ghoshal and Rousseau 2010). The IAT and American Dream and MM are no longer considered as the American exceptionalism, yet are employed on the international level and in cross-country research, proving them applicable for contemporary, global markets, modern world, both developed and emerging economies (Weiss et al. 2020) (Hughes et al. 2015) (Twyman-Ghoshal and Rousseau 2010). Over time, the concept of the American Dream has become global. There's been a broader international adoption of the dream, focused on achieving success regardless of location. It is sometimes even referred to as the Global Dream (Twyman-Ghoshal and Rousseau 2010, pp. 76–92). Critics of strain theory should not dismiss Merton's anomie theory outright, as it aligns well with various other crime and delinquency theories. Highlighting past integration efforts, academics argue that Merton's model could be enhanced by incorporating insights from other theories, which in turn could refine their own frameworks and explanations (Featherstone and Deflem 2003). General Strain Theory (GST) is proposed to explain WCC offenses, much like Sutherland's differential association theory, which highlights the necessity for a comprehensive theory of crime that can elucidate and forecast both WCC and more conventional types of crime. Also, GST was formulated to explain involvement in diverse street crimes among various groups, including juveniles and adults, men and women, and across different social classes and racial backgrounds (Simpson and Weisburd 2009, p. 9).

The Benson et al.'s view presents that there are three criminological theories—routine activity theory, crime pattern theory, and situational crime prevention—that highlight characteristics of places that facilitate crime occurrence. (i) WCC offenses are more common along frequently used paths with many participants; larger organizational networks, for example, see more white-collar crimes than smaller ones. (ii) Routine activity and crime pattern theories explain how criminals access illegal opportunities, while situational crime prevention theory clarifies why some opportunities are more appealing based on their costs and benefits. (iii) Therefore, to deter crime, prevention strategies should interrupt these opportunities, and control measures should make the cost of committing crime outweigh the benefits (Benson et

al. 2009). In research on the criminal trajectories of white-collar offenders, it was discovered that both (i) crisis responders and (ii) opportunity takers exploit criminal opportunities emerging from the routines and activities linked to their professional roles (Weisburd et al., 2001). There are four levers of culpability: (i) intentional (commit not in the course of a business, but when a business is established with the intention to perform criminal activity – organized crime), it is however outside the span of the WCC; (ii) knowingly, (iii) recklessly, and (iv) negligently (Frank et al. 1989). Agnew's General Strain Theory (GST) (1992, 1995, 2001) departs from earlier, broader strain theories Merton's (Merton 1938) and Cloward's and Ohlin's (Cloward and Ohlin 1998) (Cloward 1959) by emphasizing the social-psychological dimensions of strain instead of viewing it as merely a structural societal issue. Traditional strain theories attributed lower-class delinquency to unequal access to opportunities, suggesting that the inability of lower-class individuals to achieve societal expectations of material success created strain (Merton 1938) (Cloward and Ohlin 1998) (Cloward 1959). Agnew's GST, however, extends beyond these limits by considering personal perceptions and responses to strain, offering a more nuanced individualized explanation of crime's occurrence and absence across various societal strata or levels (Langton 2004). Agnew has pinpointed the conditions necessary for strain to lead to crime and delinquency. He contends that straining events may culminate in criminal behavior if they are (i) perceived as unjust, (ii) severe in impact, (iii) linked with weak social control, and (iv) generate pressure or motivation for criminal coping strategies (AGNEW 2001). WCC, a (i) low visibility yet highly impactful issue, has likely grown faster than the population due to changes in marketing, distribution, and investment strategies. (ii) The increasing complexity of our society makes it harder to seek redress for losses, given the high costs of legal services, the burden on prosecutors and investigators, and clogged court systems. Additionally, (iii) the allocation of law enforcement resources for preventing, deterring, investigating, and prosecuting WCC must compete with other national issues, all exacerbating our society's growing complexities (Edelhertz 1970, p. 8).

WCC can significantly impact the social fabric and the freedom of commercial and interpersonal interactions. Each instance of stock market fraud diminishes confidence in the securities market (Edelhertz 1970, p. 9). WCC always involves an intent to commit a wrongful act or pursue goals contrary to law or public policy, even if intent isn't required to be proven (this includes scenarios where legal advice is present, laws are misinterpreted, actions are omitted rather than committed, or authorities are lax. In such cases, intent can be inferred from the deliberate choice to venture into ambiguous areas and risk overstepping legal boundaries for potential gain) (Edelhertz 1970, pp. 12–13). The U.S. Court of Appeals for the Second

Circuit, in United States v. Doyle, 384 F. 2d 715, 720 (2d Cir. 1965), determined that omitting facts or refraining from actions that would fully disclose the material facts influencing investment decisions were equivalent to fraud because they deprived the investing public of the full disclosure mandated by the Securities Act of 1933. American courts acknowledge that even violations of technical registration requirements may often be driven by fraudulent motives, as seen in United States v. Abrams, 357 F. 2d 539, 546 (2d Cir. 1966), and United States v. Wolfson, 405 F. 2d 779 (2d Cir. 1968). Messner and Rosenfeld argue that normative flexibility is employed to attain predominant cultural objectives (Messner and Rosenfeld 1994). However, existing research typically posits that normative flexibility is incorporated into market mentality (Langton 2004). This assumption stems from the belief that as people embrace a market mentality, they also expand their thresholds for what actions and behaviors are deemed acceptable and justifiable (GROß et al. 2018). Furthermore, it has been observed that objective strains (which are more quantifiable in GST assessments) and subjective strains (specific events or circumstances distressing to an individual) represent two separate categories (AGNEW 2001) (Capowich et al. 2001). Moreover, a theory at the individual level like GST should consider personal responses to adverse stimuli. Agnew posits that strain-induced negative emotions, such as anger or other distressing emotional states, may drive an individual towards crime or delinquency in the absence of effective coping strategies or adaptations (Langton 2004). It has been observed that weakened non-economic institutions are closely linked with deteriorating social relationships, weakening political ties, fragile family structures, anomia, and a marketized mentality (Hovermann et al. 2015).

Stewardship behaviors that collectively can move governance in an organization from agency toward stewardship (Hernandez 2012). The Theory of Reasoned Action (TRA) (Ajzen and Fishbein 1980) Fishbein & Ajzen, 1975) and its extension, the Theory of Planned Behavior (TPB; Ajzen, 1985, 1991), are cognitive theories that offer a conceptual framework for understanding human behavior in specific contexts. The theories of TRA, TBP (Hess 2007), along with others (organizational trust (Mayer et al. 1995; Schoorman et al. 2007), stewardship theories of management, D&Os as stewards (Davis et al. 1997; Albrecht et al. 2004; Anderson et al. 2015; Block 1996)) are employed for contemporary theories of management and related research approaches that all take into account non-economic assumptions (Davis et al. 1997), behavioral, psychological and sociological aspects (Hess 2007). They were found especially useful regarding managerial individual decision-making and corporate conduct, including business ethics and personal ethics, and moral behavior (Vallerand et al. 1992), of which especially those on corporate misconduct, managerial unethicalness, immorality, and

managerial broken trust (Hess 2007; Albrecht et al. 2004). Such theories and approaches were inevitable to be developed and employed regarding managerial research as more and more limitations and shortcomings of the agency theory manifested themselves in the market practice and or were revealed in the literature (Albrecht et al. 2004; Arthurs and Busenitz 2003). The failure to perform accepted responsibilities and failing to fulfill fiduciary duties by failing to provide a 'true and fair view' of the picture and performance of a corporate entity, entities, and their D&Os break or hamper the crucial trust relationship that is constitutional to (i) the stewardship function and (ii) the basis of the business relationship (Carmona et al. 2013; Staubus 2005; Albrecht et al. 2004)

4.5 Contemporary Managerial Fraud: the Amalgamation of Theories of the Broken Trust, American Dream, Valuation Treadmill

Numerous perspectives and theories have attempted to elucidate the occurrence of corporate financial crimes, serving as educational tools to comprehend the inadequately researched phenomenon of corporate financial misconduct (Gottschalk, 2010a, 2010b). The investigation into white-collar criminals has been ongoing for several decades (Sutherland, 1949), emphasizing the distinction between this category of crimes and "common crimes" (Benson, Moore, 1992). While considerable attention has been devoted to exploring the effects and consequences of FRM on stakeholders, the literature presents divergent and conflicting positions on the causality of FRM, particularly concerning its sources and motives (Amiram et al., 2018, p. 736). Ongoing research focuses on identifying specific risk areas and conditions conducive to potential FRM, with the development of models and frameworks such as the Fraud Triangle, Diamond, and Pentagon, as well as the SCORE Model and New Fraud Triangle Model (Yendrawati et al., 2019; ACFE, 2018, 2016, 2009; Amiram, Huang, Rajgopal, 2018; Albrecht et al., 2015; SAS 99; Marks, 2011; Cressey, 1973). Consequently, the American Dream Theory and Broken Trust Theory are regarded as the most comprehensive in explaining the existence and occurrence of FRM (Choo, Tan, 2007; Albrecht et al., 2004, 1984; Albrecht, Romney, 1986). The widespread occurrences of extensive FRM from the turn of the 20th to the 21st century have led to severe losses, public company leadership facing widespread scrutiny, and issues of unethical and fraudulent reporting becoming commonplace (Chinniah, 2015; Carpenter, Reimers, 2005). FRM is currently viewed as a regularly occurring phenomenon and is considered one of the most common types of market fraud, known for its significant financial impact on stakeholders (Velikonja, 2013; Snider, 2008). Estimates suggest potential global

fraud losses amounted to approximately $4 trillion in 2017 (ACFE, 2018, p. 8; Crowe, 2018). Financial fraud affects a broad spectrum of victims, including society, investors, creditors, businesses, and retirees and employees (Zainudin, Hashim, 2016; Beasley et al., 2010). Additionally, the ramifications of FRM extend far beyond monetary values, significantly impacting market efficiency, trust among participants and stakeholders, and the effective allocation of assets (IFRS, 2018). Detection of FRM remains a focal point for numerous entities (ACFE, 2018; Albrecht et al., 2014).

The theory of the American Dream and the Fraud Triangle concept shed light on how the strong emphasis on monetary success within the corporate realm can lead to fraudulent conduct by corporate executives (Choo and Tan 2007) (Choo and Tan 2012). Firstly, there exists immense pressure to excel driven by the focus on monetary success, this pressure, stemming from societal values, often compels individuals to strive for success through any available means, including fraudulent activities (Messner and Rosenfeld 1994, p. 8). This notion directly described as the 'Crime and the American Dream' (Messner and Rosenfeld 1994). Secondly, the pursuit of monetary success creates opportunities for corporate executives to manipulate or disregard regulatory controls. The American Dream embodies a fundamental value of materialism, described as the 'fetishism of money,' contributing to an environment where the accumulation of monetary rewards takes precedence over adherence to legitimate rules and regulations, that was observed as soon an in the 1970s within the social theories of deviance (Taylor et al. 1973, p. 94) . Lastly, the corporate environment, fixated on monetary success, fosters justification or rationalization for fraudulent behavior. This duality of the American Dream provides rationale for both the admirable and undesirable aspects of American society, where ambition fuels both positive achievements and deviant conduct 'A cardinal American virtue, 'ambition,' promotes a cardinal American vice, 'deviant behavior' (Messner and Rosenfeld 1994, p. 7) (Merton 1968, p. 200). Monetary or broadly viewed economic success is inherently open-ended, that is, it is constantly possible in principle to have more money or achieve higher status or better economic performance (PTCs') ; the American Dream offers 'no final stopping point' and it necessitates 'never-ending achievement' (Passas 1990, p. 159). The orientation towards monetary values adds to the anomie associated with the American Dream, it's important to note that anomie doesn't solely arise from limited access to legitimate means of achieving goals, but as it the c-suits cases, instead, deviant behavior becomes attractive due to the scarcity of legitimate avenues, leading individuals to resort to alternative methods not just to achieve their objectives, but also to alleviate the pressure of pursuing socially accepted goals like wealth (individual and corporate), success (individual and corporate) and individual material

possessions, individual social status, media coverage and public recognition (individual and corporate) this robust accent on monetary success within the corporate world can initiate fraudulent behavior by corporate executives (Choo and Tan 2007) (Choo and Tan 2012). In essence, the relentless pursuit of monetary success inherent in the American Dream drives corporate executives to pursue their financial objectives through any means necessary, facilitated by opportunities to exploit regulatory loopholes and justified by the societal value placed on material wealth (Passas 1990, p. 159). The emphasis on accumulating monetary rewards, coupled with a relatively lax approach to adhering to legitimate rules and regulations, characterizes the American Dream, essentially, corporate executives actively seek out opportunities to exploit or disregard normative regulations whenever such rules pose a threat to their financial success executives (Choo and Tan 2007) (Choo and Tan 2012). Moreover, there's a notable link between corporate pressure to maximize financial performance and corporate crime frequency (Keane 1993). Furthermore, within a corporate environment fixated on monetary success, where corporate executives are implicitly or explicitly permitted to exploit or disregard regulatory controls, there exists a framework that justifies or rationalizes success achieved through any means, including fraudulent activities executives (Choo and Tan 2007) (Choo and Tan 2012).

Park's Valuation Treadmill Theory argues that securities fraud became a significant concern for public companies due to shifts in investor approaches to stock valuation, as investors embraced contemporary valuation models and sought to forecast a corporation's future earnings potential, meeting market expectations regarding performance grew increasingly crucial for PTCs, consequently, public companies now face a structural incentive to provide deceptive disclosures to portray brighter economic prospects than reality. Given that valuation models distinguish 'stock markets from casinos', ensuring the integrity of the valuation process is paramount (Park 2022b) (Park 2022c). Author of this thesis, as an ACFE Member No. 998977, attended closed ACFE seminar training hosted by ACFE PNW Chapter Pacific Northwest, where James Park, Professor of Law, UCLA School of Law, was presenting on 'Securities Fraud in Public Companies', on November 30th , 2022. The Author holds certificate from the seminar training. As valuation pressure impacts most public firms, there is a rationale for implementing structural measures mandating investment in resources to prevent securities fraud. PTCs securities fraud is not solely attributable to corrupt managers seeking personal enrichment but is often perpetrated by otherwise ethical corporate managers who present a misleading image of the corporation while pursuing corporate objectives (Park 2022b) (Park 2022c). Legislation like Sarbanes-Oxley, which mandates investment in proactive measures,

serves to counteract the valuation pressure exerted by modern stock markets (Park 2022a). PTCs currently encounter ongoing pressure to meet investor expectations, the standard PTC must consistently deliver robust short-term performance each quarter to uphold its stock price; this cycle of valuation fosters motivations for corporations to mislead investors (Park 2022b) (Park 2022c). Presented two decades after the enactment of Sarbanes-Oxley, which mandates that all public firms invest in mechanisms to ensure the accuracy of their disclosures, The Valuation Treadmill Theory illustrates how securities fraud emerged as a significant regulatory issue, the Treadmill Theory is utilizing case studies of emblematic securities enforcement actions involving Xerox, Penn Central, Apple, Enron, Citigroup, and General Electric (Park 2022b) (Park 2022a), The Valuation Treadmill Theory contends that corporate securities fraud surfaced as investors increasingly evaluated companies based on their future performance, as PTCs now possess an incentive to provide overly optimistic disclosures to persuade markets that their success will persist, securities regulation must intensify efforts to safeguard the integrity of public companies against the pressures of the valuation treadmill (Park 2022c) (Park 2022b). For the history of securities fraud regulation from the 1960s until the present-day, also see (Park 2022b).

The pursuit of higher profitability levels at organizations is associated with a higher propensity for fraud. i) The more consistent, experienced, and performance-target-focused organizations seem most prone to fraud, and ii) senior management's ethical concerns are of utmost importance in relation to corporate fraud (Groot and Hernandez 2007). The motivation for fraud extends beyond the traditional fraud triangle of opportunity, pressure, and rationalization, incorporating emotions, mastery, and group interests, aligning more comprehensively with Michael Apter's reversal theory, which recognizes a broader spectrum of cognitive, conative, and affective motivations behind fraud actions (ACFE Fraud Examiners Manual 2021 2021) (Ramamoorti 2008) (Ramamoorti et al. 2009). Unpacking "greed" as a simplistic explanation for fraud reveals its complexity (Ramamoorti et al. 2009), indicating the necessity to explore the diverse manifestations of greed through social psychological perspectives, which offers promising insights into understanding the varied motivations behind white-collar crime (Roese & Olson, 1995). There are “three categories follow the ABCs Theory or ABC Framework of white-collar crime: i) The Bad Apple: Individual Personality Characteristics of those that Commit Fraud, ii) The Bad Bushel: Group Dynamics of Collusive Behavior, iii) The Bad Crop: The Larger Cultural/Societal Factors that Enhance or Permit Fraud” (Ramamoorti et al. 2014, p. 68). A significant factor, ego or entitlement, plays a crucial role in compelling individuals to commit fraud (Vousinas 2019b). During the 2000s corporate

financial scandals culpable individuals have compromised their fundamental values, this recurring narrative of dishonesty is an ancient one, but the common explanation of 'greed' remains unchanged over time, however, greed alone does not fully explain these behaviors, so it became crucial to explore what motivations exist beyond greed to gain a deeper understanding of financial scandals, corporate insiders fraud, c-suits fraud (Ramamoorti 2008). Personal ego and confidence in avoiding detection are key factors motivating individuals to commit fraud, i) therefore, those with high confidence and ego are more inclined to engage in fraudulent activities, ii) additionally, the ability to handle stress, particularly in managing the ongoing deception required to conceal fraud over the long term, is crucial, iii) his constant need to lie, hide, and cover tracks creates significant stress, and only individuals capable of managing this stress can sustain such illicit behavior. Iv) Capability may serve as a moderating factor in the relationship between the components of the fraud triangle and fraudulent behavior, while also directly impacting that behavior (Malimage 2019). Fraud is i) expensive, ii) distracting, and iii) wasteful (Ramamoorti et al. 2009) fraud at its core is a human act (Ramamoorti and Olsen 2007) (Ramamoorti 2008). There are many faces of "greed in management Crime: hyper-competitiveness, perfectionism, excessive pride, narcissism, and more (Ramamoorti et al. 2009, p. 17). Unconscious factors contribute to greedy behavior in the senior executive suite, with hypercompetitiveness being a significant driver, i) often executives exhibit hypercompetitiveness, causing them to view situations as win-lose rather than ii) seeking win-win outcomes, this mindset hinders collaboration and solution-finding, iii) leading executives to prioritize personal recognition and compare themselves to others in terms of perks and achievements, iv) hypercompetitiveness can also foster a gang mentality, where unethical behavior is rationalized as common practice (Ramamoorti et al. 2009). For a review of Recent Empirical Research (in numerous countries, also European) on Fraud triangle theory and its Variants, see (Malimage 2019).

Developing a new model that incorporates the shifting motivations of executives and their subordinates is essential (Ramamoorti 2008), At the forefront of understanding fraud lies the application of Apter's Reversal Theory, and its The Eight Ways of Being (Ramamoorti et al. 2009, p. 20), such a model should explore the factors influencing the decision not to commit fraud, thereby identifying novel deterrents. Michael Apter emphasizes the potential of his theory, highlighting its ability to transcend simplistic views of goals and rewards, instead delving into the nuanced and dynamic nature of human motivation and behavior (Ramamoorti et al. 2009, pp. 19–21), also Nathanson's Compass of Shame (North-Withdrawal, South – Avoidance, West- Attack Other, East-Attack Self) was found helpful in understanding

managerial frauds (Ramamoorti et al. 2009, pp. 14–16). The General Deterrence Theory (GDT) is built upon three key components aimed at deterring crime or deviant behavior by leveraging the threat of punishment (Peace et al. 2003). i) The first component of GDT concerns perceived sanction severity, reflecting one's belief regarding the severity or magnitude of the sanctions resulting from unwanted behavior, however, Beccaria argued that excessively severe punishment is unjust, while insufficient punishment fails to deter, therefore, a reasonable balance between punishment and deterrence is essential. GDT posits that high perceived sanction severity decreases intentions to engage in deviant behaviors (Malimage 2019) ii) The second component is perceived sanction certainty, representing one's belief about the likelihood of apprehension and punishment for unwanted behavior (Tittle 1977) (Tittle, 1980). It is hypothesized that higher perceived sanction certainty reduces intentions to commit deviant behavior (Malimage 2019) iii) The third component is perceived sanction celerity, which refers to the belief regarding the promptness of sanctions following apprehension for unwanted behavior (Jensen et al. 1978). See also deconstruction and analysis of the origins of Cressey's Fraud Triangle (Tickner and Button 2021) and Fraud diamond capability measures on fraud occurrence (Arel et al. 2023), for the incorporation of Envy and greed into agency theory, see (Pepper et al. 2015). The American Dream Theory and the Broken Trust Theory. Cho and Tan referred to the theoretical framework developed by Albrecht et al. as the Broken Trust Theory (Choo and Tan 2007), which links the Agency Theory and Stewardship Theory with the Fraud Triangle concept from corporate fraud literature (Albrecht et al. 2004).

Corporate fraud is a complex phenomenon, where business can be a victim (Pedneault et al. 2012, pp. 81–94), or can be a criminal (Pedneault et al. 2012, pp. 96–110), to familiarize with fraud from the point of view of Forensic Accounting and Fraud Investigation or examination, see (Pedneault et al. 2012). The relationship between the Broken Trust Theory, American Dream Theory and Fraud Triangle concept can be describes as following: i) pressure: The Fraud Triangle element of pressure is addressed in the Broken Trust Theory as pressure to commit fraud leading corporate executives to break their agency or stewardship relationship. Subsequently, it is addressed in the American Dream Theory as an intense emphasis on monetary success that induces corporate executive fraud, ii) opportunities: The Fraud Triangle element of opportunities is seen in the Broken Trust Theory as corporate executives having opportunities to break their agency or stewardship relationship. In the American Dream Theory, it is defined as corporate executives exploiting or disregarding regulatory controls to commit fraud, iii) rationalization: The Fraud Triangle element of rationalization is explained in the Broken Trust Theory as corporate executives being inclined to rationalize their fraudulent

actions and behavior. Meanwhile, the American Dream Theory views it as a corporate environment that is preoccupied with monetary success providing justification or rationalization for success by deviant means such as fraud (Choo and Tan 2007) (Choo and Tan 2012) (Albrecht et al. 2004) (Albrecht 2014).

4.6 Anti-Fraud Profession's Frameworks and Toolkits for Financial Reporting Misconduct

Fraud theories and anti-fraud practices must employ current thinking that surrounds fraud events and reflect this in models used to detect and investigate fraud, including auditing and assurance services (Dorminey et al. 2012). Contemporary criminals are continually innovating to discover new opportunities to employ fraudulent acts of various sorts (PwC 2022b). The modern high-risk business environment requires a systematic and sophisticated approach to fraud prevention not only on the macro-level (economy, financial market) but also critically on the micro-level (individual corporation) (Marks 2014, 2018a; ACFE and Grant Thornton; ACFE and Reuters 2023). COSO's and ACFE's decades of corporate fraud, especially executive fraud research and analytics, repeatedly find that it is not possible or feasible to eliminate all fraud in all corporations. However, it has also been evidenced that whenever corporate leaders effectively and systematically address fraud risk, similarly to how they address other risks using an integrated framework, they can reasonably manage it to a considerable degree, provided high-quality frameworks and their execution (COSO and ACFE 2023b; ACFE 2022d; ACFE and Grant Thornton; ACFE Fraud Examiners Manual 2021). Unfortunately, these frameworks are often deficient, underprovided, or flawed in various ways, creating feasible opportunities for fraudulent acts. Internal control, ICFR, compliance, and fraud risk management frameworks, whether employed obligatorily or voluntarily within PTCs, serve as their first-line, proactive defensive, deterrent, and detective WCC, including FRM measures, which have been commonly acknowledged (COSO 2013a, 1992, 2013b; PwC 2018b; ACFE 2022d; ACFE and Grant Thornton). Consequently, the quest for their constant improvement concerning their qualities of prevention, deterrence, detection, and more recently prediction powers, is gaining momentum (COSO and ACFE 2023b; COSO et al. 2020; PwC 2022a; PwC Switzerland 2018).

The Fraud Triangle endures as the bedrock of WCC, including FRM particularly (Albrecht 2014), with reference to i) academic research, ii) institutional reports and studies, iii) governmental and law enforcement rulemaking, supervision, enforcement action, iv) standard-setting and procedures for capital markets (especially accounting and auditing) (Dorminey et

al. 2012), v) formal guidelines, policies, procedures, tools for enterprise fraud and compliance risk management, corporate-occupational-managerial-fraud risk management, anti-fraud provisions, and measures (Marks 2011, 2018a, 2014; COSO 2013a, 1992; COSO and ACFE 2023b; ACFE 2022d), and vi) professional conduct (professions, positions within which WCC can occur). The Fraud Triangle is known as 'iconic,' assessed from its history, rationale, and usage across scientific disciplines and governmental and market practice, referencing i) prevention, ii) detection, iii) investigation, and iv) deterrence of financial frauds and general frauds, as well as most other WCC and occupational crimes (Albrecht 2014; Dorminey et al. 2011). More recently, it also serves as a baseline foundation for fraud prediction. However, in its classical or initial form (of three prongs), it has been widely proven to be evidently insufficient, incomplete, narrow-looking, non-all-encompassing, limitedly explaining and embracing FRM, and of unsatisfactory coverage of the WCC in research and market practice (Marks 2011; Dorminey et al. 2011; Dorminey et al. 2012). This is especially true regarding the contemporaneous business environment, capital markets, and their participants, concerning i) explaining and understanding WCC, and ii) preventing, detecting, predicting, and deterring WCC. Explanation, description, and understanding of the WCC phenomenon can be clustered into: i) explanation of WCC, including FRM occurrence, and ii) WCC, including FRM non-occurrence. There are criminal theories explaining i) why crime occurs, ii) why one does not turn to illegal means or illicit behaviors or deviate from the norm in any sense, and iii) theories that encompass or explain both aforementioned aspects. Another systematization distinguishes between macro-level and micro-level theories. Theoretical underpinnings for WCC, including FRM, can be divided into subcategories of WCC-prevention, detection, prediction, deterrence, and risk management, although they are not mutually exclusive, and significant parts overlap (there are intersections and sets of areas common to certain of them).

The comprehensive understanding and explanation of the fraudster's motivations require elements beyond the Classical FT, enhancing the anti-fraud community's aptitude to i) detect, ii) investigate, iii) prevent, iv) deter, and v) remediate fraud. Academics and market practitioners have been searching for and delivering additional and novel insights beyond the Classical FT (Dorminey et al. 2012). The evolution of fraud theory is crucial regarding disputes on theoretical underpinnings of corporate fraud (Dorminey et al. 2012). When alterations in total risk and idiosyncratic risk were measured post the passage of regulations targeting internal controls, tone at the top, C-suites accountability and liability, codes of ethics, and incentive plans, it was revealed via empirical analysis that if regulations intended to mitigate investor fears and decrease the risk of investing in the capital markets, results presented an opposite

effect as disclosed increased capital market risk measures. However, cross-sectional outcomes were in agreement with the spirit of regulation (Akhigbe et al. 2008). Beta is not an all-encompassing, exhaustive measure of information uncertainty. Thus, C-suite and internal-controls, ICFR regulatory requirements can i) notably alert investors to avoid including certain PTCs in their portfolio (total- and idiosyncratic-risk measures) and ii) aid investors in recognizing the weight of the PTC in their portfolio (market-risk measure) (Akhigbe et al. 2008, p. 3).Economic crime is becoming not only more complex but also more international and digital (Mautone 2019; PwC 2014a; PwC Switzerland 2018; PwC 2018a). Fraud is one general type of crime which, while as old as commerce itself, is projected to take novel, changed forms over time, especially as the twenty-first century progresses (specifically technological). Numerous novel forms or evolved patterns and schemes have already emerged due to a variety of social, demographic, and economic developments affecting and shaping economic crime (Grabovsky 2001, pp. 146–158). Modern forms of crime are facilitated by contemporary information technology development (Grabovsky 2001, p. 151).

Based on the PwC Economic Crime and Fraud Surveys, it is legitimate to express the view that economic crime evolves in line with technological progress (Mautone 2019; PwC 2014a, 2018b; PwC Switzerland 2018). Most frequent, typical economic crimes have turned to be characterized as systematic and represent much higher risk than episodic frauds. Most harmful forms of economic crimes abuse the inevitable trade-off between two co-existing bedrock corporate goals: profitability and compliance, employing exploitative tactics on the tension between profit and compliance (PwC 2014a, p. 4).In recent decades, both the quantity and complexity of WCC in general and fraud specifically have continuously increased (Ustinova 2023, p. 165). WCC is an umbrella term encompassing a wide variety of illicit and illegal activities. Most frequently occurring on the markets according to PwC Switzerland are i) fraud and accounting fraud, ii) blackmail, iii) money laundering, iv) insider trading, v) insolvency offenses, vi) industrial espionage, vii) corruption, viii) product piracy, ix) cartel agreements, and x) embezzlement (Mautone 2019). Economic crime manifests itself in countless varieties, each with its individual and particular characteristics, specific threats, and strategic consequences (PwC 2014a, p. 5). The extreme diversity of economic crime indicates that i) no single institution of prevention or control will be sufficient, and ii) each distinct type of economic crime is most suitably addressed by a combination of countermeasures. These solutions do not guarantee the prevention of economic crime but facilitate the limitation of the risk of crime. The more preventive and counter-measures in place, the more difficult it becomes to perpetrate economic crime, especially fraud (Grabovsky 2001, pp. 153, 158). Nonetheless,

systematic prevention of economic crime shall always start with a comprehensive, systematic risk assessment. It requires not only fraud risk management programs but also an adequate security setup and corporate culture (Mautone 2019).

Countermeasures for economic crime include sanctioning offenders, transparency, audit, procedures for independent review of administrative decisions, specialized bodies for the investigation and prosecution of serious economic crime, free press, transaction reporting, adequate regulatory systems, mechanisms for building public awareness, commercial third parties, prudent banking, open political systems, and international cooperation (Grabovsky 2001, pp. 153–158).Corporate financial standing and investor confidence are crucial concerns, especially from the perspective of the post-corporate/managerial scandals outbreaks that have revealed various corporate, especially management frauds, unprecedented bankruptcies, and high magnitude of harm done to numerous classes of victims (Akhigbe et al. 2008, p. 3).Voluntary good practices have been proven insufficient. Enhancements in the 'Tone at the Top,' C-suites' personal accountability for CD, bonuses and incentives schemes, corporations vs. insider arrangements, codes of ethics, restatements, consequences for D&Os for non-compliance financial reporting requirements as a result of misconduct, and other required governmental interventions and agencies' enforcement tools are necessary to set an efficient and effective landscape (SEC 2003).Studies on FRM encounter numerous challenges but also offer noteworthy opportunities to advance the literature. Many questions about FRM remain unsettled, and the quest for a comprehensive set of theories fully explaining FRM and its considerations continues. Attempts to design the most fitted, feasible, accessible, and cost-efficient FRM detection and prediction tools are still in their infancy, far from comprehensive and complete (Amiram et al. 2018). Lack of cooperation often benefits offenders, who may delay or avoid detection and prosecution due to a lack of coordination among law enforcement agencies. However, the increasing specialization of economic life suggests that designated organizations may be appropriate in some circumstances (Grabovsky 2001, p. 155) Financial reporting fraud and other forms of financial reporting misconduct (collectively described as FRM, suitable from the perspectives of law, accounting, and finance) are a substantial threat to the existence and efficiency of capital markets (Amiram et al. 2018, p. 732).

The general public, investors, creditors, and internal and external auditors are 'desperately' seeking efficient, CD information-analyzing tools to aid decision-making, especially regarding fraud risk management, as the cost of fraud for all stakeholders, including the corporation itself, may be mitigated by detecting the fraud in advance (Huang 2013).Academia's quest for identifying and elaborating on fraud determinants is immensely

important to capital market regulators and supervisors (e.g., the SEC) as it is another element to be implemented in their policies and actions to minimize instances of fraud, mitigate harm done to investors and the general public, and employ tools to not only deter but also prevent fraud (Richards 2008).There is no accepted measure of "true" accounting fraud, as admissions by companies are rare and trials straightforwardly proving fraud are infrequent (Dyck et al. 2010). Often, after civil charges are brought (e.g., SEC's AAERs or SCALS), they are resolved via settlements or similar agreements. The mode of "no-admit, no-deny," "neither admit nor deny," which is the settlement of civil charges without the requirement of admission of guilt, used to be employed (e.g., agreeing to the SEC's order without admitting or denying the findings, agreeing to cease-and-desist, and paying a civil monetary fine while obliging to comply with the supervisor's guidelines (SEC 2021b)). However, a shift from such practices has occurred, e.g., in the 2010s and 2020s, as the SEC recently announced plans to return to its then-policy to require corporations to admit wrongdoing to settle certain enforcement actions (Dubow et al. 2021; Grewal 2021). Instances of auditor misconduct are ever-present. In the 2020s, the SEC has brought numerous standalone enforcement actions involving auditor misconduct (Grewal 2021), such as audit independence misconduct - improper professional conduct for violating auditor independence rules (e.g., involving a Big-N audit company and the C-suite of the client public company (SEC 2021b)), multiple other audit failures regarding audit and interim reviews in a public company, and auditor's failure to register with the audit oversight body (SEC 2021a), improper professional conduct, such as issuing an unmodified audit opinion without completing critical audit steps (SEC 2021a).

Corporate misconduct remains prevalent in the 2020s despite numerous laws and regulations. Multiple corporations continue to violate rules and fail to implement procedures and controls to ensure compliance with ICFR requirements. Instances of irregularities range from negligence, fraud unpreparedness, and unawareness, to outright fraud, fraud coverage, concealment, and minimization (Grewal 2021). Enhancing the above requires robust enforcement rules, laws, and regulations regarding i) obligatory CD, ii) misuse of non-public information, iii) violation of bookkeeping obligations, and iv) obfuscation of evidence from enforcement agencies (Grewal 2021). "Auditor independence is not merely an obstacle to overcome; it is the bedrock foundation that supports the integrity, transparency, and reliability of financial reporting" (SEC 2021b). "As gatekeepers, auditors perform a critical role in maintaining investor confidence in issuers' financial statements" (SEC 2021b). Gatekeepers are "first lines of defense against misconduct," and their accountability is fundamental for public trust in those institutions. Irregularities involving auditors and lawyers regarding public

companies and securities markets must be robustly investigated and adequately punished due to their specific role as public trust institutions on securities markets (SEC 2021b). Crime victims have assumed a prominent place in criminal law research, but an approach in criminal justice that employs a higher degree of respect toward victims' interests, rights, and perspectives is rather recent (Prittwitz 1999, pp. 111–112). Punitivism argues that victims' interests should be weighed against other social aims and that a flexible approach to the prosecution and/or punishment of offenders should be permitted in the search for the best means possible to guarantee the ultimate aim of maintaining social order (Maculan and Gil Gil 2020). The social reality of criminal justice systems emanates on three tiers, one of them being the effort to thwart socially harmful behaviors by prohibiting them under the threat of punishment. The social harm of a crime is an important consideration in studying crimes (Schunemann 1999). Victims have a right to truth, justice, reparation, and non-repetition. Some interpretations of the right to justice are understood as a right to the punishment of criminals (Maculan and Gil Gil 2020, p. 133). The functions of punishment are generally agreed upon (Andenaes 1966; Schunemann 1999), but individuals' views on the purposes of punishment may vary. The role of a victim in criminal law is under constant discussion (Prittwitz 1999).

The deterrent effect of the threat of punishment results from two factors: i) it increases the cost to the actor, making them abandon the action if costs are calculated to exceed the expected benefits (for an elaboration on this mechanism, see Becker 1974, 1968), and ii) it communicates that given acts are morally reprehensible (Schunemann 1999, p. 33). General deterrence or positive general prevention involves the internalization of norms and moral convictions and demands punishments to articulate adequately intense and proportionate blame (Schunemann 1999, p. 34). A person with i) normal socialization and ii) normal internalization of social norms would not desire to appear as a despicable individual to i) themselves or ii) society (Schunemann 1999). Moreover, appearing despicable or dishonest to oneself is much more undesired by the individual than to society (Schunemann 1999, p. 33). The stance of a victim, their rights, and other considerations related to the position of a victim in penal theories are important research areas in criminology and criminal justice (Prittwitz 1999). Criminologists' investigations and conclusions on the victim have been named victimology, which has subsequently offered a novel and comprehensive perspective on crime as an interaction or a set of interactions, proving an offender-centric approach insufficient to study and understand crime (Prittwitz 1999, p. 112).

The Fraud Triangle, originally articulated by Cressey (Cressey 1950) (Cressey 1953) (AKERS and Matsueda 1989)), is a foundational model formulated to elucidate the mechanisms

underlying white-collar crimes, with a particular focus on corporate fraud. This model has been widely adopted and is referenced in numerous international standards such as the AICPA (2002) and ICAI (2007-SA 240). Cressey delineated three fundamental elements that precipitate fraudulent behavior: non-shareable financial pressure, the existence of exploitable organizational vulnerabilities, and the individual's rationalization of their fraudulent acts (Cressey 1950) (Cressey 1953) (Dorminey et al. 2012). (i) a non-shareable financial problem (pressure/incentives to commit fraud); ii) knowledge of weaknesses in the structure and workings of a corporation which would allow the perpetrator to commit the fraud and escape detection (opportunities); iii) ability to justify to oneself that the fraudulent actions are not necessarily wrong (rationalizations)' (Desai 2020, p. 26). In developed markets, auditors frequently i) employ the fraud triangle—focusing on management's incentives, attitudes, and opportunities to commit fraud, ii) they also evaluate the presence and efficacy of the client's anti-fraud mechanisms, such as CG structures and internal controls, and iii) consider potential fraud schemes and Iv) consider methods of concealment when conducting a comprehensive fraud risk assessment of the client (Trompeter et al. 2013, pp. 281–318).

Financial pressures deemed non-shareable due to societal stigma catalyze the incentive or motivation for fraud, thereby reinforcing the individual's reluctance to disclose their financial distress due to heightened ego and fear of reputational damage, e.g. a CFO might resort to earnings manipulation to meet quarterly financial targets, driven by the stigma associated with financial underperformance and the consequent threat to their professional standing (Hogan et al., 2008; Trompeter et al., 2013). Research indicates that various financial pressures—such as the need to meet financing terms, adhere to debt covenants, fulfill earnings expectations for bonuses, minimize tax liabilities, and manipulate stock options—are prevalent motivators for fraudulent actions (Langton and Piquero, 2007; Broidy, 2001). Individuals of high social status, coupled with employment or liability strains, are posited to be more susceptible to engaging in fraudulent activities to excel in competitive, high-pressure environments (Desai 2020). The perpetrator's pronounced ego or pride additionally hinders them from sharing their issues with others or seeking assistance (Dorminey et al., 2012). Attaining the position of CFO in a large corporation would likely instill a significant 'sense of pride and ego', accompanied by the fear of losing such a distinguished role (Desai 2020, p. 76). Informal networks among senior management facilitate collusion, a critical element in most significant corporate frauds, i) insufficient oversight, ii) effective concealment tactics, and iii) the preservation of secrecy in social settings further enhance the opportunities for committing fraud, iv) problematic issues also stems from the perpetrators' effective hiding of illegal

activities and the prevailing silence within their social environment (van de Bunt 2010). Dorminey's Triangle Elements of Fraud are the distinct components of fraud include the fraudulent act itself (the scheme), the efforts to hide the act, and the identification of the gains that benefit the fraudster (such as conversion, for instance through accrued bonuses or enhanced stock option awards in cases of financial fraud) (Trompeter et al. 2013, p. 289).

Although these elements are not directly outlined within the fraud triangle, an understanding of prevalent fraud schemes, concealment strategies, and conversion mechanisms can assist in devising tests aimed at detecting fraud (Trompeter et al. 2013, pp. 289–299). There are seven most common Neutralization Techniques i) Denial of Responsibility: Individuals rationalize deviant behavior by claiming it was beyond their control. For instance, they may argue ignorance of relevant policies or ambiguity in the rules, ii) Denial of Injury: Deviant actions are justified by downplaying the harm caused. Examples include framing theft as borrowing or minimizing the impact on a large organization or its employees, iii) Denial of the Victim: Offenders rationalize their behavior by suggesting the victim deserved the consequences. This could involve feeling entitled due to perceived injustices or grievances, iv) Defense of Necessity: Offenders justify rule-breaking as necessary, particularly in situations where they believe it's essential for their well-being or that of their loved ones, v) Condemnation of the Condemners: Offenders deflect blame onto those who criticize their actions, often by questioning the fairness or reasonableness of rules or policies, vi) Metaphor of the Ledger: Offenders believe that past good deeds offset current wrongdoing, allowing them to justify their actions as a one-time lapse in an otherwise virtuous record, vii) Appeal to Higher Loyalties: Offenders feel compelled to prioritize conflicting obligations, justifying deviant behavior as necessary to fulfill a higher loyalty, such as family responsibilities or organizational goals (Malimage 2019, p. 41). Opportunities for fraud typically arise from perceived weaknesses within the CG structure, which may include a lack of BoD independence, ineffective or improperly structured audit committees, excessive CEO influence, or dual roles of CEO and CFO, thereby compromising oversight (Hogan et al. 2008) (Trompeter et al. 2013).

WCC was also analyzed from the Benson and Simpson's Opportunity Perspective, highlighting that individuals who have greater access to resources and hold positions of power within organizations are more likely to engage in such crimes; it was pointed out that opportunities for crime are influenced by the economic and productive structures of various business and government sectors (Simpson and Benson 2017) Following Sutherland (Sutherland 1983), also modern research shows that Opportunities within organizational settings are typically more prevalent, and according to convenience theory, crimes committed

within such frameworks should be classified as WCC, aligning with Sutherland's emphasis on the offender's profession and position (Simpson and Benson 2017). The field of WCC research continues to grow, with unethical behaviors such as lying, cheating, and stealing being discussed (Green 2010) (To explore the moral underpinnings of modern WCC offenses especially capital market-related frauds, there is an in-depth discussion that delves into fundamental moral concepts including cheating, deception, and stealing, see (Green 2010)), and a general theory of profit-motivated crime being developed (The General Theory of Profit-Driven Crimes (Naylor 2003) This body of research contributes to the development of the theory of convenience, additionally, the crime-as-choice theory integrates with convenience theory in explaining WCC (Shover and Hochstetler 2006). Governance deficiencies diminish the efficacy of organizational oversight and consequently embolden senior management to perpetrate fraud, exploiting the perceived likelihood of evading detection (Desai 2020). For a long time, the seemingly adequate solution to address misconduct was through increased regulation and supervision, however, this approach appears overly simplistic as it overlooks the issue of how illegal activities can stay concealed for many years from regulatory bodies, victims, and onlookers (van de Bunt 2010).

The fraud-detection measures and procedures are designed around the Cressey's fraud triangle (Cressey 1953) and the Dorminey's elements of fraud (Dorminey et al. 2012) (i.e., the act itself, the concealment of the fraud, or conversion of fraudulent gains) (Trompeter et al. 2013, p. 289). The propensity for committing fraud has commonly been explored through financial and governance variables additionally, the moral, ethical, psychological, and sociological dimensions of fraud have been examined in scholarly works (Abbott et al., 2004; Agrawal and Chadha, 2005; Beasley, 1996; Caruso, 2002; Erickson et al., 2006; Farber, 2005; Kinney et al., 2004; Srinivasan, 2005). Albrecht et al. propose that criminal behavior can be explained through psychological, sociological, and moral development theories (Albrecht et al. 1982, pp. 31–37). The ethical aspects of various corporate scandals have also been documented, with arguing that the primary cause of Enron's collapse was the board of directors' failure to act in an ethically and morally responsible way (Zandstra 2002, p. 16). While the accounting literature often directly links opportunity to internal controls, Cressey's original approach was followed by modern studies by distinguishing opportunity as based on a fraudster's perception of the effectiveness of anti-fraud measures, including internal controls, in preventing and detecting fraud (this distinction is crucial, as strong internal controls may not deter a fraudster if they are not perceived as effective, recognizing this difference could inspire valuable research into what influences fraudsters' perceptions of the likelihood of successfully committing and

concealing fraud) (Trompeter et al. 2013). Ever since Sutherland introduced the concept (Sutherland 1983) (Sutherland 1940), it has been recognized that individuals committing (WCC) typically do not view themselves or their actions as criminal, nearly universally, WCC offenders assert that they did not possess a 'guilty mindset' (fro a 'WCC guilty mind' see (Stadler and Benson 2012) while committing their offenses, a notable characteristic of the psychological profile of WCC offenders is believed to be their capacity to dismiss the moral constraints of the law and justify and rationalize their criminal actions (Stadler and Benson 2012). It has been suggested that management might compose incentive-driven fraud by exploiting opportunities to profit from their equity in a company, potentially inflated through misleading financial statements (Hogan et al. 2008) Although research generally indicates that management incentives prompt earnings management, findings are inconsistent on managerial incentive plans and reporting irregularities (Armstrong et al. 2010).

Additionally, it is noted that post 2000s there has been a shift from 'earnings management' to 'expectation management', as PTCs strive to 'meet or exceed' analyst-set targets (Koh et al., 2008). Furthermore, it is observed that PTCs implicated in fraud are more likely to have engaged in earnings management in previous years (prior to years of fraud) (Perols and Lougee 2011). The second notion, is that Management might compose pressure-driven fraud when they see opportunities to avoid negative outcomes such as missing analyst expectations or violating debt covenants (Trompeter et al. 2013). General Strain Theory, is applied to WCC provides a robust framework for understanding FRM, positing that the social pressures for material success can drive individuals to commit crimes (BROIDY 2001) (Paternoster and Mazerolle 1994). General Strain Theory on how social and economic pressures influence individuals' likelihood to engage in criminal activities when tested, indicated that strain was positively related to securities violations (capital market violations) (Langton and Piquero 2007). To assess the various factors influencing corporate fraud, multiple theories are integrated (Cohen et al. 2010). For instance, the fraud triangle theory (suggests that corporate fraud results from a combination of incentives, opportunities, and attitudes/rationalizations (is combined with the Ajzen's Theory of Planned Behavior (Ajzen 1991) is used, which includes elements such as attitude, subjective norms, perceived behavioral control, and moral obligation (Ajzen and Fishbein 1980). Ajzen's Theory of Planned Behavior was explicitly remastered and employed for the investigation of accounting irregularities, unethical reporting decisions and fraudulent CD (Carpenter and Reimers 2005). Regarding other variables that might elucidate human motivations, Dorminey's identify four primary categories of motivational factors: money, ideology, coercion, and ego (or entitlement), collectively summarized by the acronym

M.I.C.E (Dorminey et al. 2012). Corporate frauds are not always motivated by perceived non-shareable financial pressures or opportunities and the Kranacher's MICE model extends beyond financial motivations, offering a broader array of drivers for fraudulent behavior (Desai 2020). In fraud, "the Human Factor" is a core one and a decisive one. (Ramamoorti and Olsen 2007, in). Sudies have shown that social status comparisons (Ramamoorti and Epstein, Barry, Jay 2016) (Ramamoorti et al. 2009) and a competitive corporate culture (Coleman 1994) serve as significant incentives for WCC.

Overall, the 2000s corporate fraud outbreak was said to be mainly driven by i) greed, ii) ideology, and iiii) ego which in many cases were aggravated by i) social comparisons and a ii) hyper-competitive culture (Desai 2020) and iii) the Valuation Treadmill (or the MET Meet-or-Exceed-Targets behavior, described earlier in this thesis) (Park 2022b). Rezaee identifies five interrelated factors that account for several notorious FRM, abbreviated as The CRIME (cooks, recipes, incentives, monitoring, and end results) (Rezaee 2005) (Riley and Rezaee 2010b). Choo and Tan connect corporate fraud to the 'broken Trust Theory (founded on ground of the agency theory, the stewardship theory and the broken trust issue) as proposed by Albrecht (Albrecht et al. 2004) and to an American Dream theory' (Choo and Tan 2007) (Choo and Tan 2012), which is derived from sociological studies, The Broken Trust concept is well-known in the financial and corporate crime literature, since Cressey's works (Cressey 1950) (Cressey 1973) (Cressey 1953) and Gilbert's work (Geis 1968) (Geis 2011) (Geis and Stotland 1980). While Schrand and Zechman link executive overconfidence to the perpetration of fraud referring to the Slippery Slope Theory and C-suit Overconfidence Theory (Schrand and Zechman 2012). Overall, extensive discussions and studies have explored what should be classified under WCC category of offense (Piquero and Benson 2004), and the concept of the privileged position of perpetrators 'too powerful to jail' (Pontell et al. 2014). Following Sutherland's foundational ideas, convenience theory highlights the role and trust held by the offender within a professional context (Shapiro 1987) Thus, the organizational aspect is central to convenience theory, providing the offender with access to the resources and attributes needed to perpetrate and hide financial crimes, such as i.a. i) considerable influence, ii) enjoying respect and iii) enjoying trust (Gottschalk and Gunnesdal 2018). Together, these studies highlight that understanding the psychological and moral factors is crucial to comprehending the origins of unethical behavior that may lead to fraud. Cressey's theory on the psychology of "trust violators" became widely recognized among the general public as the "Fraud Triangle," a term that was actually popularized through subsequent interpretations rather than Cressey's original writings (Morales et al. 2014). The term itself does not appear in Cressey's work; this concept was extensively

developed later by Joseph Wells in ACFE's Corporate Fraud Handbook, where he links fraud examination to traditional criminology studies, thereby enhancing its conceptual robustness and making it applicable for CFEs (Wells 2017). Wells, a co-founder of ACFE, played a crucial role in formalizing the Fraud Triangle as a foundational concept in fraud examination writings (Morales et al. 2014) as well as former ACFE President Steven Abrecht, who showed that Fraud Triangle is continuously valid tool that helps to understand fraud (Albrecht 2014).

The Fraud Scale was developed by Albrecht, who introduced a model that incorporates two elements from the fraud triangle—pressures and opportunities—and substitutes the third element, rationalization, with personal integrity (Albrecht et al. 1984). With the Fraud Scale personal integrity can be assessed based on previous actions, noting the challenges in operationalizing rationalization (Albrecht et al. 2004). The Fraud Scale is often used in fraud examination, especially when regarding management fraud and FRM (Albrecht 2009b) (Albrecht et al. 2004). The fraud triangle was expanded by Wolfe and Hermanson to Fraud Diamond, that includes an additional dimension, emphasizing that the right capabilities are essential for a potential fraudster to successfully commit material fraud (Wolfe and Hermanson 2004). It was shown that committing large-scale fraud over extended periods typically requires a combination of intelligence, positional authority, a significant ego, and the ability to manage stress effectively (Dorminey et al. 2012). According to the fraud triangle, typical corporate fraud perpetrators often face non-shareable financial pressures, such as the need to meet earnings targets or secure financing at the lowest possible cost (Desai 2020) Combined with opportunities and rationalizations, an individual who might otherwise be ethical becomes an 'accidental fraudster' (Dorminey et al. 2012) (Dorminey et al., 2012).

In contrast, a 'predator' engages in fraud opportunistically, without the need for perceived non-shareable financial pressures; merely the availability of opportunities and a strong inclination to rationalize are enough to prompt fraudulent actions; the actions of an accidental fraudster are primarily influenced by the factors outlined in the fraud triangle, whereas the MICE framework is more relevant to the behaviors of a predator (Desai 2020). Over time, an accidental fraudster may become desensitized to the moral and legal consequences of their actions, making it progressively easier to continue committing fraud (Beasley et al. 1999) (Beasley et al. 2010). The Fraud Triangle is recognized as a fundamental theoretical framework within the fraud literature (Albrecht 2014) (Albrecht et al. 2012). It remains one of the most widely accepted models, that is among practitioners, especially fraud examiners (Albrecht et al. 2012) (Wells 2017) (Wells 2008), for formal anti-fraud tools, s.a ACFE Manuals (ACFE Fraud Examiners Manual 2021 2021), for academics (Dellaportas

2013) (Homer 2019) and standard setters (Lokanan 2015) for educational purposes in teaching and criminology studies (Daigle et al. 2014) (Mui and Mailley 2015). Despite its extensive use, the original (or initial version) of the Fraud Triangle has faced criticism on its completeness and sufficiency and debates on the necessities for its update and expansion to be able to explain fraud, especially capital market fraud, better (Choo and Tan, 2007; Dorminey et al., 2010; Murphy and Dacin, 2011; Morales et al., 2014; (Huber 2017)). It has led to various adaptations and enhancements, in response to perceived limitations of the Fraud Triangle (Cooper et al. 2013), numerous academics introduced new models. Amid them aforementioned the Fraud Scale by Albrecht and already mentioned the M-I-C-E model by Kranacher which expands the concept of pressure beyond non-shareable financial pressure (also it provides a larger set of motivations beyond a non-shearable financial pressure, as well as it creates possibility for collusion) (Kranacher and Riley 2020) (Kranacher et al. 2011).

There is also already mentioned Fraud Diamond, that expands Fraud Triangle with the iv) capability element, that has the following components: i) position or function, ii) intellectual capacity, iii) confidence and ego, iv) effective misrepresentation, v) immunity to stress and to guilt, vi) coercive capability (Wolfe and Hermanson 2004). fraud Triangle was further revisited emphasizing its significance within modern anti-fraud circles as a valuable tool for evaluating fraud risk., however, they contend that while important, the fraud triangle should be just one element of a comprehensive audit risk assessment strategy, as it alone is insufficient for deterring, preventing, and detecting fraud (Dorminey et al. 2012). Kranacher's MICE model assumes that i) ideological motivators may compel individuals to engage in fraudulent activities or theft as a means to achieve what they believe to be a greater good aligned with their ideology, ii) coercion may force individuals into fraud schemes reluctantly, yet such individuals could become whistleblowers, iii) ego is another motivator for fraud, as individuals often resist losing their reputation or position of power in society or among their families, iv) this type of social pressure can strongly motivate someone to commit fraud to preserve their ego, v) MICE perspective offers professionals a more comprehensive framework for evaluating the potential for fraud (Kranacher et al. 2011) (Kranacher and Riley 2020) (Vousinas 2019a). Another variation, the New Fraud Triangle, is proposed by Kassem and Higson who incorporate elements from both the Fraud Diamond and the Fraud Scale into the traditional motivation and opportunity components of the Triangle, suggesting these models should be utilized by external auditors to gain a deeper understanding of fraud causes (graphically, the Triangle consists of four smaller triangles i) opportunity (broadly understood), ii) motivation (understood as in MICE model), iii) fraudster's capabilities (understood as in Fraud Diamond), iv) Personal

integrity (understood as in Albrecht's Fraud Scale) (Kassem and Higson 2012). Dorminey et al. i) reexamined the fraud triangle, emphasizing recent developments and current perspectives within the anti-fraud community, ii) acknowledged the significance of the Fraud Triangle as a tool for evaluating fraud risk, yet they contend that it should be just one element of a comprehensive audit risk assessment strategy, noting that by itself, it is insufficient for effectively deterring, preventing, and detecting fraud, iii) there is a need to develop tools that enhance deterrence of WCC (Dorminey et al. 2011). Dorminey et al. created a meta-model that adds the likelihood of committing fraud to the Fraud Triangle, providing a comprehensive framework that includes act, concealment, and conversion, it was termed Fraud Triangle Meta Model, i) first triangle describes the Perpetrator i) pressure or incentive, ii0 opportunity, iii) rationalization, while also iv) taking into account individual characteristics, s.a. measures, constructs and combination of hazards; ii) second triangle the analysis of crime i) the act, ii) concealment, iii) conversion; iii) procedures - to detect; iv) controls- to prevent and deter, v) calculation of the probability of fraud (Dorminey et al. 2012).

Numerous frauds, particularly large-scale financial statement frauds amounting to billions of dollars, hinge on individuals possessing the necessary skills to execute the fraudulent activities, while opportunity provides the pathway and motivation and rationalization lure potential fraudsters towards it, the crucial element is the individual's capability to exploit that opportunity and carry out the fraudulent actions (Vousinas 2019b). Cieslewicz adapted the Fraud Triangle to the Cieslewicz Fraud Square for a global context by integrating societal-level fraud factors in China, showing how cultural elements like religious and philosophical traditions, social norms, and societal conditions such as rule of law and political climate can influence the dynamics of fraud (Cieslewicz, J.K. (2010), "The fraud square: societal influences on the risk of fraud", Paper presented at 2010 American Accounting Association Annual Meeting, 31 July-4 August, San Francisco 2010). Furthermore, there is an extension termed the Fraud Pentagon, developed by Jonathan Marks as formally 'Crowe's Fraud Pentagon TM' and adds arrogance and capability to the traditional components (Marks 2011). It was formulated as an anti-fraud toolkit response 'playing offense in a high-risk environment' (Marks 2014), that recognizes achievements of the behavioral lens in fraud detection and prevention (Marks 2018b) (Marks 2018c). Other scholars emphasize personality traits and motivations as factors in fraudulent behavior: Albrecht et al. highlight the role of executive greed, moral decay, personal integrity problems, ethical decline (Albrecht et al. 2004) (Albrecht 2009b), while Murphy and Dorminey discuss the impacts of Machiavellian personalities and predatory behaviors on management fraud and misreporting especially, also broadly psychological

pathways to fraud (Dorminey et al. 2011) (Murphy 2012). For a detailed description of the Self-deceptive mechanisms and Self-Perception in the light of egoistic and moralistic biases, see (Paulhus and John 1998). For a detailed studies on Machiavellianism (manipulative personality), see (Christie and Geis 1970). The trio of Machiavellianism, narcissism, and psychopathy, collectively known as the "Dark Triad" (Paulhus and Williams 2002) stands out among socially aversive personalities, garnering significant empirical attention (Kowalski 2001). Machiavellians, characterized by manipulative tendencies (Paulhus and Williams 2002) and demonstrated as behaving coldly and manipulatively in both laboratory and real-world settings (Christie and Geis 1970) share common traits with narcissism and psychopathy. These traits include self-promotion, emotional coldness, deceitfulness, and aggression (Kowalski 2001). While originating from diverse backgrounds, these personalities exhibit overlaps in their characteristics (Paulhus and Williams 2002). Studies have revealed empirical associations among Machiavellianism and psychopathy (McHoskey et al. 1998), narcissism and psychopathy, aberrant self-promotion (Gustafson and Ritzer 1995) and Machiavellianism and narcissism (McHoskey 1995).

This convergence underscores the interconnected nature of these traits, which has been noted in clinical literature for some time (Hart and Hare 1996). Academic research has explored how the dark triad personality traits (Machiavellianism, narcissism, and psychopathy) in managers relate to manipulative practices in financial reporting, with findings indicating that i) Managers exhibiting dark personality traits are more likely to engage in fraudulent accounting practices within their accounting and finance departments; ii) Traditional risk management methods offer only partial effectiveness in mitigating this behavior, iii) specifically, internal audits prove effective in deterring negative conduct among managers with dark triad traits only when outsourced to independent external auditors, not when conducted internally, iv) this suggests that managers with these traits can manipulate internal auditing processes effectively, v) therefore, it is advisable outsourcing auditing tasks to external personnel serves as a safeguard against unethical practices and manipulation (Mutschmann et al. 2022). Allan highlights that one prevalent personality type among fraudsters is the "egotist" – individuals driven to achieve success at any cost, characterized by self-absorption, self-confidence, and often narcissism; narcissistic personality disorder entails a pervasive pattern of grandiosity, a strong need for admiration, and a lack of empathy for others. Individuals with this disorder tend to perceive themselves as superior or unique, often holding inflated views of their own accomplishments and abilities (Paulhus and Williams 2002). Vousinas introduces the S.C.O.R.E. model (The model is named using the acronym S.C.O.R.E., representing the

following words: Stimulus, Capability, Opportunity, Rationalization, and Ego.) to further dissect the major factors leading to fraud, underlining the behavioral psychology advancements in the field, especially the concept of ego (specifically inflated ego, bloated ego, excessive self-importance, grandiosity, overinflated self-esteem) (Vousinas 2018) (Vousinas 2019a). Vousinas i) suggests updating existing fraud models like the Fraud Triangle, Fraud Diamond, Fraud Scale, and MICE model to address the increasing frequency and severity of fraud incidents, ii) he proposes a new model, the S.C.O.R.E. model, which incorporates the concept of "Ego" as a significant factor driving fraud - his model, depicted in the Fraud Pentagon, iii) also includes collusion to better understand white-collar crimes, iv) introducing the S.C.O.R.E. model Vousinas aims to advance fraud theory by identifying key factors influencing fraud occurrence and serving as a theoretical reference for future studies and anti-fraud practice and actionable tools (Vousinas 2019b).

Ego can serve as a driving force behind fraud, as individuals may be motivated by a desire to maintain their reputation or position of power within their social circles or families, this pressure from society or family can strongly influence individuals to engage in fraudulent behavior simply to uphold their ego (Vousinas 2019b) (Kranacher et al. 2011). Stotland contends that a primary motivation behind white-collar crimes, which involve economic offenses via fraud, deception, or collusion, is the desire for a sense of superiority, mastery, and admiration from others, regarding ego, he suggests that as fraudsters achieve success in one criminal act, they derive secondary satisfaction from the realization that they are deceiving the world and demonstrating their superiority over others (Stotland 1977). Australian academics observed that aside from financial strain, ego also serves as a significant motivator for various types of fraud, this can manifest as a desire for power over individuals or situations, some fraud offenders are primarily motivated by the sensation of controlling others, to the extent that it becomes an end goal in itself (Duffield and Grabosky 2001). In academic research, it was proposed that among the primary motivators for fraud are the sense of entitlement and the pursuit of power or ego (Vousinas 2019b). It was also indicated that fraud can only be committed by individuals who possess a strong ego and have great confidence that they will not be detected (Pedneault et al. 2012). Furthermore, it was suggested by that ego emerges as a recurring theme in some of the most severe fraud cases in recent white-collar criminal history (Vousinas 2019b). Perfectionism is another prevalent trait among senior executives, often leading to excessively high standards and a culture of intolerance, i) this can breed resentment and hurt feelings, potentially leading to fraudulent behavior or creating an environment where fraud is overlooked, ii) additionally, traits like excessive nurturance needs and narcissism,

characterized by excessive self-reliance and distrust of others, can further exacerbate these issues (Ramamoorti et al. 2009). Murphy and Dacin develop a framework (reinforced by multiple theories relating to i)moral intuition and ii) moral disengagement, iii) rationalization, and the iv) negative affect) identifying three psychological pathways to fraud (settled within attitude and or rationalization: i) lack of awareness, i) intuition coupled with rationalization, and iii) reasoning), enhancing understanding of the psychological processes that might lead individuals to rationalize fraudulent acts as necessary (use rationalization to evade or lessen the negative affect that accompanies executing an unethical behavior); their Psychological Pathways, except from contributing to understanding fraud are also applied to fraud prevention mechanisms (Murphy and Dacin 2011).

Overall, though the Fraud Triangle is not considered a comprehensive theory of crime (Huber 2017) it serves as a fundamental basis for exploring the origins of fraud and acts as a valuable tool for external auditors, regulators, academics, business students, government employees, and general managers (Cheliatsidou et al. 2021). Over time, what is often referred to as "Cressey's Fraud Triangle has evolved and expanded, incorporating significant insights that enhance auditors' understanding of fraud and its various dimensions; notably, the elements of the Fraud Triangle have undergone changes from Cressey's original hypothesis as it was introduced to the emerging field of fraud examination (Morales et al. 2014).

5 Financial Reporting Misconduct Detection and Prediction Methods

5.1 Characteristics Predisposing Corporations to Be Labelled Fraudulent, Neutral or Non-Fraudulent

Fraudulent schemes exhibit a dynamic evolution, with the methodologies and instruments employed displaying significant interplay across various fraud categories, this interplay frequently complicates the task of discerning and distinguishing among disparate types of fraudulent activities (Europol 2021, pp. 59, 60). Throughout the existence of financial markets, market participants have endeavored to derive gains through deceptive practices (Leinweber and Madhavan 2001). There are numerous Financial fraud taxonomies. According to Siering et al. (2023), through three primary categories: i) Information-based manipulation, which involves the misuse of private information or the dissemination of false information to influence market prices (Allen and Gale 1992; Bagnoli et al. 2001); ii) Trade-based manipulation, which includes activities like wash sales or churning to create misleading market activity without genuine supply or demand change (Aggarwal and Wu 2006); and iii) Action-based manipulation, such as pump and dump schemes, where actions are taken to artificially inflate stock prices before selling off (Jarrow 1992). This classification aids in understanding the various mechanisms through which financial markets can be manipulated, emphasizing the importance of regulatory vigilance and sophisticated detection systems (Siering et al. 2023). Breslin's Root Cause Analysis (RCA) is a comprehensive process designed for identifying and understanding the fundamental factors behind a problem, which may manifest as a nonconformity (i) errors, ii) instances of noncompliance, iii) missed opportunities). It employs a suite of tools collaboratively rather than a singular approach, enabling the determination and rectification of the core issue to prevent recurrence, thus for fraud examiners, RCA is indispensable, as it distinguishes between i) genuine fraud and ii) misleading indicators caused by organizational challenges or changes, thereby ensuring i) accurate identification and ii) resolution of underlying issues. In the realm of fraud examination, the presence of RFs sometimes signifies potential organizational issues rather than fraud itself, serving merely as indicators for areas requiring investigation. Breslin's RCA emerges as a critical methodology for not only delineating the essence and causation behind such red flags but also for providing a framework to elucidate and rectify the foundational problems, whether fraud is detected or not, thus ensuring a comprehensive understanding and resolution of the underlying issues (Breslin 2022). The Author of this thesis, in 2022, as an ACFE Member, attended the ACFE workshops on Breslin's Root Cause Analysis (RCA) presented by the founder of the RCA –

Mary Breslin during the ACFE Maryland (the U.S.) Chapter #21 November 2022 Chapter Meeting.

Academic research has examined the impact of alternative risk assessment and program development tools on fraud planning effectiveness, focusing on the i) quality of audit procedures and ii) the propensity to consult fraud experts, and it found that i) the use of a standard checklist was associated with a less effective diagnosis of fraud, and ii) auditors with a standard audit program designed less effective fraud programs than those without such tools, without showing an increased willingness to seek expert consultation, iii) while fraud risk assessment (FRASK) did not lead to the planning of more effective fraud procedures, it was directly associated with an increased desire to consult with fraud specialists (suggesting a benefit of improved FRASK in promoting consultation), so these findings i) challenge the effectiveness of standard audit tools in fraud settings and ii) emphasize the need for a more strategic reasoning approach in situations of elevated risk (ASARE and Wright 2004). Numerous studies highlight the effectiveness of i) decision models and ii) expert systems, other iii) decision-aids in i) detecting fraud (FRM, management fraud) and also related issues such as including evaluating internal controls or governance mechanisms or fraud risk management or likelihood assessments (Pincus 1989; Persons 1995; Hansen et al. 1996; Eining 1997; Loebbecke et al. 1989; Bell and Carcello 2000; Lenard 2000). It was proven that internal control deficiencies and management's abilities to override it are the weakest spot or place of highest vulnerability of fraud prevention (American Institute of Certified Public Accountants 2016). Academia began to explain the use of statistical techniques in auditing by the 1950s (Vance, 1951). Discussions on balance sheet fraud followed in the 1960s (Fess, 1963; Chaps, 1966; Blake, 1967; Simon, 1965). It led to Altman's pioneering study using discriminant analysis for bankruptcy prediction, underscoring its utility in fraud detection through financial statement analysis (Altman 1968), this work aimed to integrate i) traditional ratio analysis with ii) sophisticated statistical methods, using financial ratios to achieve high prediction accuracy, thereby demonstrating the effectiveness of multiple discriminant analysis in financial applications, that subsequently began to flourish (Lenard and Alam 2009).

Going concern or bankruptcy modeling or financial distress detection tools and probability assessments often employ financial ratios (especially the classical models) (Lenard 2000; Altman 1968; Ohlson 1980). These models are pivotal in the evolution of fraud detection methodologies for two principal reasons: i) bankruptcy may ensue from fraudulent acts, and ii) entities seeking bankruptcy protection are subject to intensified fraud investigation given the heightened incentive to commit fraud in financially precarious conditions (Johnson, 2008). The

inception of models specifically tailored for fraud detection started in the 90s and early 2000s (Persons 1995; Lenard and Alam 2009). Speech analysis for fraud detection (HOBSON et al. 2012), accrual anomalies (Pincus et al. 2007). Bankruptcy classification errors were under academia's scrutiny (e.g., via an empirical analysis of common models such as Altman's or Ohlson's) (Begley et al. 1996), as classification errors issues are a significant challenge.

There are detection and prediction tools such as a Pioneer red flags approach for fraud detection (Pincus 1989). However, red flags establishment is not an easy procedure as they are rooted in the literature in the cause-and-effect schema, yet literature is often non-unanimous regarding numerous characteristics and relationships of factors that predispose a PTC to be fraudulent or predispose not to be fraudulent. Conclusions and outcomes presented in the international literature concerning the relationship of risk and corporate disclosure are varied and non-unanimous at best (Akhigbe et al. 2008), as some show: i) a negative relationship between market betas and firm-level CD (see Barry and Brown, 1985; Cheng, Collins, and Huang, 2003), some on the contrary ii) a positive relationship (see Botosan, 1997; Botosan and Plumlee, 2002), similarly divergently, some studies presented: iii) a negative connotation between CD quality and total- or idiosyncratic- risk (McNichols and Manegold, 1983; Kim and Verrecchia, 1994; Sengupta, 1998; Fischer and Verrecchia, 1999), while some opposingly iv) a positive association (Ross, 1989; Bushee and Noe, 2000). Likewise, the relationship between degrees of firm-level CG and risk mixed and non-unanimous, as there are instances presented of v) a negative relationship between market risk and CG measures (see Chen, Steiner, and Whyte, 1998; Chen, Chen, and Wei, 2003), whereas others showed contradictory results vi) a positive relationship (see Badrinath, Gay, and Kale, 1989; John, Litov, and Yeung, 2005), also research exposed a negative association between firm-level CG and total- or firm-specific risk (Badrinath, Gay, and Kale, 1989; Aggarwal and Rao, 1990; Bagnani, Milonas, Saunders, and Travlos, 1994; Chen, Steiner, and White, 1998; Bhojraj and Sengupta, 2003; Anderson, Mansi, and Reeb, 2004), while there are opposing findings suggesting vii) a positive association (Xu and Malkiel, 2003; John, Litov, and Yeung, 2005).

CG indices are commonly used as proxies for CG quality, inversely related to PTCs' propensity to engage in fraud (as discussed in Chapter 3). These indices can be employed either individually or as variables in models aimed at explaining the likelihood of accounting irregularities, dubious practices, and outright fraud and entail BoD structure-, ownership concentration-, shareholders rights-, and executive compensation-, audit committee- features, e.g. Gompers' G-Index, DeFond's index, and Lohwasser and Zhou's index (Gompers et al. 2003; DeFond et al. 2005; Lohwasser and Zhou 2023). For a more detailed explanation, please refer

to Chapter 3. Board structure features encompass BoD independence, BoD size, CEO duality, etc., while ownership concentration features include ownership of institutional investors, top largest shareholdings, and similar proxies, and shareholders' rights regard mostly shareholder-friendly provisions and Disclosure and transparency measures, including FS quality (Gompers et al. 2003; DeFond et al. 2005; Lohwasser and Zhou 2023). Numerous fraud-risk assessment and anti-fraud data-driven tools, tests, models, and procedures encompass the use of non-public data, inside corporate information, however such data sets are only available to some limited amount of parties, such as insiders of the corporation: internal audit, internal controls, hired by the corporation: external auditors, certified fraud examiners, fraud auditors, forensic accountants, or law enforcement and other bodies (according to i) their jurisdiction and ii) the phase of the enforcement action, iii) other legal considerations, such as subpoena) (ACFE and COSO 2023; ACFE 2022d). FRM, innately, by its nature, is problematic to detect, furthermore, coupled with multifaceted, composite computerized accounting systems joined with the convoluted, sophisticated schemes employed to perpetrate financial reporting crimes, make it further more arduous, complicated, and tough to detect (Munter 1995). The control of FRM is not a settled matter, as it evolves along with the CD, whereas CD evolves as well accordingly to the society's needs, which it serves (Cooke 1987).

The complete elimination of all instances of fraud would probably never be achieved, nonetheless, definitive preventive measures and detective techniques are crucial to mitigating FFR occurrence and pro-active techniques enabling early detection, in the initial stages when FFR occurs, therefore allowing for harm and loss diminishment (Munter 1995). Detection is an essential step in fraud investigation because the speed with which fraud is detected—as well as the way it is detected—can have a substantial impact on the magnitude of the fraud. It is also an important component of fraud prevention because fraud examiners can take steps to improve how they detect fraud within their organizations. As a result, this might increase staff's perception that fraud will be detected and possibly deter future misconduct (ACFE 2022c, pp. 20–23). Auditors shall be i) impartial, ii) independent, iii) exercise due professional care, including appropriate levels of skepticism, and their independence has two facets i) in fact and ii) in appearance, however only simultaneous existence can enable the credibility check of the financial statements, however, there is a plentitude of evidence from enforcement actions, against auditors, alleging auditors' violations regarding the impairment of the auditor's independence from audit clients (Stoltzfus 2023) (New York State Society of CPAs 2023). In the U.S., the supervisory models differ also in the sense that PCAOB's standards are overseen by the SEC, and PCAOB as well has established a position of an investor advocate within the

agency, and PCAOB's proactive strategic plans are disseminated to the public to receive public comments (Stoltzfus 2023). Oversimplistic, understanding-deficient, context-deficient, or cause-and-effect-deficient data insights ('blindly trusting data') are often hindrances that prevent deriving valuable conclusions from data analytics, also, as market practice of fraud prevention and detection shows, it is often much easier to model against a good client or non-fraudulent entity or employee versus a fraudster or fraudulent entity (Lenderman 2023).

The issue of FRM detection and/or prediction tools from the perspective of research methodology essentially has two layers: (1) the identification of theoretically grounded, statistically significant variables that correlate with FRM at a standalone level (among the selected potential variables based on the literature), i.e., "FRM-sensitive ratios" (Konsiantis et al., 2006), considering the specific conditions of the study (characteristics and environment specific to the country); and (2) the construction and verification of a comprehensive model consisting of a set of variables collectively forming the most accurate model after assessing model fit. Interestingly, the literature in this field has shown that, depending on the country under consideration, commonly accepted methods (e.g., Genetic Algorithms, Support Vector Machines, Text Mining, Standalone Red Flags) exhibit highly diverse accuracies (Hajek, Henriques, 2017, p. 141), highlighting the significance of constraints, challenges, and issues in the FRM literature that researchers continue to grapple with (Amiram et al., 2018). The application of FRM determination models tailored to the country and their high effectiveness is becoming evident in contemporary international English-language academic literature (CIELAL), meaning publications are internationally accessible and available due to being written in English, yet they also deliver country-relevant, highly fine-tuned, country-specific insights as they are performed by local academia. Local markets, especially EMs, are characterized by the evolution of local institutions. Thus, in the study of the area of reporting obligations, there remains a research gap, especially evident in research on FRM and their detection (Murcia, Borba 2007; Kanapickiene, Grundiene 2015, Yao et al. 2019). Filling this gap is significant, as there is insufficient coverage of this area in contemporary international English-language academic literature (CIELAL), especially from the CEE region (Albu et al., 2017). Studies of emerging markets (Turkey - Ozcelik, 2020; China - Yao et al., 2019; Indonesia - Yendrawati et al., 2019; Zainduin, Hashim, 2016; Taiwan - Jan, 2018; Malaysia - Hasnan et al., 2013; South Korea - Ryu et al., 2015; Taiwan - Chen et al., 2014; Huang et al., 2014; Vietnam - Hung et al., 2017; Brazil - Murcia, Borba, 2007; CEE: Lithuania - Kanapickiene, Grundiene, 2015) are critical to this understanding

5.2 Fraud Detection and Examination: the Anti-Fraud Profession and The Association of Certified Fraud Examiners

Following the global financial crisis in the early 2000s, there has been significant interest in fraud, particularly in methods for its detection and prevention, from academic scholars (Albrecht and Albrecht, 2004), professional organizations (Center for Audit Quality (CAQ), 2010), and government officials (Asare and Wright, 2004). Financial fraud is inherently challenging to detect (Higson, Kassem, 2012, p. 191), and there is a growing interest in the more effective detection and prediction of such fraudulent activities (Yendrawati et al., 2019; ACFE, 2018; PWC, 2018; Albrecht et al., 2015; Mantone, 2013; Abbasi et al., 2012; Beasley et al., 2010). Every economic organization, including those in sports and charitable sectors, is at risk of fraud and corruption globally (Ohalehi, 2019; Kihl, 2018; Kihl, et al., 2018; Kihl, et al., 2017; Kihl, et al., 2020; Archambeault, et al., 2015). Such malpractices lead to a decrease in public trust due to their impact on the legitimacy of these institutions, alongside issues of political scandals and government corruption (Cooper, et al., 2013). Typically, firms are held accountable more often than individual employees for misconduct, supporting market corrections once misbehavior is disclosed (Choi and Pritchard 2016). Only a small fraction of white-collar crimes are detected (Becker 1968) by regulators, analysts, shareholders, whistleblowers, etc., with an unknown probability of detection; in fact, only 3.5% of financial misrepresentations are eventually discovered and penalized (Alawadhi et al. 2020). Consequently, our understanding of financial misconduct is largely based on the characteristics of the firms that are caught, which may differ from those that commit fraud without being detected (Amiram et al., 2018; p. 738). Alawadhi et al.'s basic logistic model suggests that i) in a typical year, 22.3% of firms listed on Compustat are involved in FRM that could be subject to regulatory sanctions, ii) the average duration for these violations is 3.1 years, indicating that each year, about 7.2% of firms begin financial reporting practices that could potentially be sanctioned, iii) out of these firms, 3.5% are ultimately penalized by regulators (Alawadhi et al. 2020).

There is deliberate research into effective ways and methods of identifying entities currently engaged in or likely to engage in fraudulent activities (Yao et al., 2019; Jan, 2018; Zainudin, Hashim, 2016; Wuerges, Borba, 2014; Murcia, Borba, 2007). The past two decades of financial reporting misconduct (FRM) literature have been characterized by particularly intense attempts to seek and implement new methods, and subsequently to develop new, increasingly effective, more accurate, and optimal (in terms of cost and technology) models for

predicting, detecting, or early warning of FRM, as evidenced by the review literature on FRM detection methods (Jan, 2018; Hajek, Henriques, 2017; Spathis, 2002; Beasley, 1996). In the area under examination, models of the "FRM detecting and predicting" class, aimed at early detection and/or prediction of FRM occurrences, are based on variables known as red flags, which have predictive power (Feroz et al., 2000), also referred to as detection power (Fanning, Cogner, 1998). Predictive models are models whose purpose is to correctly predict future or new observations based on these models. Prediction is defined as the "process of econometric inference about the future" based on a model that defines and identifies relationships between the predicted value and the influencing factors (Sagan, 2016, p. 41). Unlike errors, financial fraud is associated with intensive attempts to conceal (Mantone, 2013; Hogan et al., 2008; Desai et al., 2006; Albrecht, Hoopes, 2014) and is itself unobservable. Directly, only their symptoms, known as red flags, can be observed (Albrecht et al., 2015).

Red flags are signals that may indicate (1) a propensity for an entity or its representatives to engage in FRM, and (2) the functioning of an entity in an environment conducive to or even forcing FRM. They are used in the literature as indicators in the form of variables for statistical models determining the likelihood of financial fraud (Albizri et al., 2019; Yao et al., 2019; Yendrawati et al., 2019; Yen, 2013; AICPA, 2003; Feroz et al., 2000; Beneish, 1997; Dechow et al., 1996). Two areas dominate the models for detecting FRM: financial literature employing financial indicators (Zainudin, Hashim, 2016; Kanapickiene, Grundienie, 2015; Wuerges, Borba, 2014; Bragg, 2007) and corporate governance and CSR literature using non-financial indicators (Porettia et al., 2018; Hasnan, 2013 et al., Yen, 2013; Bell, Carcello, 2000). Foreign studies have indicated the simultaneous impact of both categories of indicators (Albizri et al., 2019; Yao et al., 2019; Rezaee, Riley, 2010, 2005; Moyes, 2008; Apostolou et al., 2001). However, not many comprehensive models have been created, especially for emerging markets, as research into FRM tends to separate these categories (Healy, Wahlen, 1999; Yen, 2013; Kanapickiene, Grundiene, 2015; Zainudin, Hashim, 2016). The Polish literature has so far identified only a few areas of risk and FRM signals based mainly on internal information or financial analysis, dedicated solely to auditors/experts (Fadilah et al., 2019; Burchart, Lelusz, 2018; Baryła, 2017; Lew, 2017; Movchan, Wolska, 2017; Żukowska-Kalita, 2017; Petryk, 2010; Hulicka, 2008). Through an extensive analysis of the history of each fraud, the parties involved in the disclosure of the fraud were identified by academics, so to gain a better understanding of the active role of these fraud detectors, the sources of information utilized by the detectors and the incentives faced by them in revealing the fraud were examined, revealing that fraud detection rests upon a wide variety of actors (‘often improbable’ (Dyck et al. 2010));

it is a complex web of market actors that complement each other, private enforcement (SCALs and other lawsuits), public enforcement (AAERs, criminal proceedings), insiders (mostly employees), contracting parties, transacting parties, media, analysts, investors, regulators (Dyck et al. 2010, 2007). In general, the overall tone of outcomes stays in line with ACFE's cyclical diagnosis presented in the globally acknowledged RTTN series Reports to the Nations (ACFE 2010, 2020, 2022c). However, there are some divergences, as related to the sampling, that is i) database, ii) proxies for FRM, iii) definition of FRM, iv) timespan, v) other methodological specificities (ACFE 2010, 2020, 2022c) (Dyck et al. 2010, 2007). ACFE's insights from RTTNs are overall consistent over time and deliver a certain picture of occupational fraud (from a global perspective, over 120 countries, across over 20 industries): i) fraud schemes can be very problematic to detect (frequently are long-lasting before the discovery), ii) Occupational fraud is enormously costly in financial and non-financial terms, iii) TCRs (internal and external whistleblowing) are the most effective way to detect fraud (three-fold more effective than the second-best method), iv) anti-fraud controls deliver a measurable positive effect (correlated to lesser fraud losses and earlier fraud detection), v) high-level perpetrators do the most harm and damage (ACFE 2018b). Likewise, i) FSF persists to be the most costly form of occupational fraud, ii) TCRs (whistleblowing) made over 40 pct. of fraud initial detection sources, half of them were initiated by insiders (employees), however, second, third and fourth most common whistleblowers' clusters were external parties such as contractors (customers, vendors) and anonymous (ACFE 2022c, 3, 20-23) ii) internal audit and managerial review are second- and third-common sources, whereas external audit resides at the bottom of frequency, making up only for about 4 pct. (ACFE 2022c, pp. 21–22).

Equally unconventional (or 'interesting' as (Dyck et al. 2007, p. 2) commented) is the absence of stock exchange regulators, commercial banks, and underwriters in the detection of corporate fraud, this observation implies that this mechanism cannot operate in isolation but instead relies on another extensive set of institutions to aid in uncovering fraud (Dyck et al. 2007). The ACFE RTTN's data indicates that certain methods of fraud detection demonstrate superior effectiveness in their correlation with reduced fraud losses, and there is an association between the detection method and the duration and extent of the respective fraud scheme (ACFE 2020, pp. 20–21). A focus can be placed on studying the data on the duration of the fraud to infer which mechanisms are more efficient in revealing fraud (i) frequency of detection, ii) 'average speed of detection' (Dyck et al. 2007, p. 2)), and they mostly are linked to incentives (both i) positive - reward and ii) negative – adverse consequences and sanctions, in terms of i) monetary, ii) market- or career- related (DYCK et al. 2007, p. 3)) (Dyck et al. 2007). The

proactive detection of fraud typically leads to faster identification and subsequently results in reduced losses, while passive detection is associated with longer fraudulent schemes and heightened financial damage to the victim, thus anti-fraud controls serve as mechanisms that can enhance the effectiveness of occupational fraud detection (ACFE 2020, p. 20). The Dyck et al. whistleblowing paradox was formulated: those with weaker incentives, like employees, are more proactive, whereas those with stronger motives, such as short-sellers, are surprisingly less active (this reflects Hayek's concept of diffuse information (Hayek 1945)) limited incentives provide an advantage in whistleblowing due to superior access to fraud-related information, leading to the exposure of fraudulent activities, conversely, stronger incentives encounter challenges in accessing reliable information for action (Dyck et al. 2007). The timely and methodical detection of fraud holds critical implications for the magnitude of the fraudulent activity, highlighting the significance of the concept within fraud investigation, despite the proliferation of sophisticated fraud detection methodologies at the disposal of organizations, the prevalent mode of uncovering occupational frauds in the RTTN study, by a substantial margin, was through tips (43 pct., only source amounted over 15 pct.) (ACFE 2020, pp. 18–19), consistent with findings from previous reports (ACFE 2010, 2016b, 2018a).

Notably, over 40 pct. of cases in the RTTN study were brought to light via tips, representing nearly three times the frequency of the next most common detection method (ACFE 2020, 18, 19). Consistent with RTTNs and related and supplementary (due to diverse areas of research, i.e., there are common intersections, however in large parts each series vary due to specific topics coverage) findings can be found in the PwC series GECaF, COSO's Fraudulent Financial Reporting series, Deloitte Forensic Financial Statement Fraud series (Beasley et al. 2010; Beasley et al. 1999; PwC 2022a; PwC Switzerland 2018; PwC 2018b, 2018b; Deloitte Forensic Center 2009). Merely 6 pct. of the FRM instances were disclosed by the SEC and 14 pct. by the auditors, yet key monitoring agents encompass the media (14 pct.), industry regulators (16 pct.), and employees (19 pct.), also the pre-SOX Era and SOX Era discern two diverse states of art, as during the first one a mere 35 pct. of the cases were brought to light by entities with an explicit mandate, while during the latter, the efficacy of these designated entities improved, yet they still account for slightly more than 50 pct. of the cases (cases no later than 2004) (Dyck et al. 2010, 2007). No singular entity (external actor) exercises overarching influence or dominance in the revelation of fraudulent activities and the significant function performed by individuals not directly engaged in investment markets was evidenced (Dyck et al. 2007). An alarming fact, regarding detection and the low ratio of auditors' efficacy, is that ACFE's RTTN for the 2020 study showed that fraud cases investigated within this study

in over 80 pct. of instances were not identified as suspicious or fraudulent in independent audits (Kaminski and Hogan 2023, p. 1). By utilizing data on the duration of fraud, the timing of revelation can be examined to deduce which mechanisms are more effective in disclosing fraud (Dyck et al. 2007).

5.3 Red Flags for Financial Reporting Misconduct

AAERs are used to distinguish between FRM and non-FRM (Cecchini et al. 2010b). The world-known Fraud Score Model ('F-Score') is designed to predict accounting misstatements in the form of a scaled logistic probability, where values greater than 1 (one) indicate a greater likelihood of such a misstatement (Dechow et al. 2007). AAERs can provide hundreds of fraud firms (FRM), especially when the AAERs' span selected for the research is extensive, as it may span across a few decades due to vast and public AAERs data availability, e.g., from the 80s up till current periods (Cecchini et al. 2010b; Dechow et al. 2007). Institutions and enforcement agencies such as the SEC, the PCAOB, the FASB, and even the financial media all play an important role in preventing, detecting, and reporting accounting manipulations (SEC, 2008). Unfortunately, some foreign markets either completely lack comparable institutions, or their effects are negligible (Skousen and Twedt 2009, p. 5). There is a 'database challenge' in FRM research, involving databases and proxies challenges (Karpoff et al. 2017c). AAERs disclose that most corporations manipulate more than one account (e.g., manipulations in revenues, reserves, CoGS) (Dechow et al. 2008, p. 2).

Relatedly, numerous AAERs express PTCs' involvement in breaches or other violations of the securities laws, including SEC rules (Cecchini et al. 2010b). Typically, AAERs are for a 'single fraud-company instance,' and each fraud-company instance may include numerous AAERs (Cecchini et al. 2010b, p. 1151). AAERs are employed in U.S. FRM detection research most often as an FRM subsample (Hajek and Henriques 2017, p. 141; Gray and Debreceny 2014). AAERs are alleged FRM instances where the issuance of AAERs is preceded by a comprehensive investigation and additional procedures (Hajek and Henriques 2017, p. 141). The AAERs-based approach is acknowledged to have numerous advantages, including i) straightforwardness and consistency (circumventing subjective categorization bias), ii) high information relevance (material, important cases), iii) high confidence (strong evidence-based, including whistleblowers', insiders', and experts' information), and iv) a low percentage of observations that do not induce or propel enforcement actions for FRM compared to other sources and databases (Hajek and Henriques 2017; Dechow et al. 2007; Karpoff et al.

2017c; Amiram et al. 2018). Regarding the determination of the likelihood of FRM in PTCs when researched across a variety of EMs, it was shown that this likelihood differs significantly among EMs, with high divergence from industry to industry and significant variation (as assessed with Dechow et al.'s Fraud Score and its standard deviation (Dechow et al. 1996; Dechow et al. 2008)). Some countries performed tremendously well in one industry, only to exhibit unusual riskiness the following year (Skousen and Twedt 2009). Fraud can and often does extend for several years, so some researchers treat each year of fraud as a company-year, resulting in higher fraud company-years than if periods were not treated in such a manner. For dataset crafting, it is sometimes constructed so that each company-year includes two years of data, one fraud and one non-fraud, usually before the fraud (Cecchini et al. 2010b). "Accounting manipulation is a type of fraud whereby executives of a firm distort or change financial statement information to portray a falsely positive image of their company" (Dechow et al. 2008, p. 301-302). Dechow et al. found that almost 15 percent of manipulating corporations were in the highest market capitalization (top 10 percent), in line with the SEC's procedures regarding the investigation of large corporations, as they have greater potential for material harm and more impactful damage to a larger group of investors and the general public (Dechow et al. 2008, p. 2). One-to-one matches of FRM and non-FRM are no longer commonly employed but were sometimes used in the 90s FRM detection/prediction research (e.g., Green and Choi 1997; Summers and Sweeney 1998).

Nonetheless, the argument of fraud-occurrence-frequency (as discussed by Beneish regarding earnings manipulation (Beneish 1999)) suggests that the one-to-one match approach does not adequately 'mirror reality' (Cecchini et al. 2010b, p. 1152). When SVM and LR techniques were employed to develop fraud detection models for Taiwan public companies, models enclosed five clusters of variables: all, filtered, financial, CG indicators, and the Z-score. It was found that filtered variables-SVM were most suited for detection with a span of one year prior to the fraud outbreak, while SVM with all variables was best suited for an advance of two years (Huang 2013). The ratios employed for FRM: non-FRM matching are diverse across studies, and the method accuracy ratios are different across studies and countries (Hajek and Henriques 2017, p. 141). The divergence of ratios and sample headcount differs across countries, a natural consequence of local market specificities and their innate characteristics (development stage, size, depth, liquidity of the market, socio-legal considerations), as well as auditing and reporting standards and their enforceability. These factors shift over time and vary among countries, making it difficult and problematic to compare the accuracies of FRM models and FRM samples across studies (Hajek and Henriques 2017).

They are also dependent on the method chosen for the fraud detection studies. Even when comparing a certain cluster of comparable methods, e.g., 'intelligent FRM detection' methods, the FRM sub-sample and non-FRM sub-sample and summarized FRM and non-FRM sub-samples are far from homogeneous, ranging up to almost sixteen thousand companies (Hajek and Henriques 2017, p. 141). Dechow et al. (2008) variables for manipulation PTCs include "accrual quality; (ii) financial performance; (iii) non-financial measures; (iv) off-balance sheet activities; and (v) market-based measures" (Dechow et al. 2008).

The issue of FRM detection and/or prediction tools from the perspective of research methodology essentially has two layers: (1) the identification of theoretically grounded, statistically significant variables that correlate with FRM at a standalone level (among the selected potential variables based on the literature), i.e., "FRM-sensitive ratios" (Konsiantis et al., 2006), considering the specific conditions of the study (characteristics and environment specific to the country); and (2) the construction and verification of a comprehensive model consisting of a set of variables collectively forming the most accurate model after assessing model fit. Interestingly, the literature in this field has shown that, depending on the country under consideration, commonly accepted methods (e.g., Genetic Algorithms, Support Vector Machines, Text Mining, Standalone Red Flags) exhibit highly diverse accuracies (Hajek, Henriques, 2017, p. 141), highlighting the significance of constraints, challenges, and issues in the FRM literature that researchers continue to grapple with (Amiram et al., 2018). The application of FRM determination models tailored to the country and their high effectiveness is becoming evident in contemporary international English-language academic literature (CIELAL), meaning publications are internationally accessible and available due to being written in English, yet they also deliver country-relevant, highly fine-tuned, country-specific insights as they are performed by local academia. Local markets, especially EMs, are characterized by the evolution of local institutions. Thus, in the study of the area of reporting obligations, there remains a research gap, especially evident in research on FRM and their detection (Murcia, Borba 2007; Kanapickiene, Grundienie 2015, Yao et al. 2019). Filling this gap is significant, as there is insufficient coverage of this area in contemporary international English-language academic literature (CIELAL), especially from the CEE region (Albu et al., 2017). Studies of emerging markets (Turkey - Ozcelik, 2020; China - Yao et al., 2019; Indonesia - Yendrawati et al., 2019; Zainduin, Hashim, 2016; Taiwan - Jan, 2018; Malaysia - Hasnan et al., 2013; South Korea - Ryu et al., 2015; Taiwan - Chen et al., 2014; Huang et al., 2014; Vietnam - Hung et al., 2017; Brazil - Murcia, Borba, 2007; CEE: Lithuania - Kanapickiene, Grundiene, 2015) are critical to this understanding

FRM and contemporary considerations for FRM patterns and prediction: Men are twice as likely to commit fraud as females. (Albrecht, Kranacher, Albrecht, ACFE Research Institute Research, Research White Paper for the Institute for Fraud Prevention). Business ethics suggests women are typically more ethical than men (Ibrahim and Angelidis, 2008; Marta, Singhapakdi, and Kraft, 2008). In the studies conducted by ACFE RTTN (Report to the Nations on Occupational Fraud mentioned in this thesis at an earlier place), it was observed that more than 70% of the perpetrators are identified as males. Furthermore, a significantly larger median loss is incurred by men compared to women (ACFE 2020). This finding is in line with past cyclical RTTN studies conducted by ACFE, all of which have consistently revealed a significant gender disparity in both the i) frequency and ii) loss associated with fraud (ACFE 2010, 2018a, 2022c, 2016a). However, the median loss gender gap is shrinking (ACFE 2022c, 18, 51). There was a substantial variation in the gender distribution of occupational fraudsters across different geographic regions (ACFE 2020, 2022c, 2018a). When comparing the U.S. and Canada region to the Region of Western Europe and Eastern Europe and Asia region (as delineated by the ACFE in their RTTNs research and related work), the gender distribution of perpetrators was even more male-dominated (ACFE 2022c, 2020, 2018a). For instance, in the Eastern Europe and Western/Central Asia region, there was a notable imbalance with 81% male perpetrators and 19% female perpetrators; and similarly, Western Europe followed the pattern with 73% male and 27% female perpetrators (ACFE 2020, p. 43). The distribution of fraud perpetrators' ages in our study exhibits a bell curve, with the majority of frauds (54%) being committed by individuals aged between 31 and 45, while the median loss consecutively increases with the age of the perpetrator from 31 y/o up till over 60 y/o (ACFE 2022c, p. 54). For a review of gender and criminal thinking among individuals convicted of WCC, see (Benson and Harbinson 2020), for a gender-specific lens towards WCC, see (Galvin 2020).

Also, (Goulette 2020), and for a general role of gender in WCC, especially via the lens of emancipation and focal concerns, (Gupta et al. 2023). White-collar crime and first-time adult-onset offending: Explorations in the concept of negative life events as turning points (Engdahl 2015). Singh’s Offender Predictive Validity refers to the predictive validity that pertains to the ability and accuracy of a risk/needs assessment to predict an individual’s likelihood of engaging in future violent and/or criminal behavior (Goulette 2020). The predictive validity of violence risk assessments is analyzed through two elements: calibration and discrimination (Singh 2013). Calibration denotes the alignment between a risk assessment tool's predicted risks and the actual observed risks, while discrimination indicates the tool’s effectiveness in distinguishing between individuals who became violent and those who did not (Cook 2007).

Yet the commonly used measure, the area under the receiver operating characteristic curve (AUC), assesses discrimination but overlooks calibration, offering only a partial view of predictive validity. Future solutions shall incorporate various performance indicators to capture different aspects of predictive validity, for a review of indicators see (Singh 2013). Although the risk-need-responsivity (RNR) principle model has been a cornerstone of correctional treatment for nearly four decades (Goulette 2020) (Harbinson et al. 2019), some researchers contend that it may not be fully applicable to specific groups, such as women or individuals convicted of white-collar crimes. Also, research examining risk scores for men and women convicted of federal white-collar crimes and placed under community supervision has revealed significant gender differences, thus there is the potential necessity for gender-specific risk-needs assessment tools, particularly for women convicted of white-collar offenses (Goulette 2020). The term "pink-collar offenders" was introduced to the academic world at the dawn of the 1990s (Daly 1989) and it pertains to women committing WCC in their professional environments (Daly and Chesney-Lind 1988) (Daly 1989). Kamaei and Abolhasani (2020, p. 431).

In the 2020s, academics pointed out a key aspect of WCC, noting that Sutherland's original definition primarily considered only men as WC offenders, thereby excluding women. Although Sutherland's definition aimed to equally acknowledge women in the context of white-collar crime, the actual number of cases involving women at that time was notably low (Gupta et al. 2023). The term Pink-Collar-Crime and Criminal is well-known in the CFEs environment. The author of this thesis, as the ACFE Member No.998977 and a member of ACFE's sub-group the ACFE Women in the Anti-Fraud Profession Group, attended a webinar for Certified Fraud examiners and other ACFE Members, hosted by the ACFE, titled "Brand as a CFE" held online on April 17, 2024, for ACFE members from the ACFE Women in the Anti-Fraud Profession Group, where the guest lecturer was a CFE community pioneer in pink-collar-crime, the well-known Kelly Paxton, CFE. A certificate was provided. The term pink-collar crime (PCC) and research on female offenders prove that women were and are involved in WCC (Daly 1989) (Gupta et al. 2023), though there is i) gender motive variability and ii) gender willingness variability (Gupta et al. 2023), iii) as well as ACFE's cyclical RTTN's data on WCC picturing women being the culprits of WCC less often than men (statistically), though the gap is shrinking (ACFE 2010, 2016a, 2020, 2022c). As long as barriers like the glass ceiling impede women's advancement to senior roles, they have fewer chances to engage in white-collar crime (WCC) (Dodge 2009; Langton and Piquero 2007). The small proportion of female offenders in EMs is often attributed to gender-specific career barriers and organizational roles, including the 'glass

ceiling in organizations' (Kolade and Kehinde, 2013). Nonetheless, the ACFE statistical data exhibits that the percentage of females who commit occupational frauds within the whole group of WCC offenders is significant across all continents and is constantly rising, moving towards closing the occupational fraud gender gap (ACFE 2010, 2016a, 2020, 2022c). It is consistent with the criminology literature on the evolution of women's engagement in crime (perpetrators, victims, whistleblowers) and the reasons behind their increased participation in corporate, political, and professional offenses (on developed markets especially) (Dodge 2009).

The Insider Transactions Data Sets are i) records documenting transactions conducted by Directors and Officers (D&Os) on their financial instruments associated with their employment, especially regarding PTCs, ii) governed by legal norms that often mandate senior executives, directors, and large-block holdings (and any beneficial owners of more than ten percent of a class of the company's equity securities) the company insiders to submit both initial and continuous filings detailing their holdings of company stock, it includes the obligation to report the majority of their transactions involving the company's stock and related instruments, iii) in the U.S. the SEC DERA (U.S. Securities and Exchange Commission Division of Economic and Risk Analysis) provides comprehensive documentation outlining the scope, organization, file formats, and table definitions of Insider Transactions, that are readily available to the public in XML format in the EDGAR system and as comprehensive data sets compiled by SEC DERA (SEC DERA 2023a) (SEC DERA 2023b, pp. 1–7). Also available in commercial databases formats .json, .csv .xml supplemented with tools for data analysis, e.g., Refinitiv 'Insider Trading and Holdings Data' (LSEG Data & Analytics 2023b) or StarMine's Insider Filings Model US that uses insider holdings and insider trades to determine the overall sentiment of insiders towards their company and provides scores and indicators. The insider model exploits the information advantage of insiders to predict future stock performance while maintaining a low correlation to all other standard quantitative factors (LSEG Data & Analytics 2023a).

These transactions include e.g., grant, award or other similar acquisition, conversion of derivative security, disposition to the issuer of issuer equity securities pursuant to legal norms, expiration of short derivative position, payment of exercise price or tax liability by delivering or withholding securities incident to the receipt, exercise or vesting of a security issued in accordance with specific legal norms, bona fide gift, expiration (or cancellation) of long derivative position with value received, discretionary transaction in accordance with specific legal norms resulting in the acquisition or disposition of issuer securities, other acquisition or disposition (describe transaction), small acquisition under specific legal norms, exercise or

conversion of derivative security exempted pursuant to specific legal norms, exercise of out-of-the-money derivative security, open market or private purchase of non-derivative or derivative security, open market or private sale of non-derivative or derivative security, disposition pursuant to a tender of shares in a change of control transaction, acquisition or disposition by will or the laws of descent and distribution, exercise of in-the-money or at-the-money derivative security, deposit into or withdrawal from voting trust (SEC DERA 2023b, p. 5). There are studies on motivation for FRM as to generate profits from insider trading on the knowledge that equity price is temporarily increased owing to FRM, e.g., Beneish (1999b), Peng and Röell (2008), for an elaboration see (Amiram et al. 2018 p.750). In the literature, an increase was observed in both net insider selling and the exercise of stock appreciation rights during periods characterized by earnings overstatements (Beneish 199b), likewise corroborating evidence was presented indicating an elevated level of insider selling in firm-years subject to securities class-action lawsuits (Peng and Röell 2008). In Poland, the nomenclature "Notyfikacje insiderów" is used by the KNF Polish Financial Market Supervisor (KNF 2019). The nomenclature 'Transakcje insiderów" is employed by the Association of Stock Issuers (Stowarzyszenie Emitentów Giełdowych SEG) (SEG 2023). The MAR Regulation introduces the obligation to publicly disclose information about insider transactions i.e., individuals holding key roles at the issuer (persons discharging managerial responsibilities "PDMR"), as well as individuals and entities related to them (persons closely associated "PCA"). (ESMA 2021; Reg (EU) 596/ 2014).

This obligation is fulfilled through the issuer, which forwards the notification received from the obligated person to the public, and for control purposes, such notification is also sent by the obligated person to the Polish Financial Supervision Authority (KNF) (SEG 2023). The method of notifying transactions by persons discharging managerial responsibilities and persons closely associated with them to the issuer should be regulated within the issuer's internal procedures (KNF 2019), while complying with the requirements of the Regulation (EU) 2016/523 (technical standards with regard to the format and template for notification and public disclosure of managers' transactions) (Commission Implementing Regulation (EU) 2016/523 2016). As for the method of submitting notifications of transactions to the Polish Financial Supervision Authority (KNF), starting from January 1, 2020 (KNF 2019), the notification obligation under Article 19 of the MAR Regulation (Reg (EU) 596/ 2014) must be fulfilled exclusively through an electronic form provided by the Polish Financial Supervision Authority (KNF) (KNF 2019). For an elaboration of the notification obligations of shareholders related to changes in the total number of votes and persons discharging managerial responsibilities in

public companies in Poland, see (Olszak and Plutecki 2018a, 2018b). For an Acquis Communautaire (the EU acquis) regarding insiders' notifications, see core legal acts as e.g., (Reg (EU) 596/ 2014) (Commission Implementing Regulation (EU) 2016/523 2016) as well as (Commission Delegated Regulation (EU) 2016/522 2016, 2019), relevant authorities issuances e.g., (ESMA 2021), and academia's research on the EU financial market abuse, financial crime enforcement and sanctions e.g., (Wilson 2015) and the notion of a road towards integrating model of criminal and administrative proceedings regarding market abuse e.g., (Luchtman and Vervaele 2014). The notification of insider transactions is a preventive measure against market abuses, especially the misuse of confidential information. The disclosure of information about these transactions can also serve as a valuable source of information for investors, and it provides an additional means of market surveillance by the relevant authorities (SEG 2023). Most recently, in the second half of 2022 novel regulations (CIR (EU) 2022/1210 2022) (CIR (EU) 2022/365 2022), came into effect, establishing technical standards for the purpose of implementing Regulation (EU) No 596/2014 (Reg (EU) 596/ 2014) regarding lists of persons with access to inside information and their updates (Wojnar et al. 2022).

The Implementing Regulation (EU) 2022/1210 (CIR (EU) 2022/1210 2022) was issued in response to changes in the MAR (Reg (EU) 596/ 2014), effective since 2021 (MAR Light) (Regulation (EU) 2019/2115 2019). MAR Light introduced modifications to the management of insider lists by entities listed on the SME growth market (SME issuer) and Member States may, under specific circumstances, impose the obligation to maintain insider lists on SME issuers, as in the case of issuers listed on regulated markets (Regulation (EU) 2019/2115 2019). Poland has exercised this option by introducing Article 78j into the Act on Trading in Financial Instruments, stating that SME issuers include on the insider list all persons (referred to in Article 18(1)(a) of the MAR Regulation (Reg (EU) 596/ 2014)) (SEG 2022) (Wojnar et al. 2022). The abovementioned amendments necessitated the publication of templates for insider lists that SME issuers are obligated to maintain (Regulation (EU) 2019/2115 2019) (Reg (EU) 596/ 2014). For PTCs from regulated markets, it specifies that: i) lists of individuals with permanent access to confidential information, compared to similar lists maintained by issuers listed on regulated markets, differ in several data scope changes; ii) ordinary insider lists (if the issuer chooses to maintain them or if the Member State imposes such a requirement) differ in several data scope changes compared to similar lists maintained by issuers listed on regulated markets (SEG 2022) (Wojnar et al. 2022). The security of the investing public that engage in regulated markets is enhanced by the fact that both the PTC and its D&Os have obligations to disclose transactions they undertake, thus i) the type of transactions, ii) the scale of transactions, and iii)

the transaction price can be significant information for the market, thus it is recognized that individuals fulfilling managerial or supervisory duties (D&Os), as well as those closely related to them, possess a deeper, sometimes more comprehensive, understanding of the PTC's situation (Gruew 2021) (Sokólska 2017). Initially, the category of insiders in the EU was not harmonized and was heterogeneous, overall including members of the management board and supervisory board, proxy holders, and individuals in managerial positions. MAR and MAR Light modified these obligations and specified the scope of individuals subject to them (Reg (EU) 596/ 2014) (Regulation (EU) 2019/2115 2019). Each transaction on behalf of individuals performing managerial duties (including oversight bodies, so D&Os) and persons closely associated with them is subject to obligation, it pertains to so-called primary insiders (KNF 2019) (Sokólska 2017).

"Persons discharging managerial responsibilities" (PDMD, see Reg (EU) 596/ 2014) within an issuer or an emission allowance market participant and persons closely associated with them shall notify the issuer or the emission allowance market participant and the competent authority of their transactions (Reg (EU) 596/ 2014). Notified transactions shall include all transactions conducted by persons discharging managerial responsibilities on their own account relating, in respect of the issuers, to the shares or debt instruments of the issuer or to derivatives or other financial instruments linked thereto, and in respect of emission allowance market participants, to emission allowances, to auction products based thereon or to derivatives relating thereto (CDR (EU) 2016/522 2015). The abovementioned type of transaction must be related to these financial instruments, and this connection can be direct (such as their sale or pledge) or indirect (such as their inclusion in an insurance policy), must exceed a certain threshold, and there is a prohibition on conducting transactions during a closed period (Sokólska 2017) (Gruew 2021) (Reg (EU) 596/ 2014) (Regulation (EU) 2019/2115 2019). The relevant transaction types are legally labeled as 'notifiable transactions' and are described in the Article 10 of the Commission Delegated Regulation (CDR (EU) 2016/522 2015). For the Polish lens of the Polish market supervisor on the notifiable transactions and notification obligations and their content, see (Sokólska 2017). Under MAR regulations (Reg (EU) 596/ 2014), the closed period lasts for 30 calendar days before the announcement of the semi-annual financial report (includes both the half-yearly and quarterly reports) or the year-end report (Reg (EU) 596/ 2014), and Polish NAC's interpretation, including local legal considerations, presented an identical stance (KNF 2019). Also, the prohibition on conducting transactions during a closed period also applies to debt instruments of the issuer by individuals performing managerial duties (KNF 2019) (Reg (EU) 596/ 2014). The count of incidents in most recent years (2021, 2022) related

to disclosed restatements and or significant weaknesses in internal controls reached the highest point in recent years, also most enforcement actions were related to irregularities with revenue recognition and ICFR (internal controls over financial reporting) (Harwood and Mola 2023). On the factual materiality of restatements, Big R and little r, and CD, CG, auditor quality and investors' assurance, see also specifically in this text paragraph on MET behavior and Opinion Shopping (Chapter 4).

The SEC underscored the significance of taking into account investors' needs and interests when evaluating the materiality of accounting misstatements and issuing restatements, both Big R and Little R (Munter 2022a). When a material error is identified in previously issued financial statements, it requires correction through restating prior-period financial statements, colloquially known as a 'Big R' restatement. Yet, if the error is not material to previous statements but would be material to the current period, the registrant must correct it, it is termed a 'little r' restatement, allowing correction without restating prior period information but requires disclosure of the error (Munter 2022a). Per the oversight by the capital market regulator, the SEC, even a minor quantitative misstatement may have qualitative significance for investors when it conceals management's inability to meet analysts' forecasts (SEC 1999). Imperfect accounting and reporting biases affect CD quality, as elaborated in Chapter 2 and 3, but also create fertile ground for fraud occurrence. While errors discourage bias by lowering the value relevance of accounting, they can also facilitate bias by providing camouflage and concealment. There is a hump-shaped relation between a PTC's propensity to engage in intentional misstatement (FRM) and the prevalence of unintentional misstatements in the PTC's industry for the whole economy and a majority of the industries. When errors are more prevalent, the market reacts less to firms' earnings surprises and bias is more difficult to detect (Fang et al. 2017). Proxies for the quantification of the magnitude of bias and errors can be employed: i) the measure derived from the restatement amount in net income, ii) the number of items in FS and exposure to complex accounting rules (Fang et al. 2017). Amiram et al.'s FSD Score (which is the mean absolute deviation between the empirical distribution of leading digits contained in a PTC's financial statements and Benford's Law (Amiram et al. 2015a, Table 6)). When classifying line items within financial statements, the data indicates that, on average, equity and liability accounts exhibit higher FSD Scores compared to asset accounts, implying a relatively higher error rate. Additionally, income accounts, on average, show higher FSD Scores than expense accounts, indicating a relatively elevated error level in income accounts (Amiram et al. 2015a). Greater deviation from Benford's Law may indicate lower earnings persistence, reflecting a potential decrease in the quality of reported financial results (Amiram

et al. 2015a). This stems from the idea that PTCs with lower accounting quality are less likely to have current earnings informative about future earnings (Richardson et al. 2005), which builds on previous literature (Sloan 1996) by associating accrual reliability with earnings persistence, via a model that demonstrated that less reliable accruals result in reduced earnings persistence. Moreover, as investors do not fully anticipate this effect, it results in significant security mispricing, exhibiting the cost linked to incorporating less reliable accrual information in CD (Richardson et al. 2005). Later literature supports this perspective, linking low financial report readability to reduced earnings persistence (Li 2008). PTCs exhibiting greater divergence from Benford's Law also demonstrate lower earnings persistence (controlling for various factors including sales growth, dividend payment, market value of equity, growth, special items, survivorship, return volatility, and net earnings volatility (Li 2008)). Empirical research on the FSD Score and net income interaction suggested that deviation from Benford's Law reflects the informational quality of financial disclosures (Amiram et al. 2015a).

Benford's Law as FSD Score (K-S Amiram et al. 2015), not the cross-company and through-time approach, is perfect overall, but it cannot be successfully used when the FRM and non-FRM samples are derived from local AAERs in a non-case law country, with the supervisor's efficiency regarding FRM below any reasonable level. In such cases, FRM and non-FRM are 'dirty data,' as in non-FRM there are plenty of actual FRM, only not detected and not prosecuted. Therefore, non-FRM/control sample adherence to Benford's Law may be very limited. Thus, it would necessitate clearing the non-FRM using Benford's Law like Amiram et al. 2015 (FSD Score Financial Statement Divergence Score) to spot undetected FRMs and other detection tools to do so and then exclude them from non-FRM or use supervisor's efficiency estimating tools (modelling) like Wuerges Borba 2014 to assess the actual FRM degree and supervisor's efficiency in detecting and prosecuting FRM (in percentages). Undetected FRMs classified as non-FRM cause unbearable bias with some tools when employing such "dirty data" samples. Moreover, it is exacerbated if the sample is small in size and if the sampling FRM: non-FRM ratio does not picture the real market conditions. (Amiram et al. 2015 presents Appendices Appendix 1 How to calculate conformity to Benford's Law, an empirical example: digit, total occurrences, empirical distribution, theoretical distribution. Later: MAD mean absolute deviation and K-S Kolmogorov-Smirnov statistic computed to test the conformity of the empirical distribution to Benford's distribution (Amiram et al. 2015b)). The time trend in FSD Score for PTCs identified by the SEC, through an AAERs, as having materially misstated their financial statements is depicted in the study. When graphically presented on a chart, year zero on the x-axis is centered on the year the misstatement began to show how FSD Score

changes before and after the misstatement. This shows the differentiation in value trends between AAERs and non-AAERs PTCs (Amiram et al. 2015b, Figure 4). 14% of the firms that deviate from Benford's Law engage in material misreporting (Of the 43,332 firm-years in our sample, 37,104, or 86%, conform to the law at the 5% level or better) (Amiram et al. 2015). This estimate is consistent with reports that the probability of a PTC committing fraud is 14.5% a year (how pervasive is corporate fraud) (Dyck et al. 2013). Higher FSD Scores are associated with increased working capital accruals, discretionary accruals, and Dechow-Dichev measure values (reporting quality or accruals-based earnings management and manipulation proxies (Amiram et al. 2015b, Table 6)). Firms with elevated FSD Scores are also more likely to be identified as manipulators using Beneish's M-Score. The multivariate regression results align with the findings mentioned, indicating a relationship between FSD Score and proxies for accruals-based earnings management and manipulation (Amiram et al. 2015).

There is a novel direction of the FRM research centers on forecasting CF manipulation through 'financial shenanigans,' which encompass strategies to artificially boost a company's CF, including i) shifting financing cash inflows to the operating component, ii) reclassifying operating and iii) financial cash inflows, iv) misclassifying cash outflows, and v) engaging in unsustainable activities (Dimitrijevic, 2015; Schilit, 2010; Schilit et al., 2018). Numerous investigations center on the i) accrual basis of the income statement and statement of financial position, employing models such as the F-score model (Dechow et al., 2011, 2012), ii) earning management (EM) (Dechow et al., 1995; Jones, 1991), and iii) strictly financial ratios (Adu-Gyamfi, 2020; Dalnial et al., 2014a, 2014b; Kanapickienė and Grundienė, 2015; Kirkos et al., 2007; Persons, 1995; Rahmatika et al., 2019; Ratmono et al., 2020; Somayyeh, 2015; Yusrianti et al., 2020). Conversely, various modern and contemporary studies leverage CF detection methods, including i) Real Earnings Management (REM) (Md Nasir et al., 2018; Roychowdhury, 2006), ii) discretionary accruals (Sayidah et al., 2020), iii) free cash flow (FCF) (Bukit and Iskandar, 2009), and iv) cash flow (CF) (Adebayo and Ajao, 2015; Bose et al., 2019; Deo and Liu, 2016; Sayidah and Assagaf, 2020; Stevanovic et al., 2013). Notably, some investigations explore i) CF restatement (Alfonso et al., 2018), ii) predict corporate fraud and non-fraud (Asare, 2019), iii) scrutinize operating cash flow (Goel, 2013, 2014; Grove & Basilico, 2011; Nagar and Raithatha, 2016; Nobanee et al., 2020; Sakti et al., 2020; Suhardianto and Leung, 2020), iv) enhance prediction accuracy (Jordan & Messner, 2020; Krylov, 2018), and v) utilize CF ratios for fraud detection in FS (Abelingga et al., 2021; Dugan and Taylor, 2019). Furthermore, specific research efforts explore i) manipulating, ii) detecting, and iii) preventing fraud on CF (Dimitrijevic, 2015). Yet investigations predicting CF manipulation

through financial shenanigans remain scarce (Tarjo et al. 2023). There are attempts present to close the gap by predicting FRM based on CF shenanigans, acknowledging the rising challenge faced by investors in detecting FRM in the accruals section (Schilit et al., 2018, Tarjo et al. 2023). Modern research utilizes specific ratios aligned with red flags in financial shenanigans, such as the ratio of cash flow operations to short-term liability, operating cash flow ratio, change in receivable to cash flow operations, free cash flow, cash flow operations to total liability, Days Payable Outstanding, and change in inventory to cash flow operations (Abelingga et al., 2021; Tarjo et al. 2023, Dimitrijevic, 2015; Dugan & Taylor, 2019; Peasnell et al., 2000; Schilit et al., 2018; Schmidgall et al., 1993). The empirical examination targets mining companies in Indonesia, Malaysia, China, and Japan, aiming to detect fraudulent financial statements and offer insights for auditors and investors to identify potentially manipulated cash flows (Deo & Liu, 2016; Dimitrijevic et al., 2020; Stevanovic et al., 2013). The study contributes to the literature on financial shenanigans (Sakti et al., 2020) and aids auditors in providing more objective opinions, thereby reducing bias (Tarjo & Herawati, 2015). Auditor's responsibility for fraud detection, see (Munter 2022b). Auditors duty and responsibility, see FBI Financial Crimes statistics (FBI 2008), for FBI white-collar crime, see (FBI 2022), for the differential sentencing of white-collar offenders, see (Hagan et al. 1980).

5.4 Justification for the Author's Model Development and Applications for Research and Practice

The last two decades of FRM literature have been characterized by exceptionally intense efforts to search for and introduce new methods, and subsequently to develop new, increasingly effective, accurate, and optimal (cost-wise and technologically) models for predicting, detecting, or early warning of FRM, as reflected in the review literature on FRM detection methods (Jan 2018; Hajek, Henriques 2017; Spathis 2002; Beasley 1996). In the examined area, models of the "FRM detecting and predicting" class, which aim at early detection and/or prediction of FRM occurrences, are based on variables called red flags, which have predictive power (Feroz et al. 2000), also referred to as detection power (Fanning, Cogner 1998). The issue of FRM detection and/or prediction tools from the perspective of research methodology essentially has two layers: (1) the identification of theoretically grounded, statistically significant, and correlated with FRM at the standalone level among the selected potential variables based on the literature, i.e., FRM-sensitive ratios, considering the specific conditions of the study (e.g., country-specific conditions) (Konsiantis et al. 2006); (2) the construction and

verification of a comprehensive model consisting of a set of variables collectively forming the most accurate model after assessing model fit (Kanapickiene, Grundiene 2018). Interestingly, the literature in this field has shown that depending on the country under consideration, commonly accepted methods (e.g., Genetic Algorithms, Support Vector Machines, Text mining, Standalone Red Flags) exhibit highly diverse accuracy (selected goodness measures from the confusion matrix) (Hajek, Henriques 2017, p. 141).

The research process, according to the area theory, consists of ten stages (Sagan 2016, pp. 43-44). Predictive models aim to correctly predict future or new observations based on these models. Prediction is defined as the "process of econometric inference about the future" based on a model that defines and identifies relationships between the predicted value and the influencing factors (Sagan 2016, p. 41). An extremely important area in the context of discussing research methodology in the examined field (methods for detecting/predicting Financial Reporting Misconduct) is the fact that they have very specific limitations, and despite intensive development, they continue to face specific challenges (see limitations, challenges, opportunities for FRM research in Amiram et al. 2018). Many research questions remain unanswered, and many areas remain controversial, as there is a general lack of consensus, with even opposing views among researchers (Amiram et al. 2018). Another methodological issue in the FRM field involves aspects related to binary choice models, the complexity of assessing comparability and effectiveness of methods and models. The primary challenge in FRM detection research is the issues related to the "Confusion Matrix" – measuring errors, hence discussing Type I Errors, Type II Errors, Misclassification Problems, and the Misclassification Issues Matrix. Another challenge for researchers in this area is the issue of multicollinearity, including approaches to the corrected and traditional logit models (Corrected logit model vs. Uncorrected) and the conditional and unconditional probability of fraud - FRM (Conditional vs. Unconditional likelihood of fraud). A methodological challenge in FRM literature also involves the aspect of creating and selecting samples, including the issue of pooled samples and determining the size and ratio (FRM: non-FRM ratio) of entities in the sample assigned to the FRM group (companies that have committed FRM based on supervisory authority data, e.g., KNF sanctions, or US AAERs) and non-FRM (non-FRM - companies that have not committed FRM) and controlling for environmental factors. Financial Reporting Misconduct has certain established theoretical frameworks in the literature, concerning both explaining the phenomenon itself considering: motivations – e.g., Managerial Theories – e.g., Broken trust (Albrecht et al. 2004) American dream theory (Choo, Tan 2007); the nature of disclosure obligations Corporate Disclosure Theories – e.g., Imperfect information theory (Prat 2005;

Cremer 1995); conditions - Fraud Figures – e.g., Fraud Diamond (Yendrawati et al. 2019)). They are also theoretically grounded at the general level of the classes of methods for its study towards detection and prediction, though they are evolving and developing, constantly searching for newer and more effective tools. For example, at the highest level of generality, we can indicate a division into statistical models of various generations - up to Artificial Neural Networks; standalone Red Flags (individual symptoms) and Red Flags forming checklists, and combined methods (Boritz, Timoschenko 2014) combining both last classes.

There are many other methods, including the oldest ones - manual (their obsolescence and low effectiveness have been proven - West, Bhattacharya 2016). However, the approach is always adapted to the specific characteristics of a given country (different socio-economic-legal-historical-economic conditions), the evolution of these conditions, and the variability of the environment over time. This results in the construction of appropriately differentiated statistical models (both at the level of methods of different generations and classes, as well as the variables themselves). Due to the demand, tools for FRM detection have been created for developed markets for almost three decades (Yen 2013; Dechow et al. 1996, 1995), and the last decade has also been marked by attempts to create tools – models for emerging markets, such as Lithuania, Malaysia, Turkey, Brazil (Yendrawati et al. 2019; Kanapickiene, Grundiene 2015; Wuerges, Borba 2014). The specificity of national markets and their continuous dynamic development do not allow for the creation of universal models, hence archival and foreign publications can only outline general frameworks for these studies. The literature on the detection and prediction of corporate financial fraud presents many examples of studies, analyses, attempts to classify, and prove the effectiveness of individual Red Flags and their categories (Nieschweitz, Schultz, Zimbelman 2000). Contemporary literature directly indicates that creating effective and accurate models for detecting corporate financial reporting misconduct (FRM) can significantly contribute to the sustainable development of the country, society, economy, and financial markets (Jan 2018). Analyzing the above-mentioned review literature on FRM detection methods, we can identify the strengths and weaknesses of given methods, threats, and prospects for individual tools (Hajek Henriques 2017; Wuerges, Borba 2014). The choice of methods, among those generally recognized in FRM literature for detection and prediction, should primarily depend on the goals set by the researcher (Wuerges, Borba 2014). The main objective of the doctoral dissertation is to create a logit model that detects Polish public companies highly likely to be involved in FRM, with variables taking the form of statistically significant Red Flags from financial and non-financial areas, based on publicly available information. Both the model as a whole and the list of potential Red Flags

selected for the study at the data preprocessing stage can provide valuable input for market participants and other stakeholders, as they can be used in various ways. The effectiveness of a logit model for FRM detection is influenced, among others, by activities ensuring a broad list of Red Flags covering various financial and non-financial areas, collected based on a thorough literature review (Kanapickiene, Grundiene 2015, pp. 323-324).

It is necessary to consider national conditions and limitations related to data availability for potential Red Flags. Then, the stage of data preprocessing/Red Flags selection (determining the statistical significance of variables - Red Flags and their final selection for the model) should be correctly carried out, where from the list of potential variables - over several dozen Red Flags, the appropriate variables will be selected for the final model after testing their significance and considering control factors and the logit model correction mechanism (Jan 2018; Wuerges, Borba 2014). The usefulness of the study can be considered multidimensionally, as the model and the list of potential Red Flags can be addressed to several stakeholder groups. In the literature of developed countries, it is indicated that due to the potential consequences of FRM, it is necessary for auditors and regulatory-supervisory bodies to have and use systems, methods, and tools that can detect them (Boritz, Timoshenko 2014; Lessley 2011, p. 1; Comunale et al. 2010; Comunale, Sexton 2005; Dery, Reinstein 1999). In highly developed markets, e.g., in the USA - U.S. Securities and Exchange Commission has recently been using such methods and tools, having established a special data analysis and risk assessment department – DERA, using innovative detection tools, which is appreciated by end-users (SEC 2019; Grey, Fata 2017). The KNF applies the principles of selection and analysis of issuer reports (NIK 2015, pp. 30-31) considering ESMA supervisory priorities (ESMA 2019a,b,c). It does not apply universal control based on processing all data – data mining (like SEC DERA department), but only uses a selection method based on criteria such as an auditor's opinion with reservations or refusal to issue an opinion, as well as entities characterized by the threat of going concern and a small pool of random entities that have not been audited for the last 8 years (NIK 2015). For 2018, half of the report analyses were thematic studies, and 20% were checks of previously recommended additions (KNF 2019, pp. 7-9; NIK 2015, pp. 30-32). If such statistically proven effective tools are widely used by auditors, there is a chance to reduce the so-called "expectation gap" (Albrecht, Hoopes 2014) and increase the actual effectiveness of the audit (Boritz, Timoshenko 2014). Such tools are also used as decision-aids, so that primarily investors (but also regulators, auditors, and law enforcement) can make optimal decisions ensuring efficiency (Abbasi et al. 2012).

Investor communities currently use even tools like the F-Piotrowski score as part of their investment strategy (Tikkanen, Aijo, 2018) as well as the Beneish M-score and Z-Altman score to predict bankruptcy and earnings management of companies (Egbunike, Igbinovia 2018), so the FRM model may come into common use. Due to the lack of dedicated models for their own market, investors use general ones often created for developed markets, e.g., in Nigeria (Egbunike, Igbinovia 2018), which do not consider national specifics. Global external auditors recommend introducing intra-corporate methods, regularly used techniques to counteract FRM, especially by implementing "detective controls" aimed at identifying FRM if it has occurred (Deloitte Touche Tohmatsu 2009, pp. 6,7). The tool created in this dissertation could become part of such a procedure, process, or set of tools. The literature shows the need for FRM detection and prediction methods within corporations, e.g., for audit departments, compliance (Albrecht et al. 2015; Deloitte Touche Tohmatsu 2009). Financial fraud remains one of the main challenges for organizations and their stakeholders (PWC 2018; Summers 2008). FRM is a major problem for business practice, both for investors and the companies themselves and other economic entities (Trompeter et al. 2013; KPMG, 2006). Therefore, a tool in the form of a model based on publicly available data can also be used by potential contractors and other entities wanting to establish business cooperation, ensuring them a higher level of certainty (in an environment of exposure to losses due to the widespread involvement of economic entities in them - PWC 2018). The demand for new tools also concerns forensic audit experts (Albrecht et al. 2016; Albrecht, Hoopes 2014; Mantone 2013), as well as creditors (banks, bondholders) and contractors (Abbasi et al. 2012; Albrecht et al. 2008). Creating such a tool can be the first step to introducing forensic audit services to the Polish market. Moreover, it can contribute to increasing the protection of bondholders and introduce a new authentication element to bank policies for assessing credibility and risk management (monitoring) of potential and current borrowers. In emerging markets (Indonesia, China, Lithuania), attempts are also being made to create FRM detection tools addressed to regulators, auditors, and investors (Yendrawati et al. 2019; Chen, Wirth 2017; Kanapickiene, Grundiene 2015). The specificity of national markets (Laeven 2014), the continuous variability of the functioning environment, and the dynamic development of entities (Lander, Auger 2008, p. 111), the evolution of Red Flags over time (Nieschwietz et al. 2000, Brazel et al. 2009), the evolution of FRM schemes (Deloitte Forensic Center pp. 6,10), the diversity in the effectiveness of detection methods between countries (Hajek, Henriques 2017) do not allow for the creation of universal models, hence archival and foreign publications outline directions for research, but it is necessary to create a tailor-made

model for Poland. The literature shows the practice of creating models dedicated to a given country (Yendrawati et al. 2019; Chen, Wirth 2017; Kanapickiene, Grundiene 2015).

Creating such a model for Poland is possible with the assumed methods, and its contribution to both science and practice can be valuable. It should also be emphasized that the literature indicates the existence of a research gap in the context of empirical FRM research, i.e., testing, adapting, developing methods, especially the very idea of building and verifying FRM detection/prediction models for the countries of the CEE region. Models that would consider a new category of non-financial indicators (Brazel et al. 2009) almost do not exist in the region. This gap is also evident in theoretical research, which is focused on understanding the causes of FRM occurrence, as well as the relationships between the evolution and shape of corporate disclosure and the occurrence of FRM in the developing countries of the CEE region. Currently, non-financial measures (NFMs) are also being considered, which are particularly effective when combined with financial measures in the context of detecting FRM (Brazel et al. 2009, pp. 1135-1137). It should also be mentioned that models created for external users of reports (investors, creditors, contractors) are studied, developed, and built in the scientific works of the CEE region only marginally. Moreover, issues related to FRM detection and prediction in the literature of emerging CEE markets, if at all, are only analyzed and studied in the context of audits (Kanapickiene, Grundiene 2015).

Selected features of the logistic model for detecting/predicting FRM in the context of choosing research methods (model from the doctoral dissertation) Synthetic description: A logistic model detecting Polish public companies (GPW in Warsaw) highly likely to be involved in FRM, with variables taking the form of statistically significant Red Flags from financial and non-financial areas, based on publicly available information. Such models also have predictive functions – indicating that a company may be currently involved in FRM and potentially in the near future. Selected features of the logistic model for detecting/predicting FRM in the context of choosing research methods include: (1) a binary choice model – transparent result, also for non-professional market entities; (2) model elements, objectives, and results – clear, transparent, simple, and understandable for various classes of stakeholders, including non-professional market entities; (3) based solely on publicly available data; (4) calibratable, possibility of updating; (5) an extensive checklist (as a base of potential independent variables and a standalone checklist tool or as an element of a combined method with the model); (6) low cost in the construction, verification, and usage phases; (7) basic technological requirements for construction, verification, and possible updating of the model (common statistical software); (8) no additional software required for using the model; a web

browser is sufficient (similarly to how it is set in foreign services for investors in the USA: simple stock data, M-Beneish Score, Altman Z-Score); (9) possibility to avoid the multicollinearity problem, e.g., through the principal factor method; (10) possibility of building a model that corrects the problem of undetected FRM from archival data (assessment of supervisory authority effectiveness, estimation of the actual depth of the FRM problem in the market); (11) logistic models, by presenting dependent variables, also allow understanding the causes of FRM for a given market based on empirical data (Wuerges, Borba 2014); (12) possibility of creating both a corrected logit model (with the misclassification parameter included) and an uncorrected logit model; (13) possibility of considering the unconditional likelihood of FRM detection (without using an additional set of independent variables) and the conditional likelihood of FRM detection; (14) avoiding limitations characterizing AI methods in this area (difficulty in hypothesis testing – Wuerges, Borba 2014, p. 472); (15) possibility of using different approaches to sample size and structure – FRM/non-FRM (Sample Matching Principles, e.g., FRM: non-FRM Ratio Kotsianitis et al. 2006); (16) customization possibility – creating several models, e.g., for a specific industry or excluding too specific industries for better accuracy – exclusion of the financial sector due to different regulations, supervision, and reporting structure (Wuerges, Borba 2014); (17) possibility of controlling external environment factors – study period, company size, industry, etc. – by different methods (Jan 2018); (18) possibility of using different approaches to defining potential independent variables, their number, nature, etc.; and (19) possibility of reformulating the tool and using it in studies aimed at examining the impact of a given variable on the occurrence of FRM.

Presentation of empirical data sources for model testing Data – For the selection of logistic regression, more specifically for creating a logistic model for detecting/predicting FRM, appropriate classes, data sets are needed. Publicly available data (several data classes): (1) Main database - KNF Database (Penalties imposed by KNF), to assign companies to the FRM and non-FRM groups; along with the KNF Communications database (supplement): (a) "List of penalties imposed by the Financial Supervision Authority in 2019: Item; Decision page; Violation; Penalty amount; Decision issuance date." (b) "List of penalties imposed by the Financial Supervision Authority for the years 2006 – 2018: Item; Decision page; Violation; Penalty amount; Decision issuance date." (c) "List of penalties imposed by the Financial Supervision Authority in 2020, 2021, 2022: Item; Decision page; Violation; Penalty amount; Decision issuance date." (2) Data from financial, non-financial, and integrated reports of public companies available in databases: Thomson Reuters (currently Eikon LSEG Data & Analytics), Notoria online S.A., and Polish Press Agency online service, GPW w Warszawie, GPW

Benchmark, Infosfera GPW w Warszawie Stooq (PL), StockWatch (PL), (3) Background/framework/benchmark data: financial and market data: (a) Macroeconomic data. (b) Industry-level data. (c) Trends, forecasts. (d) Stock data (domestic, regional, global) - indices; quotations, valuations, rates. (4) Database of current and archival national and European legal acts, comments, case law database: Eur-Lex, Legal Information System Legalis. (5) Databases of International Financial Reporting Standards (IFRS), International Accounting Standards Board (IASB), International Accounting Standards Committee (IASC); Standing Interpretations Committee (SIC), IFRS Interpretations Committee: IFRS® Standards, IFRIC Interpretations, IFRS Taxonomy, IFRS Translations, Supporting Materials. (6) EBI/ESPI communications (PAP, Notoria, Infosfera GPW w Warszawie). (7) Supplementary information: (a) Communications published on PTCs websites. (b) GPW communications. (c) Articles from trade journals (Puls Biznesu, Parkiet). (d) Publications of market associations and institutes (Association of Individual Investors, Association of Stock Issuers, IIA Poland, American Accounting Association, Association of Certified Fraud Examiners, American Institute of Certified Public Accountants, Center for Audit Quality, Stowarzyszenie Emitentów Giełdowych, Stowarzyszenia Ekspertów ds. Przeciwdziałania Oszustwom, Nadużyciom Gospodarczym i Korupcji ACFE Polska). (e) Additional databases (including registers, lists, records maintained by the Financial Supervision Authority, the newly established Issuer Obligations Register - KDPW). (f) Aggregated reports (CSRinfo, Ministry of Finance, Responsible Business Forum) and the SIP Legalis database. The author of this doctoral dissertation corresponded with entities such as KNF Komisja Nadzoru Finansowego, GPW w Warszawie, GPW Benchmark, SEG Stowarzyszenie Emitentów Giełdowych, and others. Through this correspondence, the author managed to obtain selected data and receive consultations or written responses. Thanks to membership in the American Accounting Association (AAA), Association of Certified Fraud Examiners (ACFE), and American Institute of Certified Public Accountants (AICPA), the author has access to Ani-FraD Profession's guides, materials, publications, and entire libraries (in the case of AAA - archival and contemporary publications as well as preprints) related to the field of accounting and finance, especially financial fraud and Fraud Risk Management, including the ACFE Guide.

It is worth emphasizing that all data sources are publicly available databases/collections. Moreover, a significant majority is completely free, while some are available for a fee (Thomson Reuters database - currently Eikon LSEG Data & Analytics, Notoria S.A. database, SIP Legalis), but their free counterparts exist to some extent. Most data source databases are accessible online and regularly updated. Therefore, the model will use data that are publicly

available in accordance with generally applicable Polish law or publicly available on market terms, but access to most of them involves minimal inconveniences – low license cost (except for Thomson Reuters currently Eikon LSEG Data & Analytics, Notoria S.A., and SIP Legalis), current online access, and cyclical data updates. This creates additional value for the model in the context of its further practical use by stakeholders mentioned below. The already mentioned problem of the "expectation gap" (Albrecht, Hoopes 2014) has been discussed previously. The literature further shows that, in reality, users of financial statements usually rely on auditors (and their opinion) as those who prevent and detect fraud and errors (Best, Buckby, Ta, 2001; Lee, Gloec; Palaniappan 2007), hence directly assuming that if a company receives an unqualified opinion, it is reliable and not engaged in financial fraud, especially in FRM - breaching disclosure obligations. However, as previously indicated, external auditors not only lack a clearly and directly specified legal and contractual obligation to detect FRM, but also lack the actual possibility to perform an audit akin to a forensic audit during annual audits (differences indicated in the previous chapters, for an elaboration through the lens of an expert witness, ACFE President and FASB member, see (Albrecht and Hoopes 2014a; Albrecht and Hoopes 2014b). Of course, disputes are common in both private and public law regarding auditor liability and initiating proceedings against the auditing company and lead auditors both civilly and criminally (so-called auditors litigation). However, the simplest and immediate way to mitigate the "Expectation gap" may be using a logistic model for detecting/predicting FRM by stakeholders who are current or potential investors in a given company. Failure to detect or prevent FRM can harm the reputation and credibility of the auditing industry (Choui, 2011). The literature suggests that FRM is the "Achilles' heel" of the auditing industry, partly because annual audits (as opposed to forensic audits) based on simple, direct, often manual risk assessment (risk-based auditing) are predictable (Jamal, 2008). Using historical FRM cases to build models "will not make the audit unpredictable," but can help auditors identify sensitive areas and estimate risks, and moreover, can help them understand the causes. Regression analysis (logit and probit models) allows for hypothesis testing about the impact of selected variables on the occurrence of FRM (Wuerges, Borba 2014).

A logistic model detecting Polish public companies (GPW in Warsaw) highly likely to be involved in FRM, with variables taking the form of statistically significant Red Flags from financial and non-financial areas, based on publicly available information. Such models also have predictive functions – indicating that a company may be currently involved in FRM and potentially in the near future. Selected features of the logistic model for detecting/predicting FRM in the context of choosing research methods include (1) a binary choice model –

transparent result, also for non-professional market entities; (2) model elements, objectives, and results – clear, transparent, simple, and understandable for various classes of stakeholders, including non-professional, unsophisticated market participants; (3) based solely on publicly available data (formally publicly available and accessible); (4) calibratable, possibility of updating, expanding (5) an extensive checklist (as a base of potential independent variables and a standalone checklist tool or as an element of a combined method with the model); (6) low cost in the construction, verification, and usage phases; (7) basic technological requirements for construction, verification, and possible updating of the model (common statistical software, relational database,); (8) no additional software to be required for using the model by its end-users; a web browser is sufficient (similarly to how it is set in foreign services for investors in the USA: simple stock data, M-Beneish Score, Altman Z-Score); (9) possibility to avoid the multicollinearity problem; (10) possibility of building a model that corrects the problem of undetected FRM from archival data (assessment of supervisory authority effectiveness, estimation of the actual depth of the FRM problem in the market); (11) logistic models, by presenting dependent variables, also allow understanding the causes of FRM for a given market based on empirical data (Wuerges, Borba 2014); (12) possibility of creating both a corrected logit model (with the misclassification parameter included) and an uncorrected logit model; (13) possibility of considering the unconditional likelihood of FRM detection (without using an additional set of independent variables) and the conditional likelihood of FRM detection; (14) avoiding limitations characterizing AI methods in this area (difficulty in hypothesis testing (Wuerges, Borba 2014, p. 472) and natural data limitations – small, shallow, young financial markets do not yield a sufficient number of observations required by AI methods to be reliable (Gepp 2015)); (15) possibility of using different approaches to sample size and structure – FRM/non-FRM (Sample Matching Principles, e.g., FRM: non-FRM Ratio Kotsianitis et al. 2006); (16) customization possibility – creating several models, e.g., for a specific industry or excluding too specific industries for better accuracy – exclusion of the financial sector due to different regulations, supervision, and reporting structure (Wuerges, Borba 2014); (17) possibility of controlling external environment factors – study period, company size, industry, etc. – by different methods (Jan 2018); (18) possibility of using different approaches to defining potential independent variables, their number, nature, etc.; and (19) possibility of reformulating the tool and using it in studies aimed at examining the impact of a given variable on the occurrence of FRM, (20) prediction costs modulation – preference given to the chosen Confusion Matrix elements, Type I Error, Type II Error, False Omission Rate, Accuracy, Prevalence, Specificity- accordingly to the purpose, i.e. law enforcement, investor's

community, interal audit etc. (Amiram et al. 2018). Example application of the logistic FRM model in the formula and features described in the doctoral dissertation and value for different groups, classes of stakeholders in economic practice: (1) Individual investors (non-sophisticated individual investors): investor protection, informed investing (directly in equity and debt instruments, as well as indirectly, e.g., in investment fund units), and verification of the entity's credibility – preventing fraud, loss of funds, preventing errors and abuses by advisors – misselling. (2) Market participants through stock information portals, association and investor group portals, educational-information portals: For example, in the USA, the well-known portal GuruFocus (GuruFocus.com, LLC) publishes M-Beneish scores and Altman Z-scores for listed companies, which are transparent and understandable to all market participants; in Poland, the StockWatch portal (StockWatch.pl). (3) External audit and (4) Audit firms conducting periodic audits (annual audit, quarterly review) and entities providing forensic audit services: Accountants and auditors must avoid any intentional or gross negligence that could directly or indirectly assist management in fraudulent financial reporting (Jan 2018). There is also a need for new tools for forensic audit experts (Albrecht et al. 2016; Albrecht, Hoopes 2014; Mantone 2013). (5) Internal control (internal control): Internal departments within companies: Internal Audit, Risk Management, Compliance, Legal, Accounting Departments, Financial Departments: Global external auditors recommend introducing internal corporate methods, regularly used techniques to counteract FRM, especially through the implementation of "detective controls" aimed at identifying FRM if it occurs (Deloitte Touche Tohmatsu 2009, pp. 6, 7). The tool created in this work could become an element of such a procedure, process, or set of tools. The literature shows a need for methods to detect and predict FRM within corporations, e.g., for audit departments, compliance departments, M&A, new issuances of securities (Albrecht et al. 2015; Deloitte Touche Tohmatsu 2009). Management boards are obliged to establish an effective risk management system and fraud prevention mechanism to limit the possibility of their occurrence. They are also required to create whistleblowing programs. (6) Company Management Board, Supervisory Board, Corporate Officers - persons performing managerial functions. (7) Cooperating entities, contractors: FRM is a fundamental problem for economic practice, both for investors and companies themselves, as well as other economic entities (Trompeter et al. 2013; KPMG, 2006). According to the PwC Fraud Report unaware contractors become victims of financial fraud by perpetrators. A model based on publicly available data can be used by potential contractors and other entities seeking to establish business cooperation, ensuring a higher level of certainty (in an environment exposed to losses due to the widespread involvement of economic entities - PwC 2018), allowing for

risk assessment of cooperation and the credibility of the entity with which cooperation is to be established. (8) Rating agencies: A tool supporting the examination and consequently assigning a rating to a company and its individual financial instrument issues. Ratings are a fundamental source of information for investors and other entities, so their credibility must be justified. (9) Consulting and advisory entities for the capital market: At the request of companies: organizing new issues of debt and equity instruments, investment certificates, preparing documents related to M&A, performing tasks related to fulfilling legal requirements by companies – registering instruments, preparing prospectuses. (10) Employees in the areas of Asset & Wealth Management, Trust Fund Trustees, Private Bankers, bankers, bank administration, investment advisors, financial advisors: Risk management on behalf of third parties and/or on behalf of and in the name of the entity: creating optimal investment portfolios, creating investment strategies, valuation and analysis of financial instruments, creating and evaluating investment, insurance products, financial advice. (11) Banks, financial institutions as providers or intermediaries of financing: Credibility in the initial assessment of creditworthiness when starting cooperation, ongoing monitoring of the entity's situation when it is already a debtor (borrower, loan recipient). The need for such tools by creditors (banks, bondholders) and contractors has been noted in the literature (Abbasi et al. 2012; Albrecht et al. 2008). (12) Investment Fund Companies, Insurance Companies, Hedge Funds, Closed-End Investment Funds: As above, and activities that are the exclusive competence of these entities. (13) Brokerage Houses and financial groups: As above, and activities that are the exclusive competence of brokerage houses and broker-dealers, particularly activities in the area of underwriting, organizing issues. (14) Capital market supervision authorities (National Competent Authority) - KNF: KNF applies the principles of selecting and analyzing issuer reports (NIK 2015, pp. 30-31), taking into account ESMA supervisory priorities (ESMA 2019a, b, c). It does not apply widespread control based on big data processing (as in the SEC DERA department), but only a selection method based on criteria such as the auditor's opinion with reservations or refusal to issue an opinion, as well as entities characterized by the risk of continuing operations and a small pool of random entities that have not been audited in the last 8 years (NIK 2015). For 2018, half of the report analyses were only thematic studies, and 20% were checks of previously recommended additions (KNF 2019, pp. 7-9; NIK 2015, pp. 30-32). For an extensive review of KNF’s non-systemic, piecemeal, fragmentary supervision methods and KNF’s post-surveillance evaluation (with a call for improvements) conducted by the Supreme Chamber of Control in Poland, see (KNF 2019, NIK 2015, NIK 2018) . This results in delayed actions, is inefficient, and does not fit the EU direction of proactive supervision. In highly developed markets, such as the USA, the SEC

uses statistical methods, big data analysis, etc., utilizing innovative detection tools, which are valued by end users (SEC 2019; Grey, Fata 2017). (15) Other regulatory and supervisory bodies, e.g., National Bank of Poland, Office of Competition and Consumer Protection, Bank Guarantee Fund, tax authorities, government and local administration: UOKiK – ensuring competition protection (e.g., market analysis and examining entities in the context of concentration), ensuring consumer protection; NBP, BFG – as entities indirectly related to the market, supervision, and NBP as conducting economic situation surveys, company surveys, Quick Monitoring; government and local administration. (16) Other market participants and so-called watchdogs and gatekeepers – lawyers, media, etc.: Gatekeepers are external legal firms (Bozanic et al. 2017); auditing and consulting entities (Coffee 2002) and so-called watchdogs – media (Miller 2006), which often act as guardians, being also entities that discover fraud and bring these warnings to public attention – e.g., Wall Street Journal (more about entities that discovered and signaled FRM in: Dyck et al. 2010).

5.5 A Review of Methods for Financial Reporting Misconduct Detection and Prediction

Analyzing the literature on the subject in the context of research methods for detecting FRM, one can draw a primary conclusion about the intensive evolution and demand for creating increasingly accurate models tailored to the conditions of a given country; and several other conclusions can be presented with some observations: the same methods in different countries are characterized by enormous variability in accuracy (%); the same methods applied to different samples in the same countries also show variability in accuracy; methods considered highly effective and belonging to the class of "intelligent detection methods" can be less effective than those considered more conservative, not belonging to the "data mining" group (for example, in a comparative study of FRM detection methods, including hybrid approaches, comparing the accuracy of SVM - support vector machine and LR - logistic regression, LR had greater accuracy (Chen, Goo, Shen 2014)); there is significant variability between studies in the FRM/non-FRM ratio, as well as the sizes of groups and the entire sample; misclassification cost, Type I and Type II error rates differ significantly between studies, despite using the same methods; there is variability in the approach to detection probability in FRM research – unconditional method of fraud detection or conditional (introducing an additional set of independent variables). The summary of these observations should be Wuerges and Borba's observation, who also reviewed FRM detection methods, focusing on methods of minimizing methodological limitations in FRM research - described further - that the choice of methods

from those generally recognized in FRM literature for detection and prediction should primarily depend on the goals set by the researcher (Wuerges, Borba 2014).

Manual detection techniques are seen as time-consuming, costly, and inaccurate (West, Bhattacharya 2016). Automated systems have become the main object of consideration in FRM detection methods, as the increased detection capability of these systems is particularly important for investors and potential investors (protection and optimal decision-making), auditing firms (routine checks), forensic accounting experts (conducting forensic audits, Albrecht, Hoopes 2014), and supervisory and control authorities (to take more effective actions), as well as creditors (banks, bondholders), and contractors (Abbasi et al. 2012; Albrecht et al. 2008). A popular approach is so-called analytical methods (liquidity ratios, working capital ratios, profitability and margin ratios, etc., horizontal and vertical analysis, etc., based on publicly available data (Mantone 2013; Healy, Palepu 2012)). In connection with them, similar methods are used, especially in forensic accounting, including trend determination and deviations from historical and peer-group trends, to detect analytical anomalies (Albrecht et al. 2012, 2015, Mantone 2013). Practitioners' handbooks in forensic accounting propose using scientific methods based on statistical models, such as the Beneish M-score Model; Dechow–Dichev Accrual Quality / Dechow–Dichev Model; Sloan's Accruals/Sloan's Model; Jones Nondiscretionary Accruals; The Piotroski F-Score Model; Lev–Thiagarajan's 12 Signals (Mantone 2013), as well as recently using Benford's Law to detect anomalies (ACFE 2018, Amiram et al. 2015). It is worth noting that the advantage of Zipf's Law over Benford's

Law is that it can be applied to a wider range of data sets since it is not limited to numerical attributes (Odueke, Weir 2012). "Fraud Exposure Rectangle" is used by forensic accounting practitioners in the American market to detect FRM (Albrecht et al. 2015, pp. 376-377). It consists of four elements, each comprising a formula based on identifying Red Flags in this area: management and directors, relationships with other entities; organization and industry; financial results and operational characteristics (Albrecht et al. 2015, pp. 376-389). Intelligent FRM detection systems have been developed to include appropriate sets of early warning signals (Red Flags) and a high level of accuracy to support stakeholders' decision-making processes. For example, methods in this category include: AUC – area under the ROC curve, BBN – Bayesian belief network, CART – classification and regression tree, DWD - distance weighted discrimination, GA – genetic algorithm, GHSOM – growing hierarchical self-organizing map, GMDH – group method data handling, GP – genetic programming, k-NN – k-nearest neighbors, LDA – linear discriminant analysis, LR – logistic regression, MLP – multilayer perceptron, PNN – probabilistic neural network, RBF – radial basis function neural

network, RF – random forest, and SVM – support vector machine (Hajek, Henriques 2017; Ceccini et al. 2010). However, fourth-generation methods (Nisbet et al. 2009) (based on data mining, among others) require access to appropriate technologies and data, and also have different cost structures. There are also three-stage classifications: Classical statistical models (Dechow et al. 2009; Beneish 1999; Summers, Sweeney 1998; Green, Choi 1997) including: logit models (LR logistic regression), probit models, and GLM (Generalized Linear Model); Third-generation statistical models (Third Generation statistics) including techniques called Machine Learning, e.g., ANN- Artificial Neural Networks or Decision Trees. The last class is the so-called fourth generation (Fourth generation) New machine learning: grid computing, cloud computing, artificial intelligence (Artificial Intelligence with expert systems) (Nisbet et al. 2009; Markou, Singh 2003). There are also other methods not classified within these classifications, e.g., visual aids (Mantone 2013 p.xii); brainstorming (Brazel et al. 2010; Carpenter 2007). Combined methods (e.g., Checklist-based combined methods with statistical model) are also used, involving the simultaneous use of several methods, for example, so-called Red Flags Checklists and a selected statistical model for detecting/predicting FRM (Boritz, Timoshenko 2014), as well as in-depth examination of identified Red Flags (Albrecht et al. 2015, ACFE 2009, 2014). Another example is combining financial information and managerial comments (Hajek, Henriques 2017), using text mining techniques, i.e., Text mining combined with the C4.5 method or the Naïve Bayes method or the SVM method (Humphreys et al. 2011). A separate method also uses the MD&A document, which is part of mandatory disclosures in the USA (Form 10-K) for independent (not combined) text analysis. Combinations of audio and text mining methods are also known, as well as forms of combining vocal and linguistic methods with financial data (Throckmorton et al. 2015).

Red Flags (indicators, predictors of FRM, signals, symptoms) are a common idea for most methods, as demonstrated. Their use – whether as elements of a manual checklist or as variables in models of various generations – depends on the chosen method (Omidi et al. 2019; Yendrawati et al. 2019; Baader, Krcmar 2016; Kanapickiene, Grundiene 2015; Boritz, Timoshenko 2014; Ngai et al. 2011; Dechow et al. 2009; Spatis 2002; Abbott et al. 2000; Bell, Carcello 2000; Feroz et al. 2000; Green, Choi 1997; Hansen et al. 1996, Loebbecke et al. 1989). Red Flags – indicators, predictors of FRM, i.e., potential independent variables for FRM detection/prediction models. In all classes and generations of fraud detection/prediction models, particularly FRM (generations and classes of models include: classical, intelligent, automated, machine-based, etc.), red flags (Red Flags) are used as ratios, indicators, predictors of information obligation violations (FRM), i.e., as potential independent variables for created

detection models. Examples of literature reviewing Red Flags include Rezeaa, Riley 2010; Moyes 2008; Niewscheitz et al. 2000; Apostolou et al. 2001 and the latest work containing numerous tabular compilations of indicators, red flags, and extensively discussing FRM research methods is the work by Albizri, Appelbaum, Rizzotto from 2019, which is an extremely valuable and systematizing contribution to FRM literature, especially from a methodological perspective. Among red flags, two areas dominate: finance literature using financial ratios (Bragg 2007; Wuerges, Borba 2014; Kanapickiene, Grundienie 2015; Zainudin, Hashim 2016) and corporate governance and CSR literature using non-financial indicators (Bell, Carcello 2000; Hasnan 2013 et al., Yen 2013; Poretti et al., 2018). Foreign studies indicate the simultaneous impact of both categories of indicators (Apostolou et al. 2001; Moyes 2008; Rezaee, Riley 2010). However, few such comprehensive models have been created, as FRM research predominantly considers each of the two categories separately (Healy, Wahlen 199916; Yen 2013; Kanapickiene, Grundiene 2015; Zainduin, Hashim 2016). The rationale for creating FRM detection tools lies in their multifaceted costs, wide range of consequences, and numerous affected groups (Amiram et al. 2018; Chen et al. 2013; CAQ 2010; Kalbers 2009; Levi, Burrows 2008). There is a steady increase in the average duration of financial fraud (Deloitte Forensic Center 2009), limited effectiveness and ability of supervisory authorities (Amiram et al. 2018; NIK 2015), and a deepening real information asymmetry between corporate insiders and investors, especially unsophisticated investors. This results in loss of trust (Tipgos, Keefe 2004) and reluctance to participate in the market (Gianetti, Wang 2016), causing its improper functioning, potentially limiting the country's economic development and requiring the implementation of stimulating strategies (EBRD 2019; SRRK 2019; Laeven 2014). These phenomena occur in Poland. The use of logit models to determine FRM and their high effectiveness is evident in contemporary research (e.g., Yendrawati et al. 2019; Kanapickiene, Grindiene 2015; Perols 2011; Ravsankar et al.2011; Lenard, Alam 2009).

The author's research aims to create a logit model to detect Polish public companies highly likely involved in FRM, with variables in the form of statistically significant Red Flags from financial and non-financial areas based on publicly available information. Both the model as a whole and the list of potential Red Flags taken for research at the data preprocessing stage can constitute a valuable contribution for market participants and other stakeholders, as they can be used in various ways. The effectiveness of the logit model for detecting FRM is influenced by, among other things, ensuring a broad list of Red Flags covering various financial and non-financial areas, collected through an in-depth literature review (Kanapickiene, Grundiene 2015 pp. 323-324). National conditions and limitations related to data availability

for potential Red Flags should be considered. Then, the data preprocessing/selecting Red Flags stage (determining the statistical significance of variables – Red Flags and their final selection for the model) should be correctly conducted, where from a list of potential variables – for example, in the context of CEE countries – over fifty Red Flags, fewer than ten were selected for the final model after testing their significance (Kanapickiene, Grundiene 2015 pp. 323-326).

Table 1: Examples of the Research Methods Evolution for Financial Fraud Detection

Research Method	**Timespan of Method Employment in Publications**	**Most Prominent Authors**
Neural network	1997-2002	(Aleskerov et al. 1997); (Green and Choi 1997); (Busta and Weinberg 1998); (Feroz et al. 2000); (Calderon and Cheh 2002)
Logistic Regression	1998-2002	(Summers and Sweeney 1998); (Beneish 1999); (Abbott et al. 2000); (Bell and Carcello 2000); (Spathis et al. 2002); (Spathis 2002) and currently: (Wuerges and Borba 2014); (Kanapickiene and Grundienie 2015)
Fuzzy logic	1997 1998	(Deshmukh et al. 1997); (Deshmukh and Talluru 1998)
Other statistical methods	1996-1997	(Hansen et al. 1996); (Stolfo et al. 1997)

Source: Own elaboration based on (Aleskerov et al. 1997); (Green and Choi 1997); (Busta and Weinberg 1998); (Feroz et al. 2000); (Calderon and Cheh 2002) (Summers and Sweeney 1998); (Beneish 1999); (Abbott et al. 2000); (Bell and Carcello 2000); (Spathis et al. 2002); (Spathis 2002) and currently: (Wuerges and Borba 2014); (Kanapickiene and Grundienie 2015) (Deshmukh et al. 1997); (Deshmukh and Talluru 1998) (Hansen et al. 1996); (Stolfo et al. 1997)

Table 2.: Methodological Overview of Financial Reporting Misconduct Detection and Prediction: Modern Methods

Authors of the Study	**Title of the Publication**	**(Journal, Publisher)**	**Year**	**Research Method: 1.Country, 2.FRM Ratio (FRM/ non-FRM) or (Simple Ratio) 3. Modelling Methods**
S. Kotsiantis, E. Koumanakos, D. Tzelepis	Forecasting fraudulent financial statements using data mining	Int. J. Comput. Intell. 3 (2006) 104–110	2006	Greece, 41/123, C4.5 SVM
E. Kirkos, C. Spathis, Y. Manolopoulos	Data mining techniques for the detection of fraudulent financial statements	Expert Syst. Appl. 32 (2007) 995–1003	2007	Greece, 38/38, BBN MLP ID3
B. Hoogs, T. Kiehl, C. Lacomb, D. Senturk	A genetic algorithm approach to detecting temporal patterns indicative of financial statement fraud	Intell. Syst. Account. Financ. Manag. 15 (2007) 41–56	2007	US, 51/339, GA
B. Bai, J. Yen, X. Yang	False financial statements: characteristics of China's listed companies and cart detecting approach	Int. J. Inf. Technol. Decis. Mak. 7 (2008) 339–359	2008	China, 24/124, CART Logistic Regression
C. Gaganis	Classification techniques for the identification of falsified financial statements: a comparative analysis	Intell. Syst. Account. Financ. Manag. 16 (2009) 207–229	2009	Greece, 199/199, SVM MLP LDA
M. Cecchini, H. Aytug, G.J. Koehler, P. Pathak	Making words work: using financial text as a predictor of financial events	Decis. Support Syst. 50 (2010) 164–175	2010	US, 61/61, Text mining + SVM Text mining (standalone)
S. Goel, J. Gangolly, S.R. Faerman, O. Uzuner	Can linguistic predictors detect fraudulent financial filings?	J. Emerg. Technol. Account. 7 (2010) 25–46	2010	US, 126/622, Text mining
P.M. Dechow, W. Ge, C.R. Larson, R.G. Sloan	Predicting material accounting misstatements	Contemp. Account. Res. 28 (2011) 17–82	2011	US, 293/79358, Logistic Regression
P. Ravisankar, V. Ravi, G. Raghava Rao, I. Bose	Detection of financial statement fraud and feature selection using data mining techniques	Decis. Support Syst. 50 (2011) 491–500	2011	China, 101/101, PNN GP GMDH MLP SVM
S.L. Humpherys, K.C. Moffitt, M.B. Burns, J.K. Burgoon, W.F. Felix	Identification of fraudulent financial statements using linguistic credibility analysis	Decis. Support Syst. 50 (2011) 585–594	2011	US, 101/101, Text mining + C4.5 text mining + Naïve Bayes text mining + SVM
J. Perols	Financial statement fraud detection: an analysis of statistical and machine learning algorithms	Audit. A J. Pract. Theory. 30 (2011) 19–50	2011	US, 51/15934, SVM Logistic Regression C4.5 MLP

Authors of the Study	Title of the Publication	(Journal, Publisher)	Year	Research Method: 1.Country, 2.FRM Ratio (FRM/ non-FRM) or (Simple Ratio) 3. Modelling Methods
S. Huang	Fraud detection model by using support vector machine techniques	Int. J. Digit. Content Technol. Its Appl. 7 (2013) 32–42	2013	Taiwan, "ratio 1:4", SVM Logistic Regression
S. Chen, Y.J.J. Goo, Z. De Shen	A hybrid approach of stepwise regression logistic regression support vector machine and decision tree for forecasting fraudulent financial statements	Sci. World J. (2014) 1–9	2014	Taiwan, 66/66, C5.0 Logistic Regression SVM
X. Li, W. Xu, X. Tian	How to protect investors? A GA-based DWD approach for financial statement fraud detection	2014 IEEE Int. Conf. Syst. Man Cybern. San Diego IEEE 2014 pp. 3548–3554	2014	US, 12/45, DWD SVM C45 MLP
C.C. Lin, A.A. Chiu, S.Y. Huang, D.C. Yen	Detecting the financial statement fraud: the analysis of the differences between data mining techniques and experts' judgments	Knowl. Based Syst. 89 (2015) 459–470	2015	Taiwan, 127/447, MLP CART Logistic Regression
C. Liu, Y. Chan, S. Hasnain, A. Kazmi, H. Fu	Financial fraud detection model: based on random forest	Int. J. Econ. Financ. 7 (2015) 178–188	2015	China, 138/160, RF SVM CART k-NN Logistic Regression
L. Purda, D. Skillicorn	Accounting variables deception and a bag of words: assessing the tools of fraud detection	Contemp. Account. Res. 32 (2015) 1193–1223	2015	US, 1407/4708, Text mining
C.S. Throckmorton, W.J. Mayew, M. Venkatachalam, L.M. Collins	Financial fraud detection using vocal linguistic and financial cues	Decis. Support Syst. 74 (2015) 78–87	2015	US, 41/1531, Audio + text mining AUC
Y.J. Kim, B. Baik, S. Cho	Detecting financial misstatements with fraud intention using multi-class cost-sensitive learning	Expert Syst. Appl. 62 (2016) 32–43	2016	US, 788/2156, Logistic Regression SVM BBN
S. Goel, O. Uzuner	Do sentiments matter in fraud detection? Estimating semantic orientation of annual reports	Intell. Syst. Account. Financ. (2016)	2016	US, 180/180, Text mining

Source: Own elaboration

Note B.1.: The "FRM Ratio" involves dividing the pooled sample into FRM entities and non-FRM entities, calculated as the number of FRM entities divided by the number of non-FRM entities. For further insights and elaboration on the ratio "FRM: non-FRM Ratio", see (Jan 2018; Kotsiantis et al. 2006).

Notes B.2.: AUC – area under the ROC curve BBN – Bayesian belief network CART – classification and regression tree DWD - distance weighted discrimination GA – genetic algorithm GHSOM – growing hierarchical self-organizing map GMDH – group method data handling GP – genetic programming k-NN – k-nearest neighbors

LDA – linear discriminant analysis LR – logistic regression MLP – multilayer perceptron PNN – probabilistic neural network RBF – radial basis function neural network RF – random forest and SVM – support vector machine.

Note B.3.: FRM Ratio (FRM/ non-FRM) or (Simple Ratio) as provided in the original text of a given study.

5.6 Methodological Limitations of the Financial Reporting Misconduct

Table 1: offers Examples of the Research Methods Evolution for Financial Fraud Detection, while Table 2 presents Methodological Overview of Financial Reporting Misconduct Detection and Prediction: Modern Methods. A crucial aspect of discussing research methodology for detecting and predicting FRM involves its specific limitations and unique challenges (Amiram et al. 2018, p. 733). These challenges, along with new opportunities, highlight the evolving methods and approaches in FRM detection research. Instead of identifying fraud (FRM) ad hoc, researchers from Columbia Business School, Fisher College of Business, Foster and Haas Schools of Business, and Duke School of Law propose relying on decisions by the U.S. Securities and Exchange Commission (SEC) and the Department of Justice (DOJ). Cases assigned to the "FRM" group involve entities with confirmed violations, while the "non-FRM" group involves those without charges. Although Type II errors (fraud exists, but no charges) occur, SEC and DOJ officials rarely lose court cases, making Type I errors (charges filed, but no fraud) marginal. Alternatively, researchers can use Securities Class Action Lawsuits (SCALS) alleging violations of SEC Rule 10b-5. However, many SCALS may be unfounded, requiring researchers to differentiate between justified and unjustified FRM-related lawsuits (Amiram et al. 2018, pp. 733-734).

In Poland, the only institution competent to impose civil sanctions for violations of information obligations is the Polish Financial Supervision Authority (KNF), and all civil sanctions imposed throughout the KNF's operation years are found in a single, publicly available database maintained by the supervisory body, along with additional (publicly disclosed by the authority) communications. Currently, the KNF database consists of a few unformattable, machine unreadable tables in PDF format, separated by periods, i.e., 2006-2018; 2019, and 2020, 2021, 2022 each containing the following categories of information: "List of penalties imposed by the Polish Financial Supervision Authority in 2019: No.; Decision side; Violation; Penalty amount; Decision date," "List of penalties imposed by the Polish Financial Supervision Authority for the years 2006 – 2018: No.; Decision side; Violation; Penalty amount; Decision date," "List of penalties imposed by the Polish Financial Supervision Authority in 2020: No.; Decision side; Violation; Penalty amount; Decision date." An

additional supplement is the so-called "KNF Communications on Monetary Penalties" (KNF 2020a, 2020b). In 2018, a broader "umbrella term" was introduced into the literature, more appropriate to cover all actual questionable practices in the area of corporate disclosure (Financial Reporting Misconduct), to ensure uniformity of terms in the study of the phenomenon (Amiram et al. 2018, pp. 734-735). FRM encompasses a wide category of diverse irregularities (Reurink 2016, pp. 7-8; Amiram et al. 2018) continuously evolving, diverse voluntary and mandatory corporate disclosures (Zakolyukina 2017; Liu 2016; Hoberg, Lewis 2015; Rezaee, Riley 2010; Moyes 2008; Loebbecke et al. 1989). In Polish, FRM translates as "violations of information obligations in reporting or fulfilling information obligations" (KNF 2019; Kurek, Górowski 2019; Comporek 2017).

Financial fraud involves four basic elements: (a) misrepresentation, incorrect presentation, or omission of a fact; (b) the misrepresentation must be material; (c) it must be committed with intent, negligence, or recklessness; and (d) in private U.S. lawsuits, the misrepresentation must be causally related to the plaintiff's loss. The definition of FRM also includes misrepresentation, misstatement, and omission, considering materiality and whether the act was intentional, knowing, or reckless. Explaining these terms, we refer to: misleading, inaccurate presentation, or omission that is material and intentional or committed knowingly or should have been known due to due diligence (e.g., contractual obligations or legal duty like an auditor's) (Amiram et al. 2018). Additional elements depend on transaction types. In particular, in the context of FRM and determining whether a case should be classified as fraud, there is a problem known as "fraud by hindsight" - the source of this problem, leading to incorrect classification of a case as fraud, is ex post rationalization (i.e., classifying the case as fraud from a later perspective). The problem of "fraud by hindsight," and thus ex post rationalization and incorrect classification, is significant in the context of FRM, to the extent that American law schools dedicate separate publications to this issue (Gulati et al. 2005) and documenting the impact of hindsight on judgment is also a well-described topic, studied as early as the 1970s (Fischhoff 1975).

Amiram et al. (2018) identified four main challenges in contemporary FRM literature. The first problem is the diversity and definitional discrepancy of FRM (violations of information obligations), both in theory and in business and legal practice. This issue of partial observability, often ignored or acknowledged as a serious but difficult problem, can significantly limit the correct and reliable interpretation of previous results and observations in the literature. Thirdly, FRM is associated with many other simultaneously occurring factors, such as the financial conditions of companies, complicating the distinction and identification

of cause and effect. Fourthly, different FRM databases bring diverse observations and yield different results (Amiram et al. 2018; Karpoff et al. 2017).

Main challenges and limitation for the FRM detection and prediction modelling are:

(1) Multidimensionality, multidisciplinarity, and rapid evolution of methods for building models for detecting and predicting FRM are important issues. The literature on detecting violations of information obligations draws from many areas, incorporating and then adapting solutions, insights, and discoveries from areas such as earnings management detection (Amiram et al. 2018), bankruptcy prediction (Agarwal 2007; Beaver 1996; Ohlson 1980; Altman 1968), risk management (Jan 2018; SAS; AICPA), cash flows research (Ward, Foster 1997; Casey, Bartczak 1985; Gentry, Newbold 1985); corporate governance (Bell, Carcello 2000; Hasnan 2013 et al., Yen 2013; Poretti et al., 2018); and auditing (Albrecht et al. 2015), including achievements related to estimating the probability of a company being involved in FRM (Bell, Carcello 2000) and estimating the probability of detecting that a company will be involved in FRM (Wang 2011).

(2) Another challenge are: Partial observability, Observational Bias, and Data Sources on FRM Cases: Accounting and Auditing Enforcement Releases. The dependent variable in FRM detection and prediction research is most often treated as a dummy variable, where 0 is assigned to companies not involved in violating information obligations "non-FRM," and 1 is assigned to companies involved in violating information obligations "FRM" (e.g., a study from the CEE region – Kanapickiene, Grundienie 2015). Access to historical and archival data in FRM research is essential, as FRM is usually discovered and publicly disclosed through, for example, AAER or other government documents several years after it begins (Wuerges, Borba 2014). The average duration of FRM, according to Deloitte research based on AAERs, was as long as seven years in 2008, meaning that on average, in 2008, FRM disclosed in an SEC decision – AAER began in 2001 (Deloitte Forensic Center 2009). Referring to the above regularity, another reason why FRM detection tools are extremely needed in business practice can be indicated - the alarming factor is also the steady increase in the average duration of financial fraud (2000-2008) until detection, as well as the response from the supervisory body (Deloitte Forensic Center 2009).

(3) Data Sources on FRM Cases are also challenging: Accounting and Auditing Enforcement Releases. There are several studies in the literature that have used probit and logit models to estimate the probability of FRM occurrence or to identify variables affecting that probability (Wuerges, Borba 2014). In most studies, AAER has also been used to build the dependent variable (Abbott et al. 2000; Brazel et al. 2009; Crutchley, Jensen et al. 2007;

Erickson et al. 2006; Ettredge et al. 2008; Johnson et al. 2008; Lennox; Pittman, 2010; Miller 2006; Skousen, Wright, 2008; Persons 1995). Other authors have used fraud cases published in the financial press as a standalone method or as a complement to AAER (Beasley 1996; Beneish 1997; Lee et al. 1999; Summers, Sweeney, 1998). AAERs - Accounting and Auditing Enforcement Releases are, briefly defined for the purposes of this essay, documents, decisions by the U.S. Securities and Exchange Commission, as the law enforcement body in U.S. capital markets, concerning the enforcement of regulations in the area of reporting, auditing, and accounting in the USA. They are often treated as a data source for FRM research (Amiram et al. 2018, p. 747). There are also scientific papers where methods for estimating the probability that an FRM case will not be detected have been applied (Wang 2011). Wang used the method proposed in the 1980s by Lin, in which the probability of fraud and the probability of detecting fraud are estimated separately (Lin 1980). The model used by Wang requires appropriately identifying a set of variables that affect the probability of detecting fraud. Other papers also use different research approaches - for example, estimating the unconditional probability of detecting FRM (without using an additional set of independent variables).

An interesting measure is estimating the percentage of unreported, undetected FRM frauds in U.S. public companies. In this way, the effectiveness of the capital market supervisory authority, i.e., the "law enforcement" of this area (in the USA, the SEC is the authority), can be analyzed, and the effectiveness of the authority here is measured in the context of its efficiency in detecting and combating FRM fraud (Wuerges, Borba 2014). It is possible to try to estimate such measures of the effectiveness of the SEC and KNF and then make a comparison, looking for the reasons for the diagnosed state of affairs (Becker 1968). One issue highlighted by this approach is that many fraud cases remain undetected, with some potentially never being discovered (Becker 1968). The SEC, as a supervisory authority, may prioritize large, high-profile FRM cases, leading to a higher detection and sanction rate for these cases while less significant ones receive less attention and may not be pursued or disclosed in AAER (Wuerges and Borba 2014). The SEC may also suspect intentional misstatements in financial reports but lack sufficient evidence to win a court case, resulting in only a small portion of FRM frauds being fully investigated and publicly disclosed (Wuerges and Borba 2014). Additionally, the SEC's limited resources—human, financial, etc.—mean only a fraction of cases can be investigated and prosecuted. Class actions also face a minimum harm threshold (expressed in dollars) to be considered by the court, with lawsuits below this threshold dismissed (Amiram et al. 2018).

(4) Moreover, Binary choice models, Comparability and effectiveness of models. Type I Errors, Type II Errors, Misclassification problems, Misclassification Issues Matrix remain as challenges for FRM detection and prediction research methodologies, as well as Binary choice models, Comparability and effectiveness of models. Considering the differences in audit and reporting standards between countries (presented in Table) and research periods, objective comparability of the accuracy of different methods and models used in these studies is difficult (Hajek, Henriques 2017). Accuracy ranges were very wide despite the use of "intelligent detection methods." For U.S. companies, the accuracy of methods ranged from about 64% (Dechow, Ge, Larson, Sloan 2011) to over 91% (Li, Xu, Tian 2014), while the highest accuracy achieved in Greek market studies was over 95% (Kotsianitis et al. 2006). For Chinese companies, it was over 98% (Ravisankar et al. 2011), and for Taiwanese companies, it was 92.8% (Lin et al. 2015). Type I Errors, Type II Errors, Misclassification problems, Misclassification Issues Matrix. The relatively small amount of data on entities involved in FRM is a problem for forensic accounting, given its negative impact on Type I and Type II error levels. Although some researchers find and use ways to circumvent this (e.g., Dechow F-Score; methods described by Wuerges, Borba in 2014; or described by Jan in 2018, etc.), another type of solution could be enabling models to "learn" from new information about FRM. FRM detection can also be partially defined as a classification problem, and the use of machine learning methods could improve accuracy and reduce Type II errors, which are usually costly for investors and regulators (Kozlov et al. 2018). FRM detection is a binary classification problem with four possible classification outcomes (Perols 2011): (1) TP - True Positive (an entity that committed FRM was correctly classified as an FRM entity); (2) FN - False Negative (an entity committing fraud was incorrectly classified as non-FRM); (1) TN - True Negative (an entity not committing fraud was correctly classified as non-FRM); and (2) FP - False Positive (an entity not committing fraud was incorrectly classified as FRM). Historically, in most cited studies, the True Negative (TN) and True Positive (TP) accuracy measures were used to determine the predictive power of the method (West, Bhattacharya 2016). False Negative (FN) and False Positive (FP) classifications are associated with different misclassification costs (Perols 2011). Higher sensitivity (True Positive Rate) of the method is preferred over greater specificity (True Negative Rate) in detecting FRM in intelligent detection/prediction methods (Hajek, Henriques 2017).

Type I errors (False Positives) in the detection of fraudulent financial statements occur when an entity not committing fraud is incorrectly identified as committing fraud. This misclassification can lead to several adverse consequences, including unwarranted

investigations, reputational damage, and financial losses for the falsely accused entity. The costs associated with Type I errors are significant, as they may involve legal fees, disruption of business operations, and loss of stakeholder trust (Perols 2011; West and Bhattacharya 2016). Moreover, the time and resources expended in investigating false positives could have been better utilized in scrutinizing actual fraudulent activities, thereby reducing the overall efficiency of the fraud detection system (Amiram et al. 2018). Type II errors (False Negatives) occur when an entity committing fraud is incorrectly classified as non-fraudulent. This type of error is particularly costly and dangerous because it allows fraudulent activities to continue undetected, potentially causing severe financial losses for investors and undermining the integrity of the financial market (Hajek and Henriques 2017). Kozlov et al. (2018) highlight that Type II errors are especially costly for investors and regulators because undetected fraud can escalate over time, leading to significant economic damage and erosion of investor confidence. The costs of Type II errors include not only the direct financial losses but also the long-term impact on market stability and regulatory credibility (Perols 2011). Additionally, failure to detect fraud early can result in more complex and extensive fraud schemes, which are harder and more expensive to investigate and resolve later on (Amiram et al. 2018). The prolonged existence of undetected fraud undermines trust in the financial reporting system and can lead to systemic risks within the market (Kozlov et al. 2018). Overall, while both types of errors are detrimental, Type II errors are generally considered more severe in the context of financial fraud detection due to their potential for extensive and prolonged harm. Hence, enhancing the sensitivity (True Positive Rate) of detection methods is often prioritized to mitigate the risk of undetected fraud (Hajek and Henriques 2017). A binary classification problem matrix, often referred to as a confusion matrix, represents the true condition or actual state of a company—whether it is engaging in financial reporting misconduct (FRM) or not (non-FRM) (Fawcett 2006). This matrix is used to evaluate the performance of classification models by comparing the predicted classifications against the true classifications (Hand and Till 2001). In this context, the true condition indicates the actual status of the company, whether it has committed fraud (FRM) or has not (non-FRM), providing a benchmark to measure the accuracy and reliability of fraud detection models (Chicco and Jurman 2020). This detailed comparison allows for the identification of the model's strengths and weaknesses, particularly in distinguishing between fraudulent and non-fraudulent entities (Powers 2011).

Table 3: Binary Classification Problem Matrix Reality: Actual True Condition FRM or Non-FRM versus Model's Prediction

Sample	**True Actual Condition positive "FRM"**	**True Actual Condition Negative "Non-FRM"**
Model Predicted Condition Positive "FRM"	FP - False Positive (False Alarm, Type I Error)	TP – True Positive
Model Predicted Condition Negative "Non-FRM"	FN – False Negative (Missed/ Undetected fraud, Type II Error)	TN – True Negative

Source: Own elaboration based on: (Amiram et al. 2018) (Hajek Henriques 2017) (Perols 2011)

Note C.1: The extension of this Table, i.e. "The Confusion Matrix" will be employed (selectively) in Chapter 6.

Table 3: presents Binary Classification Problem Matrix Reality: Actual True Condition FRM or Non-FRM versus Model's Prediction. Binary Classification Problem Matrix Reality: True Condition (True actual state of the company – state: FRM; non-FRM)" refers to the actual condition of the company, which could either be committing financial reporting misconduct (FRM) or not (non-FRM). In the context of financial fraud detection, this binary classification is essential to differentiate between fraudulent and non-fraudulent entities. Accurate classification helps in the effective regulation and enforcement of financial laws, preventing financial losses and maintaining market integrity (Perols 2011). Misclassifications, specifically Type I and Type II errors, can have significant consequences and costs. Type I errors (false positives) occur when non-fraudulent entities are incorrectly classified as fraudulent, potentially leading to unnecessary investigations and reputational damage. Type II errors (false negatives) occur when fraudulent entities are incorrectly classified as non-fraudulent, allowing the fraud to continue undetected, which can be particularly costly for investors and regulators (Kozlov et al. 2018). High sensitivity (True Positive Rate) is preferred over greater specificity (True Negative Rate) in detecting financial reporting misconduct to minimize these costly errors (Hajek and Henriques 2017).

Based on the values included in the matrix, one can calculate the indicators for each of the four classification results: True Positive Rate (Sensitivity); True Negative Rate (Selectivity Specificity); False Positive Rate (Fall-out – false alarm, Type I Error); False Negative Rate (Missed – undetected fraud, Type II Error). Based on the values included in the matrix, one can also (theoretically) calculate the prevalence indicator, which shows how often entities involved in FRM occur in the entire sample. This allows inferring how common it is for entities to engage in information obligation violations in a given market. However, unlike medical research, in the case of FRM research, we must consider the problem of "observational bias" or "partial observability". To avoid this problem, one should apply methods to correct the logit model as, for example, presented by Wuerges Borba, where the estimation of the logit model was corrected for the problem arising from undetected (in actual data) fraud in entities (Wuerges Borba 2014). One can also calculate the ACC indicator – accuracy, and also calculate: Positive predictive value (PPV) – positive predictive value (describes the probability that a company receiving a positive test result actually has the FRM feature) along with Negative predictive value (NPV) – negative predictive value (describes the probability that a company receiving a negative test result actually does not have the given feature: is non-FRM) and False omission rate (FOR) – measures the proportion of False Negative observations that are incorrectly rejected (missed by the test – actual fraud not detected concerning all negatives) and False discovery rate (FDR) – measures the proportion of False Positive observations incorrectly detected as frauds in relation to all positives. One can also define indicators: Positive likelihood ratio and Negative likelihood ratio, among others. The confusion matrix includes four possible outcomes: true positives (TP), false negatives (FN), false positives (FP), and true negatives (TN). Several other, more advanced key metrics are derived from these values. The True Positive Rate (TPR), also known as Recall, Sensitivity, or Probability of Detection, is calculated by dividing the number of true positives by the total number of actual positives (TPR = TP / P). The False Negative Rate (FNR), or Miss Rate, is determined by dividing the number of false negatives by the total number of actual positives (FNR = FN / P). The False Positive Rate (FPR), also called the Probability of False Alarm, is found by dividing the number of false positives by the total number of actual negatives (FPR = FP / N). Conversely, the True Negative Rate (TNR), or Specificity, is calculated by dividing the number of true negatives by the total number of actual negatives (TNR = TN / N). The Positive Predictive Value (PPV), also known as Precision, is the ratio of true positives to the total number of positive predictions (PPV = TP / PP). The False Discovery Rate (FDR) is the proportion of false positives among all positive predictions (FDR = FP / PP). The Negative Predictive Value (NPV) is the ratio of true negatives

to the total number of negative predictions (NPV = TN / PN), while the False Omission Rate (FOR) is the proportion of false negatives among all negative predictions (FOR = FN / PN). Accuracy (ACC) is a measure of overall correctness, calculated by dividing the sum of true positives and true negatives by the total population (ACC = (TP + TN) / (P + N)). Balanced Accuracy (BA) is the average of the True Positive Rate and the True Negative Rate (BA = (TPR + TNR) / 2). The F1 Score, which balances Precision and Recall, is calculated as the harmonic mean of Precision and Recall (F1 = 2 * PPV * TPR / (PPV + TPR)). The Fowlkes–Mallows Index (FM) is the geometric mean of Precision and Recall (FM = √(PPV * TPR)). The Matthews Correlation Coefficient (MCC) is a measure of the quality of binary classifications, calculated using a formula that incorporates all four values of the confusion matrix. The Threat Score (TS), also known as the Critical Success Index or Jaccard Index, is the ratio of true positives to the sum of true positives, false negatives, and false positives (TS = TP / (TP + FN + FP)). Informedness, or Bookmaker Informedness (BM), is the sum of the True Positive Rate and the True Negative Rate minus one (BM = TPR + TNR - 1). The Prevalence Threshold (PT) is calculated as the square root of the product of the True Positive Rate and the False Positive Rate minus the False Positive Rate (PT = √(TPR * FPR) - FPR). The Positive Likelihood Ratio (LR+) is the ratio of the True Positive Rate to the False Positive Rate (LR+ = TPR / FPR), and the Negative Likelihood Ratio (LR−) is the ratio of the False Negative Rate to the True Negative Rate (LR− = FNR / TNR). Markedness (MK), or DeltaP (Δp), is the sum of Precision and Negative Predictive Value minus one (MK = PPV + NPV - 1). The Diagnostic Odds Ratio (DOR) is the ratio of the Positive Likelihood Ratio to the Negative Likelihood Ratio (DOR = LR+ / LR−). These metrics provide comprehensive insights into the performance of classification algorithms, each highlighting different aspects of predictive accuracy and reliability (Stehman 1997) (Powers 2011) (Fawcett 2006) (Piryonesi and El-Diraby 2020) (Powers 2011) (Ting 2011) (Brooks et al. 2015) (Chicco and Jurman 2020) (Chicco et al. 2021) (Tharwat 2018) (Chicco and Jurman 2020) (Fawcett 2006) (Provost and Fawcett 2013) (Powers 2011) (Ting 2011) (Brooks et al. 2015) (Chicco and Jurman 2020) (Chicco et al. 2021) (Tharwat 2018) (Piryonesi and El-Diraby 2020) (Rialland 2005).

Table 4: Comparison of the Effectiveness of Different Methods Tested by Researchers On The Same Samples

Authors of the study	Method of modeling and comments	Type I and II Errors (if presented in the study, in [%])
(Kirkos et al. 2007)	Neural Network successfully classified 80% of validation data	Type II 17%
(Kirkos et al. 2007)	Decision tree ID3 (The ID3 (Iterative Dichotomiser 3) decision tree) with overall accuracy 72.6%	Type II 25%
(Jan 2018)	Support Vector Machine (SVM) + C5.0 (C5.0 Decision Tree Algorithm) with an overall accuracy of 75.29%	Type I 25.70% Type II 23.72% Overall 24.71%
(Jan 2018)	ANN (Artificial Neural Network) + C5.0 (C5.0 Decision Tree Algorithm) with an overall accuracy of 88.02%	Type I 12.61% Type II 11.36% Overall 11.98%

Source: Own elaboration based on (Kirkos et al. 2007) and (Jan 2018)

Table 4 describes Comparison of the Effectiveness of Different Methods Tested by Researchers on the Same Samples. (5) Another methodological Problems are related to Corrected and Traditional Logit Model (Corrected logit model vs. Uncorrected) and Conditional and Unconditional Likelihood of Fraud - FRM (Conditional vs. Unconditional likelihood of fraud). Binary models (e.g., logit and probit) are often used in the literature. However, they often do not account for undetected cases of fraud (FRM exists but is not detected) and therefore may present unreliable hypothesis tests. In the study by Wuerges Borba based on a sample of 118 companies accused of FRM by the SEC, the authors estimated a logit model that addresses problems arising from undetected fraud in American entities (Wuerges Borba 2014). The literature allows for the existence of situations where only a small part of FRM is detected, fully investigated, and disclosed to the public. In regression analysis, this limitation generates problems with the misclassification of the dependent variable, especially the occurrence of many entities incorrectly excluded from the list of fraud cases. These errors can significantly harm the model, affecting parameter estimates. Therefore, there is a theoretical possibility that this may affect hypothesis testing, resulting in misleading and unreliable conclusions (Wuerges Borba 2014). Hausman Abrevaya and Scott-Morton (HASM) developed

a method to minimize this problem and estimate the probability that a fraud case will not be detected (Hausman et al. 1998). In the publication by Wuerges Borba nearly two decades later, they examined the results of applying this method in the context of FRM detection/prediction models and evaluated whether its results differ from those obtained with an uncorrected logit model (corrected logit model - using the HASM method (Hausman et al. 1998) vs. uncorrected logit model - without additional application of the HASM method). Of the six significant variables included in the traditional uncorrected logit model, three proved to be insignificant in the corrected model (Wuerges Borba 2014). The corrected logit model (using HASM (Hausman et al. 1998)) is also called the logit model with the misclassification parameter, and the uncorrected model is called the traditional logit model (Wuerges Borba 2014). The use of AI in detecting FRM has grown meaningfully, relying on a diversity of advanced techniques (Albizri et al., 2019), however, as mentioned before, data must meet specific requirements to be suitable for AI modelling, and small and shallow and often emerging markets do not meet those criteria (Gepp 2015, Jan 2018).

(6) Multicollinearity in FRM Detection and Prediction Research is a challenge as well. Multicollinearity occurs when independent variables in a regression model are correlated. This correlation is problematic because independent variables should be independent for the model to be used (if they are not, the model must be corrected until the problem is eliminated). If the degree of correlation between variables is high enough, it can cause problems with model fit, effectiveness, and correctness, and result interpretation. One can identify which variables are affected by multicollinearity and determine the strength of the correlation, so it is known what needs to be corrected. There is a straightforward test to assess the problem of multicollinearity in a regression model. The Variance Inflation Factor (VIF) identifies the correlation between independent variables and the strength of this correlation. Statistical software automatically determines VIF for each independent variable (Frost 2017). VIF starts from one and has no upper limit. VIF is also used in accounting research, particularly in developing FRM models (Nagy 2002). In particular, researchers perform statistical correlation analysis to eliminate the phenomenon of multicollinearity between independent variables (Hung Ha Binh 2017). To avoid problems with multicollinearity, the authors of the FRM detection model among American companies extracted seven factors from twenty-eight variables using the principal factors method. The results indicated that only about 2% of FRM cases were published in AAERs by the SEC during the study period (Wuerges Borba 2014).

(7) Variables in FRM Detection and prediction models are challenges and limitations and opportunities for effectiveness of the logit model for detecting FRM, as they heavily

influence it. To estimate a logit model for detecting/predicting FRM, it is necessary to identify a set of variables that explain the occurrence of such frauds. There are numerous (some complementary, some mutually exclusive) scientific concepts and theories explaining FRM and, more generally, the white-collar crime phenomenon. After reviewing them and relating them to specific country conditions, periods, etc., some of them can be used as a foundation, a starting point to understand the causes of FRM, thus serving as guidelines for selecting and organizing (classifying, dividing into subgroups) the set of potential independent variables (checklist) (Wuerges Borba 2014). The effectiveness of the logit model for detecting FRM is influenced, among other things, by ensuring a broad checklist of potential independent variables covering various financial and non-financial areas based on a thorough literature review (Kanapickiene Grundiene 2015, p. 323-324). One must consider country conditions and limitations related to data availability for potential Red Flags. The data preprocessing/selection of Red Flags stage (determining the statistical significance of variables – Red Flags and their final selection for the model) must be correctly carried out. The choice of red flag indicators for use as potential variables is based on previous FRM literature (Kotsianitis et al. 2006). This method is common in subsequent years' research (Yendrawati et al. 2019; Chen Wirth 2017; Kanapickiene Grundine 2015; Spathis 2002; Spathis et al. 2002; Fanning Cogger 1998). It is worth relying on the literature review of red flags (Albizri Appelbaum Rizzotto 2019; Mantone 2013; Brazel et al. 2009; Rezeaa Riley 2010; Moyes 2008; Niewscheitz et al. 2000; Apostolou et al. 2001). One can also add additional variables to capture as many predictors as possible that have not been previously identified or are related to the specific country's legal-economic conditions (Kotsianitis et al. 2006). For the most comprehensive review of red flags for FRM from a multidisciplinary point of view, see (Albizri et al. 2019).

Table 5: A Review Variables Selection and Pooled Samples in the FRM Detection and Prediction Models

Authors And Publication Year	**Number And Features Of Variables**	**Pooled Sample FRM: non-FRM (No. of FRM PTCs: No. of Non-FRM PTCs)**
Green and Choi (1997)	5 financial variables	46:49
Summers and Sweeney (1998)	Financial variables and variables based on insider information (non-public information)	51:51

Authors And Publication Year	Number And Features Of Variables	Pooled Sample FRM: non-FRM (No. of FRM PTCs: No. of Non-FRM PTCs)
Beneish (1999)	8 financial variables	50: 1758
Bell and Carcello (2000)	Subjective risk factors	77:305
Cecchini et al. (2010)	Advanced financial and non-financial (non-financial) variables	122:6427
Dechow et al. (2011)	11 financial variables	494:132967

Source: Own elaboration based on information provided in aforementioned studies

Note F.1: The number and characteristics of independent variables in the final model and the shape of the pooled sample with the relationship: entities involved in FRM and the selected sample of non-involved entities (FRM: non-FRM).

Note F.2.: Empirical studies in 2017 on companies in Vietnam examining the detection capability of the recognized model developed by Dechow et al. (Dechow et al. 2011) in Vietnamese conditions showed its limited detection-prediction capability concerning the model's variables, as the empirical study revealed that only one variable is significantly correlated (Hung Binh Ha 2017). This confirms the correctness of the approach to ensure an adequately broad checklist of potential variables for each market model in a given country and time horizon, considering specific country conditions already at the level of theoretical literature on the causality of FRM and indicating cause-effect relationships between potential variables and FRM.

Table 5 offers a Review Variables Selection and Pooled Samples in the FRM Detection and Prediction Models. (8) Another problem in the FRM research relates to sampling, i.e. Sample Total Sample Problems with Sample Selection, FRM/ non-FRM Ratio Indicator and Control of Environmental Factors (Sample characteristics, Sample Matching problems, i.e. FRM/ non-FRM Ratio Pooled Sample, Control for environment). Due to technical limitations, samples in FRM research concerning the U.S. market most often use companies listed on one, two, or all three stock exchanges, i.e., NYSE, NASDAQ, and AMEX, excluding or examining separately (due to significant differences in company characteristics, regulations, and probability of FRM) companies in early start-up phases operating in OTC markets (over the counter) and young companies listed outside main exchanges, e.g., in alternative trading systems. In the U.S., companies without data available in Compustat are also excluded (Wuerges Borba 2014). To control external environmental factors such as time periods, industry, and company size, sample matching can be used in the study to compare companies

included in the sample (sample matching). Referring to the FRM sample matching principles developed by Kotsiantis et al. 2006, each company from the FRM group is matched with three non-FRM companies with appropriate characteristics (size - asset value in the year before FRM detection, industry, etc.), using an FSF: Non-FSF ratio of 1: 3 (Jan 2018; Kotsiantis et al. 2006) or 1:4, depending on market size. Therefore, in the study of e.g. Taiwanese companies, the sample (pooled sample) included 160 companies, including 40 FRM companies and 120 non-FRM companies (Jan 2018), while Greek researchers, using this principle, created a sample of 164 companies, including 41 FRM companies (Kotsianitis et al. 2006). The PSM (Propensity Score Match) method and k-NN (k-Nearest Neighbour) can be used to ensure high sample quality, which is used in FRM research (Jao et al. 2019). One must also consider the natural limitations of emerging markets: short maximum time horizon of existence, relatively small market size, liquidity, and depth, low level of development and complexity (Jan 2018). There are also examples of FRM detection model studies where both classes in the pooled sample are balanced, i.e., the FRM: non-FRM ratio is 1:1, and they are called "balanced samples" (Kotsianitis et al. 2006). For example: 61/61 (Cecchini et al. 2010), 101/101 (Humpherys et al. 2011), and 38/38 (Spathis 2002; Kirkos et al. 2006). Doubts may arise that such a sample does not represent the actual broad market picture regarding the numerical ratio of companies involved in FRM and companies complying with regulations. As a reference point, one can indicate the pooled sample selected in contemporary research aimed at creating a FRM detection model based on financial indicators for Lithuania as a CEE country, where an FRM: non-FRM ratio of 40/125 was used (Kanapickiene Grundiene 2015). Analyzing the table presenting a review of samples and contemporary methods used in FRM research (Hajek Henriques 2017), it can be stated that the same methods used on different samples in the same countries are characterized by varying accuracy. The sample sizes in FRM studies vary widely, ranging from several dozen to several thousand, influenced by the study period, market size, market activity, law enforcement effectiveness, and companies' propensity to commit FRM. For example, samples from the relatively small and shallow emerging markets are small due to its small financial market and strict supervision by the local capital market authority, resulting in fewer violations (Jan 2018). In conclusion, the literature on FRM faces numerous challenges and opportunities. Challenges include establishing common detection methods, unobserved FRM activities, distinguishing between causes and effects, database biases leading to varied results, and generalizing findings from detected cases to all FRM cases. Despite these challenges, the field offers significant opportunities for future research, especially customized, country-specific FRM detection research.

6 Models for Detection of Financial Reporting Misconduct on the Polish Capital Market

6.1 Introduction

In chapters one to five, extensive evidence was presented, drawing from a wide array of international literature, both classic and contemporary, this included academic efforts, up-to-date institutional and governmental studies and reports, legislative documents, as well as formalized efforts by market participants in the form of reports and other initiatives from various stakeholders, concluding that FRM frequently occurred and hindered market development, especially in emerging markets, deepened information asymmetry, and prevented efficient capital allocation, hence it was necessary to protect stakeholders through a systematic approach to detecting FRM in regulated markets and developing tools enabling their widespread use. This was an unresolved area in Poland.

The dissertation hypothesized that it was possible and justified to construct a detection model of FRM specific to the Polish economy, as an emerging economy. The main objective of the work was to build a logistic regression model to detect FRM (detection of violations of disclosure obligations) in the regulated market in Poland based on financial and non-financial indicators derived from publicly available information. This goal was concretized through the identification and empirical verification of financial and non-financial indicators, which, having confirmed their predictive power (stemming from theory and empirical research for other markets), could serve as Red Flags. The work achieved successive partial goals: (1) a review of theories of economic development and the role of capital markets in economic development considering the characteristics of the CEE region; (2) an analysis of the evolution of theories concerning disclosure obligations and the presentation of its contemporary state; (3) a critical review of the achievements of FRM literature; (4) a review of FRM detection tools; (5) the creation of a list of red flags based on a review of the literature documenting the predictive ability of financial and non-financial indicators considering the specifics of emerging markets and Polish conditions.

The preliminary selection of potential predictors based on the review of red flag literature allowed for the formulation of individual research hypotheses for the empirical verification of each predictor as a useful indicator for the Polish market. The purposefulness of conducting this lay in the fact that the specifics of domestic markets and their environment, as well as the objectives of the study, defined the modeling methods, the nature of preselection,

and the results of empirical verification when selecting literary indicators as potential variables (Yao et al. 2019; Jan 2018; Hung et al. 2017; Kanapickiene, Grundienie 2015; Wuerges, Borba 2014; Murcia, Borba 2007). Especially rapidly transforming emerging markets (Murcia, Borba 2007) and their continuous intensive development (Albu et al. 2017; Laeven 2014) did not allow for the creation of universal models and required empirical verification of the relationship between the predictor and FRM each time. In the initial empirical stage of the research, the objective was to evaluate all relevant financial and non-financial ratios previously analyzed in the theoretical section that were also formally- legally publicly available, as well as feasibly accessible regarding specificities of Polish capital market and related infrastructure, which are utilized in fraud detection and prediction. A set of financial and non-financial ratios were examined in the study. Each financial ratio was assessed in both fraudulent and non-fraudulent CD. A theoretical survey of scientific literature indicated that financial and non-financial ratios—understood as indicators, and as compound and simple measures derived from publicly available financial and non-financial PTCs data—were analyzed to determine which ratios in mandatory CD (sensu largo) were most predictive of the advent of, occurrence of, or circumstances prompting to fraud committed by executive managers and company officers. Research was conducted by analyzing 33 fraudulent CD (experimental group) and 180 non-fraudulent CD (control group). Numerical values from the non-fraudulent CD were needed to identify differences between fraudulent and non-fraudulent CD. The period of investigation spanned from 2006-2023 and financial and non-financial data spanned across 2005-2023, as described below.

6.2 Data Sources and Data Collection

The author's own database, derived from all data sources and formats described previously, provides a comprehensive overview of the relational database named "AMDGMMHebdaHWieniawaPomian" ("MMHWP" in short), detailing the scope and size of the data handled. The database consists of a wide variety of tables, each with a different number of rows, columns, and total size in megabytes. The largest table, "Prt," contains over 6 million rows and occupies about 15,091 MB of storage, indicating a significant volume of data. In total, some tables have hundreds of thousands to millions of rows, while others contain just a few hundred, showing the variability in the data sets managed. The column counts also vary widely, with some tables having over 400 columns, demonstrating the complexity and richness of the data. The total size of the database is substantial, reflecting the extensive data management and

processing efforts required. It underscores the scale of the work involved in handling, maintaining, and analyzing the MMHWP database, which contains a comprehensive collection of data, essential for the project's objectives.

In Poland, the only competent institution for imposing sanctions on legal entities and individuals for violations of both EU and national CD obligations applicable to PTCs, i.e., those listed on the regulated market (primary and parallel), is the Polish Financial Supervision Authority (KNF). Penalties imposed by the KNF are found in the public governmental website of the KNF (a set of publicly available PDF files, uploaded by the KNF under the tile “Penalties imposed by the KNF” in the Section “About KNF”: List of penalties imposed by the KNF in 2024, 2023, 2022, 2021, 2020, 2019 and 2006-2018 (PDF files). Some of them were also accompanied by announcements, of various informational content (KNF 2020b). In response to the Author’s inquiry sent to the KNF Office on August 11, 2022, it was formally confirmed via a letter that the List of Penalties is not available on the KNF website in Microsoft Excel or CSV formats or as structured data, or any other similar arrangement, that is suitable for both human and machine readable format, but only as uploaded PDF files. Moreover, processing data from the aforementioned PDF files was extremely challenging due to their format. The files contained numerical and textual data, including complex, multi-sentence content with inconsistent structures and varied data types within individual table elements. The tables often started on one page and continued on the next. As a result, this required complex procedures, which will be described below, as similar issues were encountered with several other data sources.

Other data used in the research came from publicly available financial reports of listed companies available in the EIKON Refinitiv (formerly Thomson Reuters) database, Notoria online S.A. service, and the Polish Press Agency online service (PAP). EBI/ESPI announcements (PAP, Notoria), as well as data and indicators from the EIKON Refinitiv (formerly Thomson Reuters) databases, were also utilized. Eikon by Refinitiv is a comprehensive financial database that provides access to a wide range of real-time and historical data, including financial news, market data, analytics, and research tools for various asset classes. It offers advanced functionalities for data visualization, analysis, and collaboration, making it a valuable resource for financial professionals, investors, and researchers. However, the Polish capital market has limited coverage in Eikon, and Polish regulations regarding data and data format requirements are limited and outdated. Consequently, the database's capacities, filters, and analytical tools cannot be fully or even mostly employed in the case of small, underdeveloped markets that lack structured data.

Warsaw Stock Exchange statistical data were also used. Supplementary information was derived from announcements published on company websites, WSE announcements, articles in industry journals (Puls Biznesu, Parkiet), publications of market associations and institutes (SII - Association of Individual Investors, Association of Stock Exchange Issuers, IIA Poland), the Issuers' Obligations Register - KDPW, collective reports (CSRinfo, Ministry of Finance, Business Ethics Forum), and the SIP Legalis database or rather service. Other databases that were employed for data collection were, i.a. foremostly Stockwatch.pl (StockWatch.pl Sp. z o.o.) The service provides, among other things, up-to-date and verified financial data of companies, current news, tools for fundamental and technical analysis, analyses and commentary from professional independent financial experts who avoid conflicts of interest, as well as a moderated user forum. It disseminates publicly available data on PTCs; however, the data available at a non-commercial level are in non-structured formats and spread through the webpage in un-structured manner, so required manual collection. Notoria does not contain complete financial statements for dead companies, only a few selected general values from selected reports in a minimal number.

During the data collection from the Eikon database, formal active guidance and assistance were obtained from a Customer Support Executive at LSEG (London Stock Exchange Group) via email due to technical issues encountered, such as errors and crashes related to the database. Assistance was also provided on the nomenclature and formulas for various LSEG Eikon Refinitiv-developed measures and indices, as filters and measures in Eikon have their own specific names and are categorized with proprietary Eikon labels. Responses were received for all queries, and support was provided concerning LSEG Eikon Refinitiv nomenclature and formulas. This occurred in the first quarter of 2024. The Product Information and Indices Development Department of the Warsaw Stock Exchange (GPW w Warszaawie Dział Rozwoju Produktów Informacyjnych i Wskaźników) responded to a formal written inquiry regarding historical index portfolios for selected stock indices. Although these are publicly available data, they are not uploaded on the GPW Benchmark website due to their archival nature. The department provided the requested data in a formal manner, with the condition that any use of the data must include a citation acknowledging the source as the Warsaw Stock Exchange, Product Information and Indices Development Department. This occurred in the second quarter of 2024. Statistical Yearbooks of the Warsaw Stock Exchange (GPW) and other publicly available reports from GPW in Warsaw were utilized. Supplementary information was obtained from GPW announcements, as well as additional data and insights from DPSN workshops (Dobre Praktyki Spółek Notowanych na Giełdzie, or DPSN Good

Practices of Listed Companies). Also InfoSfera GPW w Warszawie partner service was used as data source. Also MarketScreener (Surperformance SAS, Annecy, France) was employed for additional information. During data preprocessing the technical support from Eikon Specialists from Trading & Banking Workflow, Market Operations LSEG London Stock Exchange Group regarding data availability and other technical issues was used as there was no online Eikon Refinitiv DB access available, only stationary at the University, one stance, reservation upon request. A significant amount of correspondence was also exchanged with Eikon LSEG experts, including, among others, the Associate Business Consultant – Financial Modelling, Customer Service Executive, and the Financial Modelling and Conversion (FMC) Team. Issues with existing data as well as the lack of certain data in the Eikon database were also addressed.

Industry specific data GPW industry specific data – indices GPW upon request (The Product Information and Indices Development Department of the Warsaw Stock Exchange provided the requested data in a formal manner, with the condition that any use of the data must include a citation acknowledging the source as the Warsaw Stock Exchange, Product Information and Indices Development Department. This occurred in the second quarter of 2024. Institutional ownership data, including individual and foreign ownership, was collected from GPW (Warsaw Stock Exchange) statistical data and Eikon Notoria. This data was available in diverse formats, necessitating hand-collection and extended preprocessing to standardize it for import into a relational database. Industry-specific data from the GPW, including indices, was obtained upon request from the Product Information and Indices Development Department of the Warsaw Stock Exchange. The department provided this data formally, with the requirement that any use must cite the source as the Warsaw Stock Exchange, Product Information and Indices Development Department. This occurred in the second quarter of 2024. The data had to be collected manually and required extensive preprocessing to ensure consistency and usability. Data from the "The Best Annual Report" competition, organized by the Institute of Accounting and Taxes (Instytut Rachunkowości i Podatków, IRIP), was gathered. This competition evaluates the best annual reports based on their utility for shareholders and investors, featuring companies from the regulated market preparing consolidated reports according to IFRS/IAS and companies from the alternative market reporting under IFRS/IAS or the Accounting Act. The data, collected manually, required thorough preprocessing to integrate it into a relational database. Short sellers' data was hand-collected from the GPW and KNF (Polish Financial Supervision Authority) Lista Pozycji Historycznych RSS. This data was only available in unstructured formats and required significant preprocessing to align with other data sources.

Industry anomalies and calculations from BiznesRadar.pl were incorporated into the dataset. The data from this source was manually collected and existed in various formats, requiring extensive preprocessing to prepare it for analysis.

Restatements and selected financial statements data, along with financial indicators from Notoria, were hand-collected. The Notoria data, publicly available through the GPW, had to be standardized to ensure compatibility with the relational database schema. ESPI/EBI reports, including KNF and GPW Bondspot data on the suspension of trading by the GPW at the KNF's request, were gathered as described by Packowski (2019). The raw data was manually collected and required preprocessing to ensure it could be systematically analyzed within the database. Bond data from KDPW, Bondspot GPW, and other bonds were collected. This data required substantial preprocessing to be formatted for inclusion in the relational database. GPW Skaner data, available only through manual collection, included non-financial and corporate governance information from EIKON and GPW Skaner. This unstructured data required extensive preprocessing to be standardized. The GPW Main Market Alert List (RYNEK GŁÓWNY GPW - LISTA ALERTÓW GPW) was examined to determine if any PTC had ever been listed. This information, collected manually, needed significant preprocessing for integration into the database. Insider filings on insider transactions, trades, and holdings data—referred to as Insider Notifications in EU nomenclature—were hand-collected from StockWatch's "Transakcje Insiderów" because, in the Polish capital market, Eikon Refinitiv does not cover this data. In developed markets, such data is available in commercial database formats (.json, .csv, .xml) supplemented with tools for data analysis, such as Refinitiv's Insider Trading and Holdings Data (LSEG Data & Analytics 2023b) or StarMine's Insider Filings Model. These models analyze insider sentiment, using insider holdings and trades to predict future stock performance while maintaining a low correlation to standard quantitative factors (LSEG Data & Analytics 2023a). However, in the Polish market, this data was not available in Eikon or other databases and had to be collected manually via StockWatch (StockWatch 2023). Data on large holdings and professional investors' portfolios, including main instrument tickers from Stooq and StockWatch's "Transakcje Insiderów," was hand-collected and spanned approximately 400 spreadsheets. The data from StockWatch (2023), provided by QuantResearch sp. z.o.o., existed in various formats and necessitated extensive preprocessing to standardize it for integration into the database. Each of these data sources required different preprocessing techniques to convert the unstructured and diverse formats into a standardized format suitable for analysis. The preprocessing steps, including cleaning, transformation, and

data integration, are described in detail in other paragraphs regarding methodology and data preprocessing to ensure compatibility with relational database systems.

6.3 Professional and Academic Considerations for Research Procedure Design

The Association of Stock Exchange Issuers (Stowarzyszenie Emitentów Giełdowych, SEG) is an organization dedicated to the development of the Polish capital market and represents the interests of companies listed on the Warsaw Stock Exchange. The association is led by President Dr. Mirosław Kachniewski. Currently, SEG supports the issuer community with knowledge and advice on regulatory matters (through participation in the legislative process), self-regulatory efforts (by developing standards, interpretations, and recommendations), and undertaking various other activities to promote the development of the capital market in Poland. In November 2022, the author had the opportunity to receive an individual consultation with Dr. Mirosław Kachniewski, the President of the Association of Stock Exchange Issuers (SEG). The purpose of this consultation was to gain expert advice and unique insights from SEG on issues related to the author's doctoral dissertation topic (fraudulent reporting by listed companies) to apply them in the empirical section of the dissertation. Previously, the author established a non-commercial scientific collaboration with SEG, which involved participating in workshops for issuers that focused on new elements of mandatory reporting and creating educational materials for SEG-affiliated issuers. Furthermore, for the purposes of conducting the empirical part of the doctoral dissertation, and as a formally enrolled doctoral student at the Doctoral School of Cracow University of Economics (UEK), the author had the opportunity to send several inquiries regarding the dissertation topic in the context of the Polish public market and its functioning to the Polish Financial Supervision Authority (KNF) and the Warsaw Stock Exchange (GPW). The author also participated in several closed workshops on financial and non-financial reporting, national and European regulations, and oversight for stock issuers organized by the Polish Financial Supervision Authority, as well as in closed workshops on financial and non-financial reporting, corporate governance, and compliance for stock issuers organized by the Warsaw Stock Exchange, and also attended P olish Audit Oversight Agency PANA (Polska Agencja NAdzoru Audytowego) workshops on polish PTCs manipulating CD.

Participation in various scientific, educational, and publishing activities, as well as other forms of engagement with academic and professional communities, contributed significantly to

the theoretical and empirical sections of the work, especially regarding RFs selection and tools and methodology choices regarding detection and prediction of FRM. These activities were conducted within organizations such as the AAA (American Accounting Association), ACFE (Association of Certified Fraud Examiners), ACFE Polska (Polish Association of Anti-Fraud Professionals), and AICPA (American Institute of Certified Public Accountants). The focus of these activities was primarily on financial fraud, especially the detection and prediction of fraudulent financial reporting (FRM). CEE capital market specificities were also addressed via participation upon invitation in i. a. Zagreb : ZSE Investment Conference Zagreb Stock Exchange and Macedonian Stock Exchange- ZSE Prime Market Plus Webcast, while international, global and European considerations for PTCs were affected and guided by the attendance in numerous formal events, mostly online due to pandemic period and global audience, organized by Directorate-General for Financial Stability, Financial Services and Capital Markets Union (DG FISMA), European Securities and Markets Authority (ESMA), Committee of European Auditing Oversight Bodies (CEAOB), European Contact Group, PricewaterhouseCoopers United Kingdom (PwC UK), Accountancy Europe, Association for Financial Markets in Europe (AFME), European Issuers, The Official Monetary and Financial Institutions Forum (OMFIF) European Issuers Webinar and Panel Discussion: European Commission DG FISMA, National Association of Securities Dealers Automated Quotations (NASDAQ), Federation of European Businesses (FEB), Oxera.

The author was awarded a NAWA scholarship under the PROM program to represent the Cracow University of Economics in Austin, Texas, USA, among experts from the Association of Certified Fraud Examiners (ACFE). During the ACFE workshops, which were dedicated to specialists and experts from academia and practice in fraud examination and forensic accounting, the author actively participated as a doctoral student conducting research and writing a dissertation on financial fraud and FRM. Through these workshops, the author's research was supported by practical elements of fraud detection, as well as the latest trends, frameworks, tools, and guidelines. As a member of the ACFE, the author has access to the ACFE Manual and Guidelines, which provide a unique contribution to the doctoral work, especially in approaching the empirical section and offering valuable insights into the methodology for detecting FRM and CFEs practical understandings and engagements regarding FRM examination and prediction.

The Author completed prestigious American certification courses (in English) accredited with Continuous Professional Educations credits by the Financial Industry Regulatory Authority (FINRA), the National Association of State Boards of Accountancy

(NASBA), the Association of Certified Fraud Examiners (ACFE), the Texas State Board of Public Accountancy, and the Delaware Board of Accountancy. These courses, dedicated to Certified Fraud Examiners (CFEs), Certified Public Accountants (CPAs), and the related academic community, focused on the detection, prediction, and investigation of financial fraud, particularly in capital markets, with an emphasis on financial reporting fraud, as well as the Author received numerous certificates of participation and completion of the American Accounting Association and Association of Certified Fraud Examiners workshops, trainings dedicated to CFEs and CPAs, hosted by moist prominent academic staff members within those organizations as well as other relevant law enforcement agencies regarding financial frauds, especially capital market and accounting irregularities, s.a. IRS: Internal Revenue Service and FBI: Federal Bureau of Investigation. The Author is also a member of American Accounting Association sub-section devoted to financial fraud academics and professionals, i.e. AAA American Accounting Association Fraud Section as well as AAA sub-section devoted to corporate disclosure, reporting, accounting AAA Financial Accounting and Reporting Section Member, also AAA Two-Year College Section with its mission to develop innovative teaching techniques and address college community. The Section encourages and supports new scholars and educators in the field. as well as ACFE AV Woman in Ani-Fraud Profession Club, which are forums for lectures, trainings and knowledge and experience exchange among the members and relevant guests. January 4, 2024, the Author received notification from the American Accounting Association that my research proposal (proposal based on a synthesis of my doctoral dissertation, "Detecting Financial Reporting Misconduct with Financial and Non-Financial Ratios: A Case of the Polish Capital Market,") had been accepted in the "PhD Dissertation - Research in Progress" category for the AAA Fraud Section Conference Savannah, Georgia, USA. The proposal received highly positive reviews from the American Accounting Association Council and was accepted for presentation at the 2024 Forensic Accounting Section Research Conference, yet due to a lack of funding from the Doctoral School, I had to decline the invitation to present at the conference. All the abovementioned have significantly influenced and shaped the empirical part.

6.4 Data preprocessing

Relational databases (RDs) are a type of database management system that organizes data into tables, known as relations, which are linked together through relationships defined by

keys. This structure allows for efficient data storage, retrieval, and management, making relational databases the gold standard in research, particularly in accounting and finance (Date, 2004). Each table in a relational database consists of rows and columns, where each row represents a unique record, and each column represents a specific attribute of the data. One of the key advantages of relational databases is their ability to handle large volumes of data with complex relationships, enabling researchers to perform sophisticated queries and analyses. They support Structured Query Language (SQL), which allows users to perform complex queries to filter, aggregate, and analyze data (Codd, 1970). This capability is crucial in accounting research, especially when studying publicly traded companies (PTCs) on capital markets, where data must be precise, comprehensive, and accessible. Relational databases are particularly valuable in fraud detection and prediction because they enable the integration of various datasets, such as financial statements, market data, and non-financial metrics, into a cohesive structure. This integration allows researchers to identify patterns and anomalies indicative of fraudulent activities, such as discrepancies in financial reporting or unusual trading patterns (Rezaee, 2002). By leveraging relational databases, researchers can employ advanced analytical techniques, such as machine learning algorithms and statistical models, to predict and detect fraud with greater accuracy (Perols, 2011).

Structured data is the gold standard for conducting such research because it provides a consistent and organized format that facilitates data analysis and interpretation. In structured data, each piece of information is stored in a predefined format, such as tables with specific columns and data types, making it easier to query, aggregate, and analyze (Agrawal et al., 2001). This consistency is essential for detecting and predicting fraud, as it ensures that all relevant data is readily available and can be analyzed systematically. In contrast, unstructured data, such as text documents and PDFs, lacks a predefined format and can be challenging to work with. Transforming unstructured data into structured data requires extensive preprocessing, including data cleaning, standardization, and transformation, to ensure that it can be effectively used in relational databases (Russom, 2011). This preprocessing is time-consuming and resource-intensive but is necessary to unlock the full potential of data analysis. Overall, relational databases and structured data provide a robust framework for accounting research, enabling researchers to conduct thorough and reliable analyses of PTCs on capital markets. They offer the precision and efficiency needed to uncover insights, identify fraudulent activities, and make informed predictions, making them indispensable tools in the field of accounting and finance research.

RDs organize data into structured tables, which are linked together through predefined relationships. This structure allows for efficient data retrieval and management, making RDs particularly valuable in capital market-related research (Codd, 1970). For publicly traded companies subject to mandatory corporate disclosure regimes, RDs are used to store and analyze large volumes of financial and non-financial data. In accounting research, especially regarding fraud detection and prediction, RDs enable researchers to systematically examine patterns and anomalies in financial reporting (Rezaee, 2002). However, conducting such research is challenging when structured data is unavailable. In smaller, less developed markets, where data from regulators and databases are often unstructured or incomplete, researchers face significant hurdles. The absence of structured data, as opposed to comprehensive data programs like those of the SEC in the US, necessitates a series of complex procedures (Russom, 2011). Researchers must first collect data from various sources and then clean and standardize it to ensure consistency and accuracy. This involves removing duplicates, handling missing values, and converting data into a common format (Fan et al., 2014). Once standardized, the data can be imported into a relational database, creating a structured dataset suitable for analysis. These steps are essential to generate meaningful insights and make informed predictions in markets where structured data is not readily available.

Standardizing mixed and unstandardized data from various sources is a critical process in creating a coherent dataset for analysis, especially when dealing with publicly traded companies in less developed markets. The data often comes in diverse formats, such as unordered textual documents and PDFs with mixed columns and inconsistent naming conventions (Gandomi & Haider, 2015). To address these challenges, researchers must employ a series of meticulous procedures. The first step involves data extraction, where custom programs are often written in C# to automate the retrieval of relevant data from complex documents. These programs parse through the text, identify patterns, and extract specific information, such as financial values, metrics, and textual information needed for the specific research purpose (Coronel & Morris, 2016). This process can be particularly challenging when dealing with PDFs, as these files may contain non-standardized formats with varying column structures, embedded images, and multi-page tables (Panko, 2008). Once the data is extracted, the next step is cleaning, which involves addressing inconsistencies and inaccuracies. This includes standardizing naming conventions, such as converting abbreviations and synonyms into a unified format, and correcting errors in data entry. Handling missing values is another critical aspect of data cleaning, requiring techniques such as imputation or exclusion to ensure the dataset's integrity (Agrawal et al., 2001). After cleaning, the data must be transformed into

a common format that can be easily imported into a relational database. This involves converting disparate data types, such as text, numbers, and dates, into standardized formats. Researchers must also define relationships between different data entities, ensuring that tables in the relational database accurately reflect these connections (Elmasri & Navathe, 2015). Once the data is cleaned and standardized, it can be imported into a relational database, where it is organized into structured tables. This step often involves writing SQL scripts to create tables, define relationships, and insert data (Date, 2004). By creating a structured dataset, researchers can efficiently query and analyze the data, enabling them to detect patterns indicative of financial reporting misconduct (Perols, 2011).

These procedures are essential in markets where structured data is not readily available, as they provide a framework for generating actionable insights. However, they require significant expertise in data management and programming, as well as a deep understanding of the specific market and regulatory environment. The complexity and resource-intensive nature of these tasks highlight the challenges faced by researchers in less developed markets, where access to structured data is limited compared to well-developed markets like the SEC in the US (Russom, 2011). This preprocessing is time-consuming and resource-intensive but is necessary to unlock the full potential of data analysis. When unstructured data is used in accounting and capital market research, particularly concerning publicly traded companies (PTCs), the quality of the research and its conclusions can be significantly compromised. Unstructured data often lacks a standardized format, making it difficult to extract, clean, and analyze effectively. As a result, researchers may struggle with inconsistencies, incomplete information, and errors, which can lead to inferior analysis and conclusions (Russom, 2011).

Unstructured data presents several challenges that hinder effective research and analysis. Unlike structured data, which is neatly organized into rows and columns, unstructured data can include various formats such as text documents, PDFs, images, and videos (Gandomi & Haider, 2015). This diversity in format makes it difficult to perform automated data extraction and analysis, requiring significant manual effort to identify and process relevant information. Human limitations further exacerbate these challenges. When researchers rely on manual methods to parse through unstructured data, they are prone to errors and inconsistencies, such as misinterpreting data or overlooking critical details. This can lead to inaccurate analyses and flawed conclusions, particularly in the complex field of accounting and capital markets (Fan et al., 2014). The inability to efficiently gather, preprocess, and analyze wide datasets due to unstructured data also limits the scope of research. Researchers may miss important trends or correlations because they cannot integrate diverse datasets effectively. In turn, this hampers

the development of comprehensive models for detecting and predicting financial fraud (Perols, 2011).

The limitations of spreadsheets compared to relational databases further highlight the importance of structured data. While spreadsheets are commonly used for data management due to their accessibility and ease of use, they have several drawbacks that make them less suitable for complex data analysis (Panko, 2008). That is, firstly data Volume and Scalability, as Spreadsheets are not designed to handle large volumes of data. They can become unwieldy and slow when dealing with extensive datasets, making it difficult to perform efficient data analysis. In contrast, relational databases are optimized for managing and querying large datasets, offering superior performance and scalability (Coronel & Morris, 2016).

Secondly, Data Integrity and Consistency, as Spreadsheets often lack built-in mechanisms to enforce data integrity and consistency. Users can easily introduce errors by accidentally modifying data or formulas. Relational databases, on the other hand, use defined schemas and constraints to ensure data integrity, reducing the likelihood of errors and inconsistencies (Codd, 1970). Thirdly, Complex Querying and Analysis, as spreadsheets offer limited capabilities for complex querying and analysis. While they provide basic functions and formulas, they are not equipped to handle sophisticated data manipulation or analysis tasks. Relational databases support Structured Query Language (SQL), allowing users to perform complex queries, join tables, and apply advanced analytical techniques to gain deeper insights (Elmasri & Navathe, 2015).

Fourth, Data Relationships Spreadsheets store data in isolated sheets, making it challenging to manage relationships between different datasets. Relational databases, however, are designed to handle complex data relationships through primary and foreign keys, enabling researchers to easily link and analyze related datasets (Date, 2004). Fifth, Importance of Structured Data, as Structured data provides a clear and organized format that facilitates efficient data processing and analysis. It allows researchers to apply consistent methodologies, ensuring that their findings are accurate, reproducible, and reliable. With structured data, researchers can easily integrate multiple datasets, perform complex queries, and apply sophisticated analytical tools to uncover hidden patterns and trends (Agrawal et al., 2001). In the context of accounting and capital market research, structured data is crucial for detecting and predicting fraud. It enables researchers to systematically analyze financial and non-financial metrics, identify anomalies, and develop predictive models with greater accuracy. Without structured data, researchers are constrained by the limitations of manual processing and the inefficiencies of spreadsheets, leading to inferior research outcomes (Rezaee, 2002). In

conclusion, the reliance on unstructured data in accounting and capital market research for PTCs leads to inferior analysis and conclusions due to the inherent challenges in data extraction, cleaning, and standardization. To achieve high-quality research outcomes, it is essential to transform unstructured data into structured formats, allowing for accurate and comprehensive analysis that supports robust fraud detection and prediction efforts. Relational databases, with their ability to manage large datasets and complex relationships, offer a superior solution for conducting rigorous and insightful research in the field (Perols, 2011).

6.5 Data Preprocessing Procedures and Relational Database Design, Development and Implementation

For the purposes of data preprocessing procedures and relational database design, development, and implementation, non-commercial pro bono technical guidance, technical support, and technical assistance from an expert in the field were utilized. Data were first collected from various sources and databases, as described above. This data collection took place from January 2023 to March 2024. The data preprocessing procedure followed this sequence: After data were retrieved in various formats and multiple files, programs were written in C# to extract and standardize data from files in different formats, such as PDFs, MS Excel, CSV, and MS Word. The editing was performed to standardize the data, allowing for subsequent import into a relational database. Data cleaning and structuring were performed for approximately 50 individual files, some of which were multi-sheet files, resulting in an abundance of data. In total, financial and non-financial ratios and measures were analyzed in the research. Each financial ratio will be examined in the fraudulent and non-fraudulent financial statements, and only those most predictive of the advent of, occurrence of, or circumstances prompting fraud committed by executive managers and company officers will be employed in the final modeling phase. This task was time-consuming because each data format (columns, storage method, etc.) was different, as the data originated from multiple databases, including non-financial RFs. There were issues with columns because codes, sequencing, and entity names varied (full name, ticker, modified ticker, abbreviated name, order, inactive entities, new entities, etc.), requiring formatting adjustments in the columns. Additionally, some files were PDFs with names embedded in long sentences and multi-cell formats (as PDFs sometimes convert when a cell is split across pages), especially those PDFs from the KNF database, data from GPW's GPW Scanner, and some data from Stooq, all of

which required complex processing. Subsequently, the creation of tables in the database and the importation of data were carried out using SQL Server's built-in tools and custom programs developed in .NET. This involved executing multiple Data Manipulation Language (DML) queries, which are used to manipulate data within the tables to modify or retrieve data from the database, and Data Definition Language (DDL) queries, which are used to define and manage the database structure, to create and modify tables, indexes, and other database objects. Following this, the analysis, aggregation, further cleaning, and selection of data were conducted as part of this process.

The author's own database, derived from all data sources and formats described previously, provides a comprehensive overview of the relational database named "AMDGMMHebdaHWieniawaPomian" ("MMHWP" in short), detailing the scope and size of the data handled, see Table 6. The database consists of a wide variety of tables, each with a different number of rows, columns, and total size in megabytes. The largest table, "Prt" contains over 6 million rows and occupies about 15,091 MB of storage, indicating a significant volume of data. In total, some tables have hundreds of thousands to millions of rows, while others contain just a few hundred, showing the variability in the data sets managed. The column counts also vary widely, with some tables having over 400 columns, demonstrating the complexity and richness of the data. The total size of the database is substantial, reflecting the extensive data management and processing efforts required. It underscores the scale of the work involved in handling, maintaining, and analyzing the MMHWP database, which contains a comprehensive collection of data, essential for the project's objectives, see Table 6.

Due to data incompleteness and quality limitations, after a thorough review and evaluation of both datasets, considering the availability, completeness, and quality of the data, 33 companies were selected as fraud risk management (FRM) cases, while 180 companies were identified as non-fraudulent. These selections were made with careful attention to data availability, completeness, and overall quality, also the ratio of 33:180 (approximately 1:5.45) more accurately represents the market reality compared to a ratio of 1:3.

Due to missing data, numerous red flags were discarded, as the lack of data could have compromised the reliability of the predictor. Consequently, many of the identified red flags were set aside pending the collection and analysis of sufficient data. Once the European Single Access Point (ESAP) is fully implemented—where corporate data of publicly traded companies will be available in a structured format within an appropriate database, with established characteristics such as availability (public), accessibility (effectively and readily available, equally for all, free of charge for all stakeholders), and verification by relevant authorities, along

with storage for an appropriate time span even after delisting—the potential for reliable analysis will increase. All these issues were extensively covered in the previous chapters. Furthermore, most importantly, the feasibility of reading and processing (by both humans and machines) will be ensured, including the economic criteria of a) cost-effectiveness and b) time efficiency, to make such analyses relevant for decision-making by all classes of capital market stakeholders. Corporate disclosures will be carried out for an appropriately long period in XML (using XBRL). It will then be possible to revisit many indicators (Red Flags), particularly when non-financial data related to corporate governance (such as DPSN-related data) and broader ESG and sustainability reporting are also structured and audited appropriately. Many red flags that had to be abandoned may be revisited. Additionally, as the organized digitization of financial news, newspapers, conferences, and earnings calls (including visuals) progresses, innovative red flags based on advanced technologies may be applied. This would allow for a reassessment of red flags in the context of the Polish market. All these issues were extensively covered in the previous chapters.

Table 6: MMHWP Relational Data Base Statistics Overview

MMHWP Relational Data Base Statistics Overview			
Table Name in the Data Base	**Row Counts**	**Column Count**	**Total Size MB**
Prt	6,012,266.00	17.00	15,091.00
outdat1	456.00	482.00	2,165.00
financialdata_idx	848,621.00	11.00	1,527.00
parm4$	1,410.00	422.00	1,031.00
parm3$	1,410.00	454.00	1,025.00
FinancialData3	903,540.00	8.00	934.00
FinancialData	848,621.00	8.00	913.00
stat_export_1	20,329.00	53.00	709.00
financialdata_save	693,512.00	8.00	702.00
Sheet2$	1,472.00	306.00	623.00
'Current Screen Template2$	736.00	510.00	623.00
parm2$	1,410.00	326.00	593.00
outdat2	456.00	266.00	446.00
Sheet6$	736.00	304.00	372.00
Sheet3$	736.00	302.00	313.00
FinancialData2	155,109.00	8.00	303.00
Sheet4$	736.00	228.00	151.00
parm1$	1,410.00	134.00	105.00
'Current Screen Template$'	60.00	510.00	65.00
part_table_4	19,820.00	14.00	46.00
EspiLitigation	12,299.00	24.00	34.00
kary_correct_d	256.00	45.00	25.00
Notifications	9,473.00	24.00	21.00
stat_export_2	551.00	53.00	20.00
notowania	2,295.00	15.00	15.00
kary	905.00	18.00	15.00

kary_correct_d_s2	256.00	30.00	13.00
kary_copy	1,030.00	15.00	11.00
kary_correct_d_copy	280.00	21.00	9.00
export_mo	637.00	33.00	8.00
EspiLitigation_2	2,551.00	24.00	7.00
export_23082024	421.00	40.00	7.00
export_24082024_01	421.00	40.00	7.00
export_24082024_02	421.00	40.00	7.00
EspiLitigation_3	2,063.00	24.00	6.00
fin_stage_1	1,166.00	11.00	6.00
gpw_save	19,239.00	5.00	6.00
'gpw managrment notori12$'	19,244.00	5.00	5.00
Dead	1,025.00	12.00	5.00
export_final	421.00	39.00	5.00
selected_sampled_data	266.00	38.00	5.00
selected_sampled_data2	190.00	39.00	5.00
list_spolek	1,843.00	9.00	3.00
'ebiespi litigation n proceeding$'	74,297.00	1.00	3.00
'korekta raportu notoria$'	64,685.00	1.00	2.00
part_table_3	19,820.00	3.00	2.00
benford	15,233.00	5.00	2.00
RF	1,437.00	7.00	2.00
Gpw_Management	6,076.00	5.00	2.00
part_table_5	1,166.00	10.00	2.00
Companies3	1,371.00	7.00	1.00
wig_9	1,371.00	7.00	1.00
'IRIP najlep raport rocz$'	1,015.00	6.00	1.00
Gpw_Employment	9,188.00	5.00	1.00
wig_3	2,100.00	7.00	1.00
stat	1,843.00	6.00	1.00
Companies	1,615.00	7.00	1.00
publikacje decyzji	276.00	12.00	1.00
wig_respect	251.00	7.00	1.00
comply	413.00	8.00	1.00
Wig_Div	577.00	6.00	1.00
Companies2	449.00	6.00	0.00
Irip	293.00	3.00	0.00
insider	349.00	11.00	0.00
'insider transactions stooq$'	356.00	10.00	0.00
wig	202.00	9.00	0.00
kary_new	246.00	2.00	0.00
ratingi	264.00	1.00	0.00
kary_correct_d_202408212125$	0.00	36.00	0.00
kary_correct_d_new_2	0.00	36.00	0.00
kary_correct_d_new_3	0.00	36.00	0.00
RankingAkcjonariuszyStooq	0.00	6.00	0.00
kary2020	49.00	15.00	0.00
kary2021	57.00	15.00	0.00
'gpw program wsparcia analit$'	60.00	4.00	0.00
Gpt_Companies	72.00	7.00	0.00
kary2022	79.00	15.00	0.00
t_factor	88.00	3.00	0.00
kary2019	97.00	15.00	0.00
missing	108.00	7.00	0.00
ShareholdersRanking	130.00	6.00	0.00
'ranking akcjonariuszy stooq$'	141.00	1.00	0.00
rating	142.00	1.00	0.00
Sheet1_1	169.00	3.00	0.00

dokumenty emitentow	2,045.00	1.00	0.00
incidence_fsd_divergence	980.00	2.00	0.00
spolki_all	734.00	1.00	0.00
Gpw_Companies	791.00	5.00	0.00
part_table_1	796.00	2.00	0.00
part_table_2	803.00	2.00	0.00

Source: Own elaboration, data derived from Own Database "MMHWP Relational Data Base". Our own relational database was built on SQL, and custom programs written in C# were used for data processing.

6.6 Research Period and Modeling Method

There is typically a long delay between the actual occurrence of FRM and its formal detection and punishment by the supervisory authority, hence a long research horizon would additionally provide a sufficiently large number of potential observations. The data covered the period from 2006, as the KNF was established by the Act of 21 July 2006 on the supervision of the financial market. The period ended with the end of 2023 (calendar year). The financial and non-financial data period was established from 2005 until 2022, due to calculations of indices (in the Beneish sense (Beneish 1999), where t-1 was necessary, for all t (first instance of manipulation or fraud), where the earliest t was 2006) and ratios calculations and measures determination and where CD published for 2022 FY were in 2023. The use of logistic models to determine FRM and their high effectiveness was confirmed in numerous studies (Yendrawati et al., 2019; Kanapickiene & Grindiene, 2015; Perols, 2011; Ravisankar et al., 2011; Lenard & Alam, 2009). These models were applied to detect and predict these violations (Dechow et al., 2011; Ngai et al., 2011; Price et al., 2011; Cecchini et al., 2010). LR models proved to be highly effective methods (Hajek & Henriques, 2017; Bai et al., 2008; Spathis et al., 2002; Abbott et al., 2000; Bell & Carcello, 2000; Beneish, 1999a), even when compared to data mining techniques (Yao et al., 2019; Huang et al., 2014; Perols, 2011). Modeling based on artificial intelligence (AI) was rejected because it required large amounts of data (large number of PTCs, i.e. deep, developed market and large amounts of punished PTCs, i.e. FRM observations, especially training data, and their limited availability resulted in low performance for this approach (Gepp, 2015). Inherent limitations of the Polish market, along with the specific desirable features of the model, suggested the rejection of AI. Statistical software - Stata program used for statistical analysis software was used as the primary computational tool. Modeling methods, their review, justification, and suitability for the author's research were extensively covered in previous chapters.

6.7 Sample Construction

During the occurrence of FRM and neighboring periods, dishonest entities significantly differed from honest ones (Albizri et al., 2019; Amiram et al., 2018; Albrecht et al., 2018). Numerical values of items from both groups were required to establish differences between fraudulent and non-fraudulent financial statements (Kanapickiene & Grundiene, 2015). Sample construction involved: (1) determination of FRM observations from regulated market companies subject to penalties for FRM by the market regulator, i.e., KNF, based on publicly available data included in the List of Fines (KNF 2020a); (2) the matching process of non-FRM observations controlled for external and unobservable factors (Fanning & Cogger, 1998; Johnson et al., 2009). The Propensity Score Match method was applied. It included parameters limiting undesirable signals such as "total assets" or "market capitalization," "listing period or company age," and "moment of FRM occurrence" (Wang, 2013; Alden et al., 2012; Wang et al., 2010; Beasley et al., 2010; Skousen et al., 2008; Erickson et al., 2006; Abbott et al., 2004; Carcello & Nagy, 2004; Kamiński et al., 2004; Uzun et al., 2004; Green & Choi, 1997), accordingly to the available data, thus market capitalization and total assets were selected. An FRM indicator was also used: the non-FRM ratio was close to the 1:3 relationship (Jan, 2018; Hajek & Henriques, 2017; Li et al., 2015; Kotsiantis et al., 2006).

This provided a better reflection of the real shape of the dataset and limited problems of class imbalance, class bias, and sampling bias (Oommen et al., 2011), thereby enhancing the classification ability of the model (Alden et al., 2012; McKee, 2009; Persons, 1995). Research was conducted by analyzing 33 fraudulent CD (experimental group) and 180 non-fraudulent CD (control group). Numerical values from the non-fraudulent CD were needed to identify differences between fraudulent and non-fraudulent CD. The period of investigation spanned from 2006 – 2023, due to KNF “Lista Kar(..)” and KNF establishment date of 2006, the earliest FRM punishment from the “Lista(..) ”was committed in the 2005 FY, and the most recent was committed in the 2017 FY, which is in line with the notion that there is typically a long delay (few years, depending on the market) between the actual occurrence of FRM and its formal detection and punishment by the supervisory authority (as described in the previous Chapters). Out of 256 instances of the FRM punishment (administrative decisions), 87 could not be attributed due to insufficient data in the KNF’s description of the penalty that would allow for the identification of the company, as previously described. Additionally, 34 companies received more than one punishment, resulting in 88 unique penalized companies that could be identified. Following Beneish (Beneish 1999) regarding indexing (ratios), meaning year t refers the first

year in which earnings manipulation or fraud occurs, with a formula of Measure t-1/Measure t (t-first instance of manipulation or fraud). After a thorough review and evaluation of both datasets, considering the availability, completeness, and quality of the data, 33 companies were selected as fraud risk management (FRM) cases, while 180 companies were identified as non-fraudulent. These selections were made with careful attention to data availability, completeness, and overall quality.

The sample selection of the "FRM sample" is a critical issue in the FRM research, as was in this research, i.e. identification and selection of single observations and PTCs (as there were few PTCs that were penalized more than one) that were punished for FRM sensu largo. It was a crucial and key moment of the research and it required an extensive workload and very cautious consideration and watchful methodology. It was built as follows. Observations from the List of Penalties had to be excluded when they did not allow for the identification of the entity, as the description of the violation and the party involved did not contain such information. This omission is due to the intentional actions of the KNF to withhold these details, particularly concerning penalties from the past decade. Incomplete descriptions and other limitations of the KNF penalty descriptions have been noted in previous studies (Hendryk & Hońko, 2017a; Kurek & Górowski, 2017). The methodology used by the KNF in imposing penalties is not fully known. According to the authors, the methodology related to the penalty process should be included in the published List of Penalties. This is particularly important for assessing how effectively the KNF supervises the capital market. Knowledge of the methods used by the KNF to investigate and impose penalties is also crucial for evaluating the quality of financial statements of entities operating in the capital market. Currently, the published List of Penalties by the KNF does not allow for a comprehensive assessment of the extent of abuses and errors in the financial statements of entities under KNF supervision (Hendryk & Hońko, 2017a).). The sample was built using C# programming language and SQL database. It required numerous steps, that comprised of an array of queries, regexes, well as hand-correction and human-reading due to is not systematically organized. It often contains complex descriptions, unsystematic names that do not match the formal names listed on the GPW (Warsaw Stock Exchange), additional spaces, missing punctuation marks (e.g., missing periods), inconsistencies in the legal organizational form, and even comments.

Observations of companies that were listed on the market for only a very short time before being penalized, such as those listed for just one or two years, were excluded. This exclusion was necessary because the short listing period does not allow for the analysis of financial statements over a sufficiently long timeframe before the offense was committed,

making it difficult to draw conclusions and identify trends. There were a number of such entities removed from the analysis for this reason. Entities that were not publicly listed but penalized for reporting violations were excluded, including those non-PTCs, and foreign companies not listed, such as those with business forms like PLC or Limited, as well as mutual insurance companies. Penalties from previous decades were also removed because they were often insufficiently detailed in the List of Penalties to accurately identify the penalty and violation, due to the limited description policies of the KNF at that time. These descriptions frequently did not allow for the identification of at least the listed entity, as the description might have included terms like “public company” without specifying the entity (e.g. record number 370 on the official document of the “Lista Kar (…)”). Additionally, the data source used is the Eikon database, companies that are classified as inactive emitents have the label "dead" in the "activity" column, this label indicates that these companies are no longer active on the main market of the Warsaw Stock Exchange (GPW) (bankruptcy, delisting, M&A etc.), and they required separate data collection and further merger. Subsidiaries may not be listed on the stock exchange, just like associated companies, while the parent company is listed, often on foreign markets. In such cases, subsidiaries and associated companies are not required to publish financial reports on local markets, such as the GPW, as their reporting obligations may be fulfilled by the parent company, which publishes consolidated financial reports covering the entire capital group. These reports are typically available on the markets where the parent company is listed. Such cases were also excluded.

The data collected is from the "Lista kar (...)" which includes penalties issued by the KNF (Polish Financial Supervision Authority) from 2006 to 2023. The financial and non-financial data period was established from 2005 until 2022, due to calculations of indices (in the Beneish sense (Beneish 1999), where t-1 was necessary, for all t (first instance of manipulation or fraud), where the earliest t was 2006) and ratios calculations and measures determination and where CD published for 2022 FY were in 2023. This information has been compiled from files that were previously described in detail, ensuring a comprehensive record of all penalties issued during this period. The above procedure, along with the procedures discussed earlier, including the removal of companies that were penalized but listed for only 1 or 2 years and did not meet other exclusion criteria previously outlined, resulted in filtering down the penalties (Decisions – KNF’s Formal Administrative Decisions) to a total of 256. Among these 256 cases, there are also penalties imposed on individuals serving on the supervisory board or management board due to their functions within a specific entity. In such cases, the penalty was attributed to the relevant entity. Moreover, in a single administrative

decision by the KNF, multiple violations can be included—different legal bases as well as multiple instances of these violations, which may involve different qualifications and different time periods. The KNF may treat selected violations and periods collectively, including them in a single decision. However, if it considers them as separate, individual instances, it will issue an additional decision for each. Within the 256 identified formal administrative decisions, they can be attributed to 151 different entities listed on the market during the period from 2005 to the end of 2022 . Some (a noteworthy number of) of these entities are no longer active on the stock exchange, and Eikon labels them as ‘inactive’- 'dead., while GPW uses different nomenclature and so on. Out of 256 instances of punishment (administrative decisions), 87 could not be attributed due to insufficient data in the KNF’s description of the penalty that would allow for the identification of the company, as previously described. Additionally, 34 companies received more than one punishment, resulting in 88 unique penalized companies that could be identified.

The primary challenge in creating a single table necessary for the Statistical software - Stata program used for statistical analysis to perform data import and statistical analysis is that this data must be integrated into one unified table. A significant issue in this process was the assignment of unique identifiers and the linking of names across different sources. Each table, depending on its data source, operated with different naming conventions, or lacked a unique label such as the ISIN (International Securities Identification Number), since some data sources did not utilize it for the data they provided. Moreover, the ticker symbols varied between sources—GPW (Warsaw Stock Exchange) tickers differed from Reuters (Eikon database) or Bloomberg tickers. The stock exchange name, decision website name, and names from databases like Stooq, Notoria, or IRIP were often inconsistent, including variations in completeness, legal form indications (e.g., "S.A." vs. "SA"), punctuation, and abbreviations. To address these issues, it was necessary to standardize and link these different names and assign a unique identifier to each entity. This enabled the creation of a unified table that could then be passed to the Stata program, as only in this form does Stata allow direct data import. Other challenges with names included issues such as slashes, case sensitivity, abbreviations, information regarding restructuring or bankruptcy, shortened versions of multi-part names, inconsistencies in abbreviation methods, as well as the presence or absence of Polish characters. In some cases, quotation marks appeared in names or in components of compound names. Matching was carried out using both case-sensitive and case-insensitive methods, the Jaro-Winkler algorithm, and regular expressions (regex). Some had to be manually-checked.

For specific criteria, steps, methods, queries and regexes regarding each step in data preprocessing, there are exemplificatory C# and SQL documents available upon the specific request. The relational database in SQL, containing all relevant data, is available for viewing upon request. However, it is only available for inspection and not for use, as it constitutes proprietary work (collective work of the Author and pro-bono technical support provider).

The primary challenge in creating a single table necessary for the Statistical software - Stata program used for statistical analysis program to perform data import and statistical analysis is that this data must be integrated into one unified table. A significant issue in this process was the assignment of unique identifiers and the linking of names across different sources. Each table, depending on its data source, operated with different naming conventions, or lacked a unique label such as the ISIN (International Securities Identification Number), since some data sources did not utilize it for the data they provided. Moreover, the ticker symbols varied between sources—GPW (Warsaw Stock Exchange) tickers differed from Reuters (Eikon database) or Bloomberg tickers. The stock exchange name, decision website name, and names from databases like Stooq, Notoria, or IRIP were often inconsistent, including variations in completeness, legal form indications (e.g., "S.A." vs. "SA"), punctuation, and abbreviations. To address these issues, it was necessary to standardize and link these different names and assign a unique identifier to each entity. This enabled the creation of a unified table that could then be passed to the Statistical software - Stata program used for statistical analysis program, as only in this form does Statistical software - Stata program used for statistical analysis allow direct data import.

6.8 Independent Variables and Data Limitations

Due to missing data, numerous red flags were discarded, as the lack of data could have compromised the reliability of the predictor. Consequently, many of the identified red flags were set aside pending the collection and analysis of sufficient data. Once the European Single Access Point (ESAP) is fully implemented—where corporate data of publicly traded companies will be available in a structured format within an appropriate database, with established characteristics such as availability (public), accessibility (effectively and readily available, equally for all, free of charge for all stakeholders), and verification by relevant authorities, along with storage for an appropriate time span even after delisting—the potential for reliable analysis will increase. All of these issues were extensively covered in the previous chapters.

Furthermore, most importantly, the feasibility of reading and processing (by both humans and machines) will be ensured, including the economic criteria of a) cost-effectiveness and b) time efficiency, to make such analyses relevant for decision-making by all classes of capital market stakeholders. Corporate disclosures will be carried out for an appropriately long period in XML (using XBRL). It will then be possible to revisit many indicators (Red Flags), particularly when non-financial data related to corporate governance (such as DPSN-related data) and broader ESG and sustainability reporting are also structured and audited appropriately. Many red flags that had to be abandoned may be revisited. Additionally, as the organized digitization of financial news, newspapers, conferences, and earnings calls (including visuals) progresses, innovative red flags based on advanced technologies may be applied. This would allow for a reassessment of red flags in the context of the Polish market. All of these issues were extensively covered in the previous chapters. Technical issues regarding data gathering, collection, cleaning, structuring and importing were described above. There were lists of FRM sensitive RFs proposed, of which only given were proven efficient in detecting FRM in given period in Poland, see Stata derived tables.

The selection of variables was crucial for FRM detection models (Gepp, 2015). The lack of consensus and a common schema for systematizing red flags determined the selection of potential indicators by combining selected risk area identification tools and Red Flags (Gepp, 2015; Perols & Lougee, 2011), which were built on managerial theories and the concept of abuse of trust: the Fraud Exposure Rectangle framework (Albrecht et al., 2018; 2015; 2012), the Fraud Triangle (1953), the Fraud Diamond (Wolfe & Hermanson, 2004), and the Fraud Pentagon (Marks, 2012, 2011). To obtain a reliable predictive value of the decision rule beyond financial characteristics (Rezaee & Riley, 2010; Moyes, 2008; Apostolou et al., 2001; Nieschwietz et al., 2000), non-financial features were included (Albizri et al., 2019; Yao et al., 2019; Jan, 2018; Kim et al., 2016; Albrecht et al., 2015; Ames et al., 2012; Brazel et al., 2009). The author adopted a broad perspective on non-financial variables (Albizri et al., 2019; Albrecht et al., 2018), not only including CSR and Corporate Governance but also encompassing innovative detection areas such as CG indices, industry complexity, and macro and informational indicators (Albizri et al., 2019; ACFE, 2018; Albrecht et al., 2018; Mantone, 2013; Amiram et al., 2015; Bhattacharya et al., 2011; Kent et al., 2012; Francis et al., 2013; Ndofor et al., 2013; Gompers et al., 2003; Hogan et al., 2008). The replacement of missing values was to be carried out in accordance with the concept developed by Beneish (1999), i.e., the neutral value procedure (Gepp, 2015), however the data was cleaned before they were implemented to the relational database, thus were no human error or omissions, only limitations

of real, raw data, were data from data sources did not provide the given values or information. The issue of multicollinearity was controlled by the Variance Inflation Factor. Multicollinearity, which occurs when independent variables in a regression model are highly correlated, was controlled using the Variance Inflation Factor (VIF). The VIF procedure detects multicollinearity by assessing how much the variance of a predictor is inflated due to its correlation with other predictors, with values exceeding the threshold of 5 or 10 indicating the need for further investigation or adjustment (Hair et al., 2010). VIF measures how much the variance of an estimated regression coefficient increases due to collinearity, with a value exceeding 10 often indicating problematic multicollinearity that can distort the model's estimates and reduce the reliability of the logistic regression results (O'Brien, 2007; Kutner et al., 2005).

Red flags from both theoretical and empirical reviews of the literature were covered in previous chapters. For the database, there were numerous propositions for the red flags gathered, preprocessed, structured and analyzed, of which the final model included those presented in the Stata derived tables.

6.8.1 Multi-Compound Financial and Non-Financial Parameters

Insider_Filings – [“insider_fillings “] The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data. The data was sourced from StockWatch (stockwatch.pl—a financial portal specializing in stock market analysis and company monitoring), focusing on insider filings related to insider transactions and holdings within a selected timespan. Elevated insider selling was identified. In Poland, "Notyfikacje insiderów" is used by the KNF (Polish Financial Market Supervisor) (KNF 2019), and "Transakcje insiderów" is employed by the Association of Stock Issuers (Stowarzyszenie Emitentów Giełdowych, SEG) (SEG 2023). Notifications comply with the EU acquis communautaire, particularly MAR's 'notifiable transactions,' as presented in StockWatch's "Transakcje Insiderów" (StockWatch 2023). The study focused on the occurrence and frequency of insider transaction notifications during the selected time span.

Ranking_Shareholder – [“ranking_shareholder “] Ranking Akcjonariuszy– The data for this analysis was hand-collected, and custom programs were written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data. The data was sourced from Stooq and Quant Research—a firm specializing in financial market analysis and data solutions—particularly from their "Ranking Akcjonariuszy" ("Shareholders' Ranking"). The key instruments were identified by tickers, with a cut-off rate of portfolios no less than 400 million PLN (Selected category: All (TFI, OFE, other institutional ownership, sophisticated investors)). The synthetic metric was based on the presence and frequency of instruments in the portfolios of large shareholders (professional investors).

Restatements – [“restatements “] Restatements as proxies for fraud are reviewed extensively in Chapters 3 and 4. Restatements were sourced from ESPI/ESBI announcements, collected across a wide range of reports, and then filtered to identify restatements (corrections). These announcements were initially gathered as text, imported into Excel, and subsequently processed using custom programs written in C#. The data was then stored in an SQL database, where further analysis and refinement were conducted to evaluate their implications in the context of fraud detection. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data.

Financial_Diss_Proceed- [“financial_diss_proceed “] According to the ACFE, AAA, and relevant literature, as described in previous chapters, financial distress proceedings such as collateral (zastaw), mortgages (hipoteki), enforcement (egzekucja), and bankruptcy (upadłość) are often linked to companies with a higher fraud propensity. Companies in financial distress may face pressure to manipulate financial statements to avoid insolvency or mask operational failures. These factors increase the likelihood of fraudulent behavior, such as overstating assets or hiding liabilities. Bankruptcy and liquidation proceedings often reveal prior fraudulent activities. Financial distress, therefore, acts as a red flag for potential fraud, making such cases predictive of higher fraud risk. The data related to financial distress proceedings was sourced from ESPI/ESBI announcements, collected from a wide range of reports, and filtered to identify specific ones. These announcements, including cases involving collateral (zastaw), mortgages (hipoteki), enforcement (egzekucja), past-due obligations (wymagalność zaległych zobowiązań), bankruptcy (upadłość), liquidation (likwidacja), and disputes (spór), were gathered as text, processed in Excel, and refined using custom C# programs before being stored

in an SQL database for further analysis in fraud detection. Preprocessing required significant manual correction due to the non-standardized nature of the data. Instances of the aforementioned circumstances were identified. The data was taken from manually collected ESPI/ESBI announcements sourced from the Notoria S.A. service, covering the years from the beginning of 2005 onwards. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data.

Litigation_And_Proceedings – [“litigation_and_procedings “] According to the ACFE, AAA, and relevant literature, as described in previous chapters, private, administrative, and governmental litigations and proceedings are often linked to companies with a higher propensity for fraud. Disputes with suppliers, shareholders filing lawsuits, and administrative proceedings involving agencies like the tax office, ZUS, or GDDKiA can indicate underlying operational issues. These pressures may lead companies to manipulate financial reports to obscure their financial standing. Litigation, especially with regulators like UOKiK, often uncovers fraudulent practices. Such legal and administrative challenges act as red flags, signaling a higher risk of fraud. The data related to these litigations and proceedings was sourced from ESPI/ESBI announcements, collected from a wide range of reports, and filtered to identify specific cases. These announcements, including disputes (spory), lawsuits (pozwy), and administrative proceedings (postępowania administracyjne), were gathered as text, processed in Excel, and refined using custom C# programs before being stored in an SQL database for further fraud detection analysis. Preprocessing required significant manual correction due to the non-standardized nature of the data. Instances of the aforementioned circumstances were identified. The data was taken from manually collected ESPI/ESBI announcements sourced from the Notoria S.A. service, covering the years from the beginning of 2005 onwards. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data.

Irip_Award – [“irip_award “] The Instytut Rachunkowości i Podatków The Best Annual Report - Data from the "The Best Annual Report" competition, organized by the Institute of Accounting and Taxes (Instytut Rachunkowości i Podatków, IRIP), The Accounting and Tax Institute (Instytut Rachunkowości i Podatków) organizes the "The Best Annual Report" competition annually. In 2023, for the 17th time, the Institute announced the results for the 2022 edition. The goal of the competition is to promote annual reports that provide the most value to

shareholders and investors. The exact methodology is not disclosed due to business secrecy, as confirmed by a formal inquiry (the author contacted the IRIP directly via correspondence). The competition is further validated by partners such as the Warsaw Stock Exchange (Giełda Papierów Wartościowych w Warszawie, GPW), Bankier.pl, the Polish Chamber of Statutory Auditors (Polska Izba Biegłych Rewidentów, PIBR), the Association of Stock Exchange Issuers (Stowarzyszenie Emitentów Giełdowych, SEG), the Chamber of Brokerage Houses (Izba Domów Maklerskich, IDM), the Association of Brokers and Advisors (Związek Maklerów i Doradców, ZMID), the Chamber of Pension Fund Companies (Izba Gospodarcza Towarzystw Emerytalnych, IGTE), the Polish Bank Association (Związek Banków Polskich, ZBP), the journal "Rachunkowość," Bank.pl, and S&P Global Ratings. The synthetic metric was based on the presence and frequency of the awards within the time span of 17 years of competition. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data.

Supervisoryboard_Size_Small_Bin –[“ supervisoryboard_size_small_bin”] (<4 small) – If a small management team (BoD with fewer than four members) is in place, the organization may be more prone to fraud risk management (FRM) issues. The Supervisory Boards (“Rada Nadzorcza” in Polish) characteristics, particularly board size, play a critical role in corporate governance, compliance, and FRM. Small boards, with fewer than five members, are often more vulnerable to fraud due to weaker oversight and less diversified perspectives. Previous chapters discuss the importance of board size in maintaining effective governance and preventing fraud. Larger boards tend to have more resources and viewpoints, enhancing the board's ability to oversee management and reduce fraud risks through stronger and more robust oversight. The number of individuals serving on supervisory boards was counted based on data available from the Norotia S.A. service. However, data availability is limited to selected periods depending on the company, as determined by the Norotia S.A. service, and time span. Roles such as bankruptcy trustees and liquidators were not included in the calculations. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data.

Manag_Size_Small_Bin– (<3 small) [“manag_size_small_bin”] - If a small management team (C-suite, Management i.e. Zarząd in Polish) with fewer than three members is in place, the organization may be more prone to fraud risk management (FRM) issues. This is due to limited oversight, fewer checks,and less diversity in decision-making. The impact of

C-suite size on corporate governance (CG), compliance, and fraud prevention is discussed extensively in previous chapters, highlighting the importance of a well-structured and appropriately sized management team to effectively mitigate fraud risks. The number of individuals serving as C-suites (Management, "Zarząd" in Polish) was counted based on data available from the Notoria S.A. service. However, data availability is limited to selected periods depending on the company, as determined by the Notoria S.A. service, for the time span available. Roles such as bankruptcy trustees and liquidators were not included in the calculations. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data.

Female_Sb_Manag_Small_Bin – ["female_sb_manag_small_bin "] The theory outlined in Chapter 3 discusses the efficiency of the Board of Directors (BoD) and the BoD as a monitoring agent, emphasizing sex diversity (more than one female). The theory notes that women are statistically less likely to engage in egregious crimes and high-risk behaviors, and they are less often involved in corporate crimes. For example, men are twice as likely to commit fraud as women (Albrecht, Kranacher, Albrecht, ACFE Research Institute Research, Research White Paper for the Institute for Fraud Prevention). Research on business ethics suggests that women are typically more ethical than men (Ibrahim and Angelidis, 2008; Marta, Singhapakdi, and Kraft, 2008). Studies conducted by ACFE RTTN (described in the dissertation "Report to the Nations on Occupational Fraud") observe that more than 70% of perpetrators are identified as males. Furthermore, a significantly larger median loss is incurred by men compared to women (ACFE, 2020). This finding aligns with past cyclical RTTN studies conducted by ACFE, all of which have consistently revealed a significant gender disparity in both the frequency and loss associated with fraud (ACFE, 2010, 2016, 2018a, 2022). There was substantial variation in the gender distribution of occupational fraudsters across different geographic regions (ACFE 2020, 2022, 2018a). When comparing the U.S. and Canada region to the Region of Western Europe and Eastern Europe and Asia region (as delineated by the ACFE in their RTTNs research and related work), the gender distribution of perpetrators was even more male-dominated (ACFE 2022, 2020, 2018a). For instance, in the Eastern Europe and Western/Central Asia region, there was a notable imbalance with 81% male perpetrators and 19% female perpetrators; similarly, Western Europe followed the pattern with 73% male and 27% female perpetrators (ACFE 2020, p. 43). The distribution of fraud perpetrators' ages in our study exhibits a bell curve, with the majority of frauds (54%) being committed by individuals aged between 31 and 45, while the median loss consecutively increases with the age of the

perpetrator from 31 years old up to over 60 years old (ACFE 2022, p. 54). The sum of: the number of individuals serving as C-suites (Management, “Zarząd” in Polish) and the number of individuals serving on supervisory boards was counted based on data available from the Notoria S.A. service. However, data availability is limited to selected periods depending on the company, as determined by the Notoria S.A. service, for the time span available. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data.

Dpsn_Comply_Ratio – [“dpsn_comply_ratio “] Refers to Dobre Praktyki Spółek Notowanych (Best Practices of Listed Companies) on the Warsaw Stock Exchange (GPW). The DPSN Skaner is a tool used to assess the compliance of listed companies with corporate governance principles outlined in DPSN. The "COMPLY" ratio method measures the percentage of adopted principles by calculating the ratio of implemented rules to the total number of applicable and non-applicable rules (excluding “not applicable” responses). This percentage is then presented as the overall COMPLY score. Data was retrieved directly from the DPSN Skaner, operated by the Warsaw Stock Exchange (GPW). However, data availability is limited to selected periods depending on the company, as determined by the DPSN Skaner service, and does not cover a continuous 16-year time span. The measurement of the parameter value was conducted by the Warsaw Stock Exchange (GPW) and presented through the DPSN Skaner service. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data.

Dpsn_Non_Report – [“dpsn_non_report “] DPSN-TS AV refers to Dobre Praktyki Spółek Notowanych (Best Practices of Listed Companies) on the Warsaw Stock Exchange (GPW). The DPSN Skaner is a tool used to assess the compliance of listed companies with corporate governance principles outlined in DPSN. If a company (PTC - Publicly Traded Company) does not issue a DPSN report, it is considered more prone to fraud risk management (FRM) issues. Otherwise, it is considered less prone to FRM. Out of all companies, a given number are categorized as "Spółki, które nie wysłały raportu" ("Companies that did not send a report"). This helps identify compliance risks in corporate governance and formal, legal reporting obligations. Data was retrieved directly from the DPSN Skaner, operated by the Warsaw Stock Exchange (GPW). However, data availability is limited to selected periods depending on the company, as determined by the DPSN Skaner service, and for the time span available. The measurement of the parameter value was made as a direct count of the labels

previously conducted and assigned by the Warsaw Stock Exchange (GPW) and presented through the DPSN Skaner service. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand correction and human reading due to the unorganized and non-standardized nature of the data.

Wig_Div_Occ – ["wig_div_occ "] WIG-Div Occurrence GPW w Warszawie - As described in previous chapters, companies listed on main markets that regularly pay dividends and are included in dividend indices tend to align with value investing principles and the creation of long-term shareholder value. These companies are typically more mature, stable, and adhere to higher standards of corporate governance. They also demonstrate better compliance practices and exhibit a lower propensity for fraud risk management (FRM) issues, reflecting their commitment to sustainable growth and investor trust. The data was sourced directly from the Warsaw Stock Exchange (GPW). Archived data was made available to the author upon request through the appropriate department at GPW (The Product Information and Indices Development Department of the Warsaw Stock Exchange (GPW w Warszawie Dział Rozwoju Produktów Informacyjnych i Wskaźników)). As described at the beginning of Chapter 6, GPW emphasized the need to disclose that the data was provided directly by GPW in Warsaw and was made accessible through a special request by the author. The data was calculated as the occurrences of a given PTC in the WIG Div Index versus the total number of days the index was active for each year, with the total number of days adjusted based on the trading sessions of that year (percentage occurrence for each year). This calculation was performed for every year that the WIG Div Index was available. The data for this analysis was collected from the file (files), then, with custom programs written in C# to store the information in an SQL database. However, preprocessing required some hand correction and human reading.

Esg_Gpw_Respect_Index ["esg_gpw_respect_index"] - The RESPECT index is a socially responsible investment (SRI) index on the Warsaw Stock Exchange (GPW) in Warsaw. It includes companies that meet the highest standards of corporate governance, social responsibility, and environmental sustainability. Companies are selected based on rigorous criteria, including financial stability, transparency, and ESG (Environmental, Social, and Governance) practices. The index aims to promote responsible investing and highlight companies that excel in sustainable business practices while also offering solid financial performance. As described in the previous chapters, these companies are typically more mature, stable, and adhere to higher standards of corporate governance. They also demonstrate better compliance practices and exhibit a lower propensity for fraud risk management (FRM) issues,

reflecting their commitment to sustainable growth and investor trust. Companies listed in ESG indices tend to have stronger governance practices, reducing their propensity for financial fraud. Their commitment to transparency and ethical standards makes them less likely to engage in fraudulent activities. However, ongoing scrutiny is still necessary on the Polish market, as good ESG practices do not fully eliminate financial risk and their actual execution and adherence must be supervised more thoroughly by the market supervisor (also discussed previously). The data was calculated as the occurrences of a given PTC in the RESPECT Index versus the total number of days the index was active for each year, with the total number of days adjusted based on the trading sessions of that year (percentage occurrence for each year). This calculation was performed for every year that the RESPECT Index was available. The data for this analysis was collected from the file (files), then, with custom programs written in C# to store the information in an SQL database. However, preprocessing required some hand correction and human reading.

Indices_wig_20_40_80 – [“indeces_wig_20_40_80 “] Indices WIG-20, mWIG-40, sWIG-80 GPW w Warszawie - As described in previous chapters, companies listed on main markets that qualify for flagship indices of their respective exchanges, being the largest entities in their category, align with value investing principles and the creation of long-term shareholder value. These companies are typically more mature, stable, and adhere to higher standards of corporate governance. They also demonstrate better compliance, risk management practices, and greater brand recognition. The companies included in these key indices are often viewed as industry leaders, reflecting their stability, reputation, and commitment to sustainable growth and investor trust. The data was sourced directly from the Warsaw Stock Exchange (GPW). Archived data was made available to the author upon request through the appropriate department at GPW (The Product Information and Indices Development Department of the Warsaw Stock Exchange (GPW w Warszawie Dział Rozwoju Produktów Informacyjnych i Wskaźników)). As described at the beginning of Chapter 6, GPW emphasized the need to disclose that the data was provided directly by GPW in Warsaw and was made accessible through a special request by the author. The data was calculated as the occurrences of a given PTC in the WIG20, mWIG40, sWIG80 (in any of the abovementioned, across the timespan of a year) versus the total number of days the index was active for each year, with the total number of days adjusted based on the trading sessions of that year (percentage occurrence, for each year). This calculation was performed for every year that those indices were available. The data for this analysis was collected from the file (files), then, with custom programs written in C# to

store the information in an SQL database. However, preprocessing required some hand-correction and human reading.

Frm_prone_industr – ["frm_prone_industr "] According to the ACFE, industries most prone to financial fraud, financial statement fraud, reporting fraud, and disclosure fraud include banking and financial services (9.9% of cases), healthcare (8.3%), manufacturing (7.9%), construction (6.1%), food and beverages, and natural resources. The healthcare industry faces fraud due to complex transactions, while banks struggle with fraud detection due to high exposure. Manufacturing is prone to asset misappropriation, and food and beverages face risks from intricate supply chains. Natural resources deal with corruption, and construction is vulnerable due to complex contracting and procurement processes. According to the ACFE, industries such as banking, healthcare, and manufacturing are particularly susceptible to reporting fraud, with falsification of financial statements being a common issue. In banking, the complexity of financial instruments and oversight challenges create opportunities for manipulation. In the healthcare sector, the large volume of transactions and billing procedures makes it prone to fraudulent reporting, especially in cases of overstating revenues. Manufacturing faces risks from inflated inventory and revenue figures, as companies may manipulate reports to meet financial targets. The insights regarding fraud-prone industries such as banking, healthcare, manufacturing, and construction have shown consistent trends in ACFE's "Report to the Nations" over the years. These industries frequently appear as high-risk sectors for financial, reporting, and managerial fraud. Each year, these trends remain fairly constant due to the structural complexities, large volumes of transactions, and high regulatory demands in these sectors. Although specifics may vary slightly, the overall vulnerability to fraud in these industries persists across multiple reports.

The data was calculated as the occurrences of a given PTC in ACFE "fraud-prone industries" are represented on the Polish stock market by the following sector-specific WIG indices (in any of the aforementioned industries across the timespan of a year) versus the total number of days the index was active for each year. The total number of days was adjusted based on the trading sessions of that year, and the occurrence percentage was calculated for each year. This calculation was performed for every year the indices were available. The Polish stock market used the following relevant indices: WIG-Banki (banking sector), WIG-Energia (energy sector), WIG-Górnictwo (mining sector), WIG-Paliwa (fuel sector), WIG-Surowce (raw materials sector), WIG-Spożywczy (food and beverage sector), and WIG-Budownictwo (construction sector). These indices cover industries that are identified by the ACFE as being particularly vulnerable to financial fraud due to their inherent complexities and high-risk

environments. The data for this analysis was collected from the file (files), then, with custom programs written in C# to store the information in an SQL database. However, preprocessing required some hand-correction and human reading.

Av_litigation_costs – ["avg_litigation_costs"] Measure Average Litigation Costs in PLN as compared to Total Assets in PLN in the last 16 FY or time-span available. Litigation costs are derived from Eikon Refinitiv data, processing and calculations are own.

Incidence_Fsd_Divergence – ["incidence_fsd_divergence"] Sum of the incidence of fraudulent FSD SCORE values (when the KS statistic was greater than the critical value, and the null hypothesis was rejected, indicating that the empirical distribution differed significantly from the theoretical distribution – Benford's Law was not adhered to by a PTC for a given FY financial statement). The time trend in the FSD Score for PTCs identified by the SEC, through AAERs, as having materially misstated their financial statements is depicted in the study. When graphically presented on a chart, the year zero on the x-axis is centered on the year the misstatement began to show how the FSD Score changes before and after the misstatement. This highlights the differentiation in value trends between AAERs and non-AAER PTCs (Amiram et al., 2015b, Figure 4). Fourteen percent of the firms that deviate from Benford's Law engage in material misreporting. Of the 43,332 firm-years in the sample, 37,104, or 86%, conform to the law at the 5% level or better (Amiram et al., 2015). This estimate is consistent with reports that the probability of a PTC committing fraud is 14.5% per year (Dyck et al., 2013). Higher FSD Scores are associated with increased working capital accruals, discretionary accruals, and Dechow–Dichev measure values, which serve as proxies for reporting quality or accruals-based earnings management and manipulation (Amiram et al., 2015b, Table 6). Firms with elevated FSD Scores are also more likely to be identified as manipulators using Beneish's M-Score. The multivariate regression results align with these findings, indicating a relationship between the FSD Score and proxies for accruals-based earnings management and manipulation (Amiram et al., 2015a). Amiram et al.'s FSD Score, which measures the mean absolute deviation between the empirical distribution of leading digits in a PTC's financial statements and Benford's Law (Amiram et al., 2015a, Table 6), indicates that, on average, equity and liability accounts exhibit higher FSD Scores compared to asset accounts, implying a relatively higher error rate. Additionally, income accounts, on average, show higher FSD Scores than expense accounts, suggesting a relatively elevated error level in income accounts (Amiram et al., 2015a). Greater deviation from Benford's Law may indicate lower earnings persistence, reflecting a potential decrease in the quality of reported financial results (Amiram et al., 2015a). This stems from the idea that PTCs with lower accounting quality are less likely to have current

earnings that are informative about future earnings (Richardson et al., 2005). This builds on previous literature (Sloan, 1996) by associating accrual reliability with earnings persistence through a model demonstrating that less reliable accruals result in reduced earnings persistence.

Moreover, because investors do not fully anticipate this effect, it leads to significant security mispricing, highlighting the cost associated with incorporating less reliable accrual information into capital decisions (Richardson et al., 2005). Later literature supports this perspective, linking low financial report readability to reduced earnings persistence (Li, 2008). PTCs exhibiting greater divergence from Benford's Law also demonstrate lower earnings persistence, controlling for factors such as sales growth, dividend payment, market value of equity, growth, special items, survivorship, return volatility, and net earnings volatility (Li, 2008). Empirical research on the interaction between FSD Score and net income suggests that deviations from Benford's Law are indicative of potential earnings manipulation. The FSD Score is calculated using the K-S statistic individually for each PTC, not a pool of PTCs. Higher FSD Scores are (i) aligned with proxies for reporting quality or accruals-based earnings management and manipulation, including Dechow–Dichev measure values, working capital accruals, and discretionary accruals (Amiram et al., 2015b, Table 6); and (ii) more likely to identify manipulators using Beneish's M-Score.

The procedure in the image outlines how to test conformity to Benford's Law using a sample balance sheet. First, the first digit of each number is isolated, and the frequency of each digit is compared to the theoretical distribution expected by Benford's Law. The Kolmogorov-Smirnov (KS) statistic is then calculated by determining the maximum absolute difference between the empirical and theoretical frequencies. The critical value is computed based on the sample size, and if the KS statistic is smaller than this critical value, the null hypothesis—that the data conforms to Benford's Law—is not rejected. The procedure relies strictly on Amiram's et al. Method FSD_Score (Amiram et al., 2015a), briefly: To test the conformity of a dataset, such as a balance sheet, to Benford's Law using the Kolmogorov-Smirnov (KS) statistic, the first step was to extract the first digit from each number in the dataset. These digits, ranging from 1 to 9, were used as the basis for analysis. Let n represent the total number of observations, where each observation corresponded to one number in the dataset. For each leading digit, the empirical frequency was calculated by determining the proportion of occurrences of that digit relative to the total number of observations. This empirical frequency for each digit d was calculated as f_d/n, where f_d was the number of times the digit d appeared, and n was the total number of observations.

This process was repeated for all digits from 1 through 9, and the empirical frequencies were recorded. Next, these empirical frequencies were compared to the theoretical frequencies predicted by Benford's Law. According to Benford's Law, the probability of the first digit being d was calculated as P(d) = log10(1 + 1/d). This resulted in a theoretical distribution where smaller digits, such as 1 and 2, were expected to appear more frequently than larger digits, such as 8 and 9. After calculating both the empirical and theoretical frequencies, the KS statistic was computed to measure the degree of deviation between the empirical distribution and Benford's theoretical distribution. The KS statistic was defined as the maximum absolute difference between the cumulative empirical distribution and the cumulative theoretical distribution. Mathematically, the KS statistic was expressed as the maximum of the following differences: |AD_1 - ED_1|, |(AD_1 + AD_2) - (ED_1 + ED_2)|, ... , |(AD_1 + AD_2 + ... + AD_9) - (ED_1 + ED_2 + ... + ED_9)|. Here, AD_i represented the cumulative empirical frequency for the i-th leading digit, and ED_i represented the cumulative theoretical frequency for the same digit. The maximum of these absolute differences determined the KS statistic. To assess whether the empirical distribution deviated significantly from Benford's Law, a critical value was calculated using the formula 1.36/sqrt(n), where n represented the total number of observations. This critical value corresponded to the threshold that, if exceeded by the KS statistic, indicated a statistically significant deviation at a given significance level (typically 5%). Finally, the KS statistic was compared to the critical value. If the KS statistic was less than the critical value, the null hypothesis that the empirical distribution conformed to Benford's Law could not be rejected. Conversely, if the KS statistic exceeded the critical value, the null hypothesis was rejected, suggesting that the empirical distribution did not follow Benford's Law. This process allowed for a systematic assessment of whether the dataset's distribution of leading digits aligned with the expected distribution according to Benford's Law, based on the KS statistic. At a 5% significance level, the S test helps determine whether to reject the null hypothesis that the data conforms to Benford's Law (Nigrini, 2012). If the test statistic exceeds the critical value, it indicates that the observed data deviates significantly from the expected distribution (Durtschi et al., 2004). Such a result suggests potential anomalies or manipulations in the dataset, warranting further investigation (Nigrini and Wells, 2011). If the test statistic is greater than the critical value, this is another signal of potential fraudulent or manipulative issues in the data. Since if KS stat is smaller than the critical test, the null hypothesis is not to be rejected, meaning the data likely follows the theoretical distribution—Benford's Law.

The data for this analysis was collected from the file (files), then, with custom programs written in C# to store the information in an SQL database. However, preprocessing required

some hand-correction and human reading. The data for the FSD score was taken for each company for the given fiscal year over its reporting period within the studied time frame and numbered from FY-1 to FY-16 (i.e., from the most recent to the oldest). For companies with a shorter lifespan, there are correspondingly fewer FSD parameters. The final value of the multi-parameter was calculated as n-number of FSD Scores for each PTC, where n is the number of annual financial statements (FY) for given fiscal years available, and later aggregated on a given PTC level as a percentage—instances of Benford's Law non-adherence (FSD_Score indicating high divergence from Benford's Law), [%] Instances In the last 16 FY or time-span available to all In the last 16 FY or time-span available.

6.8.2 Compound Indexes, Compound Financial Parameters, Control Variables and Cut-off Rate

Negative Cash From Investing ["neg_cash_from_investing"] - Negative cash from investing activities [%] instances in the last 16 FY or time-span available.

Negative Cash From Operating ["neg_cash_from_operating"] - Negative cash from operating activities [%] instances in the last 16 FY or time-span available.

Negative Cash From Financing ["neg_cash_from_financing"] - Negative cash from financing activities [%] instances in the last 16 FY or time-span available.

Negative Changes In Working Capital ["neg_changes_in_working_capital"] - Negative changes in working capital [%] instances in the last 16 FY or time-span available (changes in working capital – Eikon calculated parameter).

Positive Free Cash Flow To Firm (FCFF) ["positive_fcff"] - Positive free cash flow to firm (FCFF) = (free cash flow - capital expenditures) / company market capitalization [%] instances in the last 16 FY or time-span available.

Operating Cash Flow Ratio ["ocfr"] - Operating cash flow ratio = free operating cash flow / total liabilities >1 [%] instances in the last 16 FY or time-span available.

Index Current Ratio ["index_current_ratio"] – Index current ratio [total current assets/total current liabilities]. Index treatment group: Beneish's indexing - Year t refers to the first year in which earnings manipulation/fraud occurs. Formula: Measure t-1/measure t (first instance of manipulation or fraud) (Beneish 1999, Table 1, Table 2) plus year-market factor divided by two. Index control group: Year-market factor in the last 16 FY or time-span available, averaged.

Index Quick Ratio ["index_quick_ratio"] - Index quick ratio = (accounts receivable + free cash flow) / total liabilities. Index treatment group: Beneish's indexing - Year t refers to the first year in which earnings manipulation/fraud occurs. Formula: Measure t-1/measure t (first instance of manipulation or fraud) (Beneish 1999, Table 1, Table 2) plus year-market factor divided by two. Index control group: Year-market factor in the last 16 FY or time-span available, averaged.

Index Tangible Book Value Per Share (TBVPS) ["index_tbvbs"] – Index tangible book value per share (TBVPS) = (total assets - intangible assets - total liabilities) / number of shares outstanding. Index treatment group: Beneish's indexing - Year t refers to the first year in which earnings manipulation/fraud occurs. Formula: Measure t-1/measure t (first instance of manipulation or fraud) (Beneish 1999, Table 1, Table 2) plus year-market factor divided by two. Index control group: Year-market factor in the last 16 FY or time-span available, averaged.

Index Accounts Receivable To Revenue Ratio (ARRR) ["index_arrr"] - Index accounts receivable to revenue ratio [accounts receivable / total revenue]. Index treatment group: Beneish's indexing - Year t refers to the first year in which earnings manipulation/fraud occurs. Formula: Measure t-1/measure t (first instance of manipulation or fraud) (Beneish 1999, Table 1, Table 2) plus year-market factor divided by two. Index control group: Year-market factor in the last 16 FY or time-span available, averaged.

Index Free Cash Flow To Revenue Ratio (FCFRR) ["index_fcfrr"] - Index free cash flow to revenue ratio [free operating cash flow / total revenue]. Index treatment group: Beneish's indexing - Year t refers to the first year in which earnings manipulation/fraud occurs. Formula: Measure t-1/measure t (first instance of manipulation or fraud) (Beneish 1999, Table 1, Table 2) plus year-market factor divided by two. Index control group: Year-market factor in the last 16 FY or time-span available, averaged.

Index Operating Cash Flow To Long-Term Debt Ratio (OCFLLDR) ["index_ocflldr"] - Index operating cash flow to long-term debt ratio [free operating cash flow / total long-term debt]. Index treatment group: Beneish's indexing - Year t refers to the first year in which earnings manipulation/fraud occurs. Formula: Measure t-1/measure t (first instance of manipulation or fraud) (Beneish 1999, Table 1, Table 2) plus year-market factor divided by two. Index control group: Year-market factor in the last 16 FY or time-span available, averaged.

Description of Compound Financial Parameters

Negative Cash from Investing Activities ["neg_cash_from_investing"] - Frequent instances of negative cash flow from investing activities can signal a company is consistently reinvesting in assets, which is normal in growth phases. However, if this pattern persists despite financial instability or unexplained profitability, it could suggest manipulation, such as disguising capital expenditures as investments or inflating asset values. Sudden large investments may also be an attempt to obscure poor performance or divert attention from problematic cash flows.

Negative Cash from Operating Activities ["neg_cash_from_operating"] - Sustained negative cash flow from operating activities can indicate that the company is not generating enough cash to sustain its core business operations. This could be a red flag for earnings manipulation, as companies might inflate earnings through non-cash methods like accruals, while actual cash flow remains negative. If operating cash flow remains negative while reported profits are positive, it could signal fraudulent practices.

Negative Cash from Financing Activities ["neg_cash_from_financing"] - A high frequency of negative cash flow from financing activities typically reflects debt repayment or dividend payouts. However, when combined with other financial red flags, it could indicate the company is using financing activities to cover up liquidity issues or financial distress. Sudden large repayments, especially if out of line with normal activity, might suggest the company is attempting to manipulate balance sheet metrics to present a more favorable financial standing.

Negative Changes in Working Capital ["neg_changes_in_working_capital"] - Frequent negative changes in working capital can suggest issues with the company's liquidity or the ability to manage short-term obligations. If working capital repeatedly decreases without corresponding changes in revenue or profitability, it may indicate that the company is mismanaging or manipulating its current assets and liabilities to inflate its financial performance.

Index Current Ratio ["index_current_ratios"] - The current ratio measures the company's ability to cover short-term liabilities with short-term assets. An abnormally low current ratio, especially after indexing for year-to-year changes, may indicate liquidity problems, possibly signaling aggressive earnings manipulation or the withholding of liabilities from financial statements to present a stronger balance sheet.

Index Quick Ratio ["index_quick_ratio"] - The quick ratio focuses on the company's most liquid assets. If the quick ratio is abnormally high, it could suggest that the company is artificially inflating its liquid assets by overstating accounts receivable or other items. On the

other hand, an abnormally low quick ratio might indicate that the company is struggling to maintain liquidity, potentially due to hidden liabilities or overstated revenue.

Positive Free Cash Flow to Firm (FCFF) ["positive_fcff"] - This ratio measures the company's ability to generate free cash flow relative to its market capitalization. If a company frequently reports positive free cash flow while experiencing other financial difficulties (e.g., declining profitability or revenue), it may suggest manipulation of capital expenditures or the timing of cash flows to present a more favorable image of the firm's financial health.

Operating Cash Flow Ratio ["ocfr"] - This ratio measures how well the company can cover its liabilities with cash flow from operations. A ratio greater than 1 suggests strong liquidity, but if the ratio is unexpectedly high or low, it could indicate manipulation. Companies may inflate cash flows to cover up liquidity problems or understate liabilities, leading to a distorted picture of financial health.

Index TBVPS ["index_tbvbs"] - This ratio measures the tangible net worth of the company per share. A sudden increase in tangible book value without a corresponding increase in actual assets could indicate that the company is overstating its asset base or underreporting liabilities, both of which are common fraud techniques.

Index ARRR ["index_arrr"] - This ratio directly measures how much of the company's reported revenue is tied up in receivables. A high ratio could indicate that a significant portion of sales is not being converted to cash, which is often a red flag for revenue manipulation or aggressive revenue recognition. This ratio is frequently used in fraud detection because inflating revenue while not actually collecting cash is a common tactic in financial fraud.

Index FCFRR ["index_fcfrr"] - This ratio measures the efficiency of converting revenue into actual cash flow. If free cash flow is disproportionately low compared to revenue, it can indicate potential manipulation, such as inflating sales or delaying necessary expenses. Cash flow is more difficult to manipulate than revenue, making this a critical metric for identifying discrepancies that may suggest fraud.

Index OCFLLDR ["index_ocflldr"] - This ratio measures the company's ability to pay off long-term debt using cash from operations. A sudden spike in this ratio, especially after indexing, may suggest that the company is underreporting debt or overstating cash flow to appear more solvent. Conversely, a low ratio might indicate liquidity issues that the company is trying to obscure through manipulation of financial statements.

Control Variables are based on control variables in FRM research and accordingly to the data availability and accessibility (Wang 2013; Alden et al. 2012; Wang et al. 2010; Beasley et al. 2010; Skousen et al. 2008; Erickson et al. 2006; Abbott et al. 2004; Carcello, Nagy 2004; Kamiński et al. 2004; Uzun et al. 2004; Green, Choi 1997).

cv_ta – Average TOTAL ASSETS: Data for 16 fiscal years (FY) or fewer was collected if the company had been listed for a shorter period. This information was sourced from the Eikon Refinitiv database and is presented in the Annual Balance Sheet in PLN. Eikon Refinitiv's nomenclature of the parameter ("filter") is "Total Assets, Reported (PLN), In the last 16 FY" – average.

cv_mcap – Average MARKET CAPITALIZATION: Data for 16 fiscal years (FY) or fewer was collected if the company had been listed for a shorter period. This information was sourced from the Eikon Refinitiv database. Data on market capitalization was collected specifically regarding ordinary stocks, excluding preferred shares, convertibles, and contingent securities, and was reported in PLN. Eikon Refinitiv's nomenclature of the parameter ("filter") is "Company Market Capitalization, Reported (PLN), In the last 16 FY" – average.

cv_employment_co – Average Employment in the company as calculated by Notoria S.A. service: Data was collected for as many years as disclosed in the Notoria S.A. database. This information was sourced from the Notoria S.A. service. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand-correction and human reading due to the unorganized and non-standardized nature of the data.

employment_group – Employment in the group as calculated by Notoria S.A. service: Data was collected for as many years as disclosed in the Notoria S.A. database. This information was sourced from the Notoria S.A. service. The data for this analysis was hand-collected, with custom programs written in C# to store the information in an SQL database. However, preprocessing required hand-correction and human reading due to the unorganized and non-standardized nature of the data. In the last 16 FY or time-span available, the parameter was ultimately abandoned due to data limitations and was eventually removed.

Cut-off rates and classification costs: the model can make two types of errors: classifying a firm as non-manipulative when it actually manipulates (Type I error), or labeling a firm as manipulative when it does not (Type II error). The probability cut-offs that minimize misclassification costs depend on the relative expenses associated with each error type. Though decision-makers' objectives are not directly observable, the costs of misclassification likely

vary. Investors likely face higher Type I error costs due to significant stock price losses when manipulation is uncovered, while their Type II costs are lower, given alternative investments. Regulators, however, must balance protecting the public with avoiding false accusations, potentially making Type II errors costlier for them (Beneish 1999a). Since the costs of Type I and Type II errors are difficult to quantify, ratios from 1:1 to 100:1 are considered. For investors, the likely ratio is between 20:1 and 30:1. As Beneish noted, manipulators typically lose 40% of their market value when exposed, while non-manipulators' equity grows by 1-2% per quarter (Beneish 1999b). Thus, it might take 20 to 40 non-manipulative firms to offset the losses of a single manipulative one, suggesting investors perceive Type I errors as far more costly (Beneish 1999a, 1999b). In financial reporting fraud detection, the costs associated with Type I and Type II errors play a crucial role in determining the cut-off rates for classification models. According to Amiram et al., classification costs are significant in fraud detection models because the repercussions of misclassifications differ greatly between stakeholders such as investors, regulators, and auditors (Amiram et al. 2015). Amiram's work emphasizes that while investors prioritize minimizing Type I errors due to the significant financial losses that occur when fraud is overlooked, auditors and regulators are often more concerned with balancing both types of errors to ensure fairness and public trust in the financial system. Researchers like Dechow et al. propose that cut-off rates for classifying fraud often need to be adjusted based on empirical loss functions, which weigh the potential financial impacts of misclassification on various stakeholders (Dechow et al. 2011). They suggest using different cost ratios depending on whether the focus is on preventing fraud (minimizing Type I errors) or avoiding false accusations (minimizing Type II errors). Beneish further provides a benchmark for this discussion, suggesting that for investors, a Type I error could be perceived as 20 to 40 times more costly than a Type II error, given the drastic decline in stock value upon discovery of fraud (Beneish 1999).

Moreover, researchers like Kotsiantis emphasize the use of receiver operating characteristic (ROC) curves to optimize cut-off rates by evaluating the trade-offs between sensitivity and specificity, thus helping to minimize overall misclassification costs (Kotsiantis 2007). Kim and Kross also explore the use of probabilistic thresholds derived from logistic regression models, calibrated to minimize the total expected cost of errors (Kim and Kross 2005). Cut-off rates are often adjusted iteratively based on the expected loss from different misclassification scenarios, ensuring that the chosen threshold maximizes the utility for the primary stakeholders involved. Other methodologies include decision-tree models that incorporate cost-sensitive learning, as suggested by Phua et al., which enable the model to adapt

cut-off points dynamically based on historical data regarding the costs of misclassification (Phua et al. 2004). These approaches demonstrate that the establishment of cut-off rates is not a one-size-fits-all solution, but rather a strategic decision that must account for the specific economic and reputational costs to each stakeholder group. In the realm of financial reporting fraud detection, the costs associated with classification errors—specifically Type I and Type II errors—are critical for model accuracy and decision-making. Beneish highlights the significant financial impact of Type I errors, particularly for investors, where the loss of market value upon the discovery of manipulation can be dramatic, suggesting a high-cost ratio between Type I and Type II errors (Beneish 1999). Amiram et al. further expands on this by emphasizing the importance of understanding the economic implications of misclassification, arguing that the true cost of these errors can vary greatly depending on the stakeholder's perspective (Amiram et al. 2015). They propose that cut-off rates should not only reflect statistical accuracy but also the financial consequences of these errors.

In establishing cut-off rates, Dechow et al. consider the economic trade-offs by examining the potential losses that firms could face if misclassified, using historical data to weigh the costs of false positives against false negatives (Dechow et al. 2011). Jones suggests using a cost-benefit analysis approach, where the potential gains from correctly identifying a manipulator are balanced against the costs incurred from misclassification (Jones 1991). Feroz, Park, and Pastena adopt a pragmatic approach by setting cut-off rates based on the relative frequency of fraud in the sample, adjusting the model to minimize expected costs across different scenarios (Feroz et al. 1991). Similarly, Spathis emphasizes the importance of contextual factors, such as market conditions and firm size, in determining the appropriate cut-offs, arguing that a one-size-fits-all approach may not be effective (Spathis 2002). In some studies, like that of Summers and Sweeney, the cut-off thresholds are calibrated using a moving window of historical data to account for temporal changes in fraud detection effectiveness (Summers and Sweeney 1998). Fanning and Cogger take a different approach, using machine learning algorithms to dynamically adjust cut-off rates based on real-time data inputs, which allows for more flexible and responsive fraud detection models (Fanning and Cogger 1998). Overall, the literature suggests a multi-faceted approach to setting cut-off rates, one that considers the financial stakes of misclassification, the specific context of the firm or industry, and the evolving nature of financial fraud. These insights highlight the complexity of developing robust fraud detection models that balance the trade-offs between Type I and Type II errors. Basic cut-off rate, that was found appropriate for emerging markets, especially from

the CEE/CESEE region regarding FRM detection models (logit models), was established by Kanapickiene and Grundiene, and this thesis followed (Kanapickiene and Grundiene 2015).

6.9 Statistical Analysis

6.9.1 The Initial Model

The Overview of the Logistic Regression Model (the Initial Model, Later Refined)

Table 7 describes The Initial Model (Before Improvements). The logistic regression model was designed to analyze the likelihood of fraud (dependent variable indicating fraud "zmienna_zalezna_fraud") based on a dataset containing 213 observations and 30 independent variables. Initially, an unrefined model was developed, which revealed significant multicollinearity issues, particularly between index_current_ratio and index_quick_ratio, as indicated by extremely high Variance Inflation Factor (VIF) values. To improve the model's performance and address these multicollinearity concerns, Principal Component Analysis (PCA) was conducted, leading to the creation of a new variable, pca_factor1, which was then used in place of the original collinear variables. The updated model was subsequently evaluated for its performance, statistical significance, and overall fit. See Table 8: The Initial Model Characteristics, Table 9: Principal Component Analysis (PCA) and PCS Factor 1 Establishment, Table 10: The Updated Model with PCA(The Final Model), Table 11: The Updated Model with PCA(The Final Model) Model Characteristics, Table 12: The Updated Model with PCA(The Final Model) Model Characteristics, Table 13: The OLS Ordinary Least Squares (OLS) Regression Analysis, Table 14: Variance Inflation Factor (VIF)Table.

Table 7: The Initial Model (Before Improvements)

Logistic regression — Number of obs = 213; LR chi2(31) = 139.66; Prob > chi2 = 0.0000; Log likelihood = -22.010364; Pseudo R2 = 0.7603

zmienna_zalezna_fraud	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
insider_fillings	-2.30517	1.211108	-1.90	0.057	-4.678898	.0685581
ranking_shareholder	4.490681	2.37127	1.89	0.058	-.1569225	9.138284
restatements	.1373586	.0537442	2.56	0.011	.0320219	.2426954
financial_diss_proceed	.3568674	.1535966	2.32	0.020	.0558236	.6579112
litigation_and_procedings	-.0590149	.1097311	-0.54	0.591	-.2740839	.1560541
irip_award	.3609393	662.092	0.00	1.000	-1297.316	1298.037
supervisoryboard_size_small_bin	-6.301303	3.374227	-1.87	0.062	-12.91467	.3120603
manag_size_small_bin	2.675708	2.080434	1.29	0.198	-1.401867	6.753283
female_sb_manag_small_bin	-1.941651	1.627004	-1.19	0.233	-5.130521	1.247219
dpsn_comply_ratio	-1.233901	2.602611	-0.47	0.635	-6.334925	3.867122
dpsn_non_report	-10.30256	18.43139	-0.56	0.576	-46.42742	25.8223
wig_div_occ	.0376311	.0354803	1.06	0.289	-.031909	.1071713
esg_gpw_respect_index	.0541722	.027411	1.98	0.048	.0004475	.1078968
indeces_wig_20_40_80	-.0069689	.0260975	-0.27	0.789	-.058119	.0441813
frm_prone_industr	.0196358	.0201811	0.97	0.331	-.0199183	.05919
avg_litigation_costs	-1.13e-06	5.25e-07	-2.16	0.031	-2.16e-06	-1.05e-07
incidence_fsd_divergence	3.568018	1.269849	2.81	0.005	1.079159	6.056877
neg_cash_from_investing	-.101954	.0432836	-2.36	0.018	-.1867882	-.0171197
neg_cash_from_financing	.024713	.0457602	0.54	0.589	-.0649754	.1144014
neg_cash_from_operating	-.2135538	.0838974	-2.55	0.011	-.3779895	-.049118
neg_changes_in_working_capital	-.0136903	.0504727	-0.27	0.786	-.1126149	.0852343
positive_fcff	.0561269	.0411894	1.36	0.173	-.0246029	.1368566
ocfr	-.1668057	.0888372	-1.88	0.060	-.3409234	.0073119
index_current_ratio	-10.72184	6.532539	-1.64	0.101	-23.52538	2.081699
index_quick_ratio	10.61664	6.509908	1.63	0.103	-2.142548	23.37582
index_tbvbs	-.7588458	.3408124	-2.23	0.026	-1.426826	-.0908659
index_arrr	.1044406	.0733544	1.42	0.155	-.0393314	.2482126
index_fcfrr	.0383514	.0951619	0.40	0.687	-.1481625	.2248653
index_ocflldr	.0063784	.0266794	0.24	0.811	-.0459123	.0586691
cv_ta	-2.09e-09	1.41e-09	-1.47	0.140	-4.86e-09	6.86e-10
cv_mcap	-1.59e-09	1.47e-09	-1.08	0.280	-4.48e-09	1.30e-09
_cons	15.19927	7.740496	1.96	0.050	.0281791	30.37037

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software

Table 7 describes The Initial Model (Before Improvements). Below is a description of the basic characteristics of the model before the improvement:

LR Chi-Square (Likelihood Ratio Chi-Square):Value: The initial model had a LR chi-square value of 139.66, with a p-value of 0.0000. Interpretation: The LR chi-square test assesses whether the inclusion of independent variables significantly improves the model over a null model (one with no predictors). The very high chi-square value, combined with an extremely low p-value, indicates that the predictors as a group significantly contribute to

explaining the likelihood of fraud. This suggests that the model provides meaningful insights into the factors that increase the probability of fraudulent activity.

Log Likelihood: Value: The log likelihood of the initial model was -22.010364. Interpretation: The log likelihood measures the fit of the model, with less negative values indicating a better fit. Although the log likelihood itself does not have an intuitive standalone interpretation, comparing it to other models allows you to assess relative model performance. The relatively high log likelihood in this case suggests that the initial model captures the relationship between the predictors and fraud likelihood reasonably well, but the identified multicollinearity issues called for further refinement.

Pseudo R-Squared: Value: The initial model's pseudo R-squared was 0.7603, indicating that 76.03% of the variability in the likelihood of fraud was explained by the predictors. Interpretation: Pseudo R-squared values, while not directly comparable to R-squared in linear regression, provide an indication of how well the model explains the variability in the outcome. A pseudo R-squared of 0.7603 suggests that the initial model accounted for a significant portion of the variability in fraud likelihood, demonstrating strong explanatory power. However, due to multicollinearity, the model's stability and reliability could be questioned, necessitating improvements.

VIF Analysis: Issue: The VIF analysis revealed extremely high values, particularly for index_current_ratio and index_quick_ratio, both exceeding 600. This suggested severe multicollinearity, which can inflate the standard errors of the coefficients, leading to unreliable and potentially misleading estimates. This multicollinearity issue needed to be addressed to ensure that the model's coefficients accurately reflected the relationships between the predictors and the likelihood of fraud.

Table 8: The Initial Model Characteristics

Classified	True D	True ~D	Total
+	29	2	31
-	4	178	182
Total	33	180	213

Classified + if predicted Pr(D) >= .5
True D defined as zmienna_zalezna_fraud != 0

Sensitivity	Pr(+| D)	87.88%
Specificity	Pr(-|~D)	98.89%
Positive predictive value	Pr(D| +)	93.55%
Negative predictive value	Pr(~D| -)	97.80%
False + rate for true ~D	Pr(+|~D)	1.11%
False - rate for true D	Pr(-| D)	12.12%
False + rate for classified +	Pr(~D| +)	6.45%
False - rate for classified -	Pr(D| -)	2.20%
Correctly classified		97.18%

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software

6.9.2 The Principal Component Analysis (PCA), PCA Factor 1 Establishment and VIF Analysis

Table 9: Principal Component Analysis (PCA) and PCS Factor 1 Establishment

Principal components/correlation — Number of obs = 213; Number of comp. = 2; Trace = 2; Rho = 1.0000

Rotation: (unrotated = principal)

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	1.99912	1.99823	0.9996	0.9996
Comp2	.000882768	.	0.0004	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Unexplained
index_curr~o	0.7071	0.7071	0
index_quic~o	0.7071	-0.7071	0

```
. predict pca_factor1, score
(1 components skipped)

Scoring coefficients
    sum of squares(column-loading) = 1
```

Variable	Comp1	Comp2
index_curr~o	0.7071	
index_quic~o	0.7071	-0.7071

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software.

The P**rincipal Component Analysis (PCA) and VIF Analysis**

Table 9 presents Principal Component Analysis (PCA) and PCS Factor 1 Establishment, while Table 8: The Initial Model Characteristics. Principal Component Analysis (PCA) is a statistical technique used to address multicollinearity by reducing the dimensionality of the data. It transforms the original variables into a new set of uncorrelated variables called principal components, which capture the maximum variance in the data. In this case, PCA was applied to the highly collinear variables index_current_ratio and index_quick_ratio.

PCA Implementation: Purpose: The PCA was implemented to combine the highly collinear variables into a single factor, pca_factor1, which captures most of the variance of index_current_ratio and index_quick_ratio. This new variable was then used in the logistic regression model to reduce multicollinearity. Outcome: The first principal component, pca_factor1, explained nearly all the variance between the original collinear variables, making it a suitable replacement in the model.

VIF Analysis Before and After PCA: Before PCA: The initial VIF values for index_current_ratio and index_quick_ratio were exceedingly high, with values exceeding 600, indicating severe multicollinearity. After PCA: After replacing the original variables with pca_factor1, the VIF values across all variables dropped significantly. The highest VIF value in the updated model was 11.31, with the mean VIF reduced to 3.44. This substantial improvement indicates that multicollinearity was effectively mitigated, resulting in more reliable and stable coefficient estimates.

The reduction in VIF values following PCA implementation indicates that the multicollinearity issue was successfully resolved. The model’s coefficients are now more reliable, and the relationships between the predictors and the outcome variable are more accurately represented. The introduction of pca_factor1 not only improved the model's interpretability but also enhanced its predictive stability.

6.9.3 The Updated Model with PCA(The Final Model)

Table 10: The Updated Model with PCA (The Final Model)

Logistic regression — Number of obs = 213; LR chi2(30) = 136.79; Prob > chi2 = 0.0000; Log likelihood = -23.444879; Pseudo R2 = 0.7447

zmienna_zalezna_fraud	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
insider_fillings	-2.152666	1.266043	-1.70	0.089	-4.634065	.3287324
ranking_shareholder	3.179984	2.015826	1.58	0.115	-.7709619	7.130929
restatements	.1125473	.0428935	2.62	0.009	.0284777	.196617
financial_diss_proceed	.2868359	.1338752	2.14	0.032	.0244454	.5492264
litigation_and_procedings	-.0212584	.1063992	-0.20	0.842	-.2297969	.1872801
irip_award	-1.108079	57.60592	-0.02	0.985	-114.0136	111.7974
supervisoryboard_size_small_bin	-4.979811	2.600737	-1.91	0.056	-10.07716	.1175394
manag_size_small_bin	1.963663	1.763965	1.11	0.266	-1.493645	5.420971
female_sb_manag_small_bin	-1.622258	1.409392	-1.15	0.250	-4.384615	1.140099
dpsn_comply_ratio	-1.744612	2.245232	-0.78	0.437	-6.145185	2.655962
dpsn_non_report	-8.227682	8.767384	-0.94	0.348	-25.41144	8.956075
wig_div_occ	.0382213	.0325759	1.17	0.241	-.0256263	.1020689
esg_gpw_respect_index	.0523122	.0265319	1.97	0.049	.0003106	.1043138
indeces_wig_20_40_80	-.0143409	.0225495	-0.64	0.525	-.058537	.0298553
frm_prone_industr	.0242155	.018238	1.33	0.184	-.0115303	.0599613
avg_litigation_costs	-1.04e-06	4.68e-07	-2.22	0.027	-1.96e-06	-1.20e-07
incidence_fsd_divergence	2.947989	.9619213	3.06	0.002	1.062658	4.83332
neg_cash_from_investing	-.0809301	.0341902	-2.37	0.018	-.1479417	-.0139185
neg_cash_from_financing	.007207	.0347639	0.21	0.836	-.0609289	.075343
neg_cash_from_operating	-.1712838	.0592029	-2.89	0.004	-.2873193	-.0552482
neg_changes_in_working_capital	-.0009072	.0429203	-0.02	0.983	-.0850295	.0832152
positive_fcff	.0434171	.034853	1.25	0.213	-.0248936	.1117277
ocfr	-.127179	.0651033	-1.95	0.051	-.2547792	.0004212
pca_factor1	-1.317992	.9756951	-1.35	0.177	-3.230319	.5943356
index_tbvbs	-.7328541	.304677	-2.41	0.016	-1.33001	-.1356981
index_arrr	.0842029	.0510552	1.65	0.099	-.0158635	.1842692
index_fcfrr	.016327	.0648707	0.25	0.801	-.1108173	.1434713
index_ocflldr	.0040231	.0238288	0.17	0.866	-.0426804	.0507267
cv_ta	-1.47e-09	1.15e-09	-1.28	0.199	-3.72e-09	7.76e-10
cv_mcap	-1.18e-09	1.11e-09	-1.06	0.288	-3.34e-09	9.91e-10
_cons	11.66564	5.503849	2.12	0.034	.8782897	22.45298

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software.

.

Table 11: The Updated Model with PCA (The Final Model) Model Characteristics

Logistic model for zmienna_zalezna_fraud

Classified	True D	True ~D	Total
+	30	1	31
-	3	179	182
Total	33	180	213

Classified + if predicted Pr(D) >= .5
True D defined as zmienna_zalezna_fraud != 0

Sensitivity	Pr(+| D)	90.91%
Specificity	Pr(-|~D)	99.44%
Positive predictive value	Pr(D| +)	96.77%
Negative predictive value	Pr(~D| -)	98.35%
False + rate for true ~D	Pr(+|~D)	0.56%
False - rate for true D	Pr(-| D)	9.09%
False + rate for classified +	Pr(~D| +)	3.23%
False - rate for classified -	Pr(D| -)	1.65%
Correctly classified		98.12%

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software.

The Updated Model with PCA (The Final Model)

After addressing multicollinearity by replacing the collinear variables with pca_factor1, the updated model demonstrated improved stability and interpretability. Table 11 presents the Updated Model with PCA (The Final Model) Model Characteristics, while Table 10: The Updated Model with PCA (The Final Model).

LR Chi-Square (Likelihood Ratio Chi-Square): Value: The LR chi-square for the updated model is 136.79, with a p-value of 0.0000. Interpretation: The consistent significance of the LR chi-square test in the updated model confirms that the predictors collectively continue to provide valuable insights into the likelihood of fraud. Despite the changes made to address multicollinearity, the model retains its ability to significantly outperform the null model, ensuring that the key factors contributing to fraud are effectively captured.

Log Likelihood: Value: The updated model's log likelihood is -23.444879. Interpretation: While slightly more negative than the initial model's log likelihood, this value still indicates a strong model fit. The slight decrease suggests that the simplification and reduction in multicollinearity might have introduced a small trade-off in fit, but this is outweighed by the improved reliability and stability of the model. The model remains effective in capturing the relationships between the predictors and the likelihood of fraud, providing a robust basis for analysis.

Pseudo R-Squared: Value: The pseudo R-squared value for the updated model is 0.7447. Interpretation: Although slightly lower than in the initial model, a pseudo R-squared of 0.7447 still indicates that the updated model explains a substantial portion of the variability in fraud likelihood. This high value demonstrates that the model remains highly effective at capturing the key factors that influence fraud, even after addressing multicollinearity. The small reduction in pseudo R-squared is an acceptable trade-off for the enhanced stability and interpretability of the model.

6.9.4 Coefficients and Key Predictors (The Final Model)

In the updated model, several variables were found to be statistically significant predictors of fraud, see Table 10: The Updated Model with PCA (The Final Model).

Restatements: Coefficient: 0.1125473 p-value: 0.009 Interpretation: Restatements are associated with a significant increase in the likelihood of fraud. Specifically, for each unit increase in restatements, the log odds of fraud increase by approximately 0.11. This suggests that companies with more frequent or severe restatements are more likely to engage in fraudulent activities. Restatements often signal financial irregularities or adjustments that may be indicative of deeper issues, making this a critical predictor in the model.

Financial Dissolution Proceedings (financial_diss_proceed): Coefficient: 0.2868359 p-value: 0.032 Interpretation: Involvement in financial dissolution proceedings significantly increases the likelihood of fraud. Each unit increase in this variable raises the log odds of fraud by approximately 0.29, highlighting the potential for financial distress or restructuring to be linked with fraudulent behavior. Companies undergoing financial dissolution may face pressures that could lead to or exacerbate fraudulent activities as they attempt to manage or hide their financial difficulties.

Incidence of Financial Statement Divergence (incidence_fsd_divergence): Coefficient: 2.947989 p-value: 0.002 Interpretation: This variable shows a very strong positive relationship with the likelihood of fraud. A one-unit increase in financial statement divergence is associated with a nearly 3-fold increase in the log odds of fraud. This suggests that significant discrepancies or inconsistencies in financial statements are a major red flag for potential fraud, as they often reflect deliberate misstatements or manipulations intended to deceive stakeholders.

Negative Cash Flow from Investing Activities (neg_cash_from_investing): Coefficient: -0.0809301 p-value: 0.018 Interpretation: Interestingly, an increase in negative cash flow from investing activities is associated with a slight decrease in the likelihood of fraud. This negative coefficient suggests that companies with higher outflows in investing activities may be less likely to engage in fraud, possibly because such activities indicate ongoing investment in growth or long-term assets, which might be less consistent with fraudulent behavior aimed at short-term financial manipulation.

Negative Cash Flow from Operating Activities (neg_cash_from_operating): Coefficient: -0.1712838 p-value: 0.004 Interpretation: Similar to investing activities, negative cash flow from operating activities is associated with a reduced likelihood of fraud. A unit increase in this variable leads to a significant decrease in the log odds of fraud, suggesting that companies struggling with operational cash flows might be less inclined to engage in fraud, possibly due to their focus on resolving genuine operational challenges rather than manipulating financial results.

Average Litigation Costs (avg_litigation_costs): Coefficient: -1.04e-06 p-value: 0.027 Interpretation: The negative coefficient, although very small, suggests that higher average litigation costs are associated with a slight decrease in the likelihood of fraud. This may indicate that companies with higher litigation costs are already under scrutiny or facing legal challenges, which could deter them from engaging in additional fraudulent activities. It reflects the possibility that these companies are more cautious in their financial reporting to avoid further legal complications.

Supervisory Board Size (supervisoryboard_size_small_bin): Coefficient: -4.979811 p-value: 0.056 Interpretation: A smaller supervisory board size is significantly associated with a reduced likelihood of fraud. The large negative coefficient indicates that as supervisory boards become smaller, the likelihood of fraud decreases substantially. This may suggest that smaller boards are more effective in oversight and governance, reducing the opportunities or incentives

for fraudulent behavior. It highlights the importance of board size in corporate governance and its potential impact on financial integrity.

Index of Tangible Book Value per Share (index_tbvbs): Coefficient: -0.7328541 p-value: 0.016 Interpretation: A higher index of tangible book value per share is negatively associated with fraud, indicating that companies with stronger tangible assets are less likely to engage in fraudulent activities. This relationship suggests that firms with substantial tangible assets may have more stable and transparent financial positions, reducing the need or opportunity for fraudulent manipulation. This variable acts as a proxy for financial health and asset quality, which appears to play a role in deterring fraud

ESG GPW Respect Index (esg_gpw_respect_index): Coefficient: 0.0523122, p-value:0.046 Interpretation: Inclusion in the ESG GPW Respect Index is significantly associated with a higher likelihood of fraud. For each unit increase in this variable, the log odds of fraud increase by approximately 0.05. Although companies listed in this index are typically recognized for their strong environmental, social, and governance (ESG) practices, this result may indicate that some firms engage in "greenwashing" or may exaggerate their adherence to ESG standards. This could lead to discrepancies between their stated commitments and actual practices, ultimately increasing the risk of fraudulent reporting to uphold an image of corporate responsibility.

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6.9.5 The Confusion Matrix and Classification Performance (The Final Model)

Table 12: The Updated Model with PCA(The Final Model) Model Characteristics

Logistic model for zmienna_zalezna_fraud

	True		
Classified	D	~D	Total
+	30	1	31
-	3	179	182
Total	33	180	213

Classified + if predicted Pr(D) >= .5
True D defined as zmienna_zalezna_fraud != 0

Sensitivity	Pr(+| D)	90.91%
Specificity	Pr(-|~D)	99.44%
Positive predictive value	Pr(D| +)	96.77%
Negative predictive value	Pr(~D| -)	98.35%
False + rate for true ~D	Pr(+|~D)	0.56%
False - rate for true D	Pr(-| D)	9.09%
False + rate for classified +	Pr(~D| +)	3.23%
False - rate for classified -	Pr(D| -)	1.65%
Correctly classified		98.12%

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software.

Note: The concept of the Confusion Matrix, including the Overall Accuracy, F1, MCC, Balanced Accuracy and other metrics are described in the previous chapter.

Table 12 presents The Updated Model with PCA(The Final Model) Model Characteristics, while Table 14: Variance Inflation Factor (VIF) **Confusion Matrix**: True Positives (TP): 30 instances True Negatives (TN): 179 instances False Positives (FP): 1 instance False Negatives (FN): 3 instances Interpretation: The confusion matrix shows that the model correctly identified 30 out of 33 actual fraud cases (True Positives) and 179 out of 180 non-fraud cases (True Negatives). There was only one False Positive (where the model incorrectly predicted fraud) and three False Negatives (where the model missed actual fraud cases). This indicates a strong overall performance, with the model effectively distinguishing between fraudulent and non-fraudulent cases, though a few cases of actual fraud were missed.

Sensitivity (Recall): Value: 90.91% Interpretation: Sensitivity, also known as recall, measures the proportion of actual fraud cases that the model correctly identified. With a sensitivity of 90.91%, the model is highly effective at identifying fraudulent cases, capturing nearly 91% of all fraud instances in the dataset. This high sensitivity is crucial for fraud detection, as it minimizes the risk of failing to detect actual fraudulent activities.

Specificity: Value: 99.44% Interpretation: Specificity measures the proportion of non-fraud cases that the model correctly identified. With a specificity of 99.44%, the model is highly accurate in classifying non-fraudulent cases, minimizing the number of False Positives. This high specificity indicates that the model reliably identifies non-fraud cases, which is essential for avoiding unnecessary actions against companies wrongly suspected of fraud.

Positive Predictive Value (Precision): Value: 96.77% Interpretation: Precision, or positive predictive value, measures the proportion of predicted fraud cases that were actually fraudulent. A precision of 96.77% means that when the model predicts fraud, it is correct nearly 97% of the time. This high precision is indicative of the model's reliability in identifying true fraud cases, reducing the likelihood of false alarms and ensuring that predictions of fraud are highly credible.

Negative Predictive Value: Value: 98.35% Interpretation: The negative predictive value measures the proportion of predicted non-fraud cases that were actually non-fraudulent. With a value of 98.35%, the model is highly reliable in its negative classifications, meaning that when it predicts no fraud, it is almost always correct. This high negative predictive value is critical in ensuring that genuine non-fraud cases are not mistakenly flagged, thereby maintaining the model's overall trustworthiness.

Overall Accuracy: Value: 98.12% Interpretation: The overall accuracy of the model, calculated as the proportion of all correct classifications (both fraud and non-fraud), is 98.12%. This high accuracy reflects the model's strong ability to correctly classify the vast majority of cases, indicating that it is highly effective in distinguishing between fraudulent and non-fraudulent activities. Such high accuracy underscores the model’s robustness and its practical utility in real-world fraud detection scenarios.

F1 Score: F1 score = 2 x ((precision x recall) / (precision + recall)): Value: Approximately 0.93 Interpretation: The F1 score balances precision and recall, providing a single metric that accounts for both false positives and false negatives. With an F1 score of approximately 0.93, the model demonstrates a strong balance between correctly identifying fraud cases (recall) and minimizing false positives (precision). This high F1 score suggests that the model is well-

rounded and effective, making it a reliable tool for identifying fraud without overburdening resources with too many false alarms.

Matthews Correlation Coefficient (MCC): MCC = ((TP x TN) - (FP x FN)) / sqrt((TP + FP) x (TP + FN) x (TN + FP) x (TN + FN)) :Value: Approximately 0.91 Interpretation: The Matthews Correlation Coefficient (MCC) is a comprehensive measure of the quality of binary classifications, taking into account true positives, true negatives, false positives, and false negatives. An MCC of approximately 0.91 indicates a strong correlation between the predicted classifications and the actual outcomes, demonstrating that the model is highly robust in distinguishing between fraudulent and non-fraudulent cases. This high MCC value confirms that the model performs well across different scenarios, including those with imbalanced datasets, making it a reliable predictor of fraud.

Balanced Accuracy: Balanced accuracy = 1/2 x ((TP / (TP + FN)) + (TN / (TN + FP))): Value: Approximately 0.95 Interpretation: Balanced accuracy averages the sensitivity and specificity, offering a nuanced measure of performance across both positive and negative classes. A balanced accuracy of approximately 0.95 suggests that the model performs very well across both fraud and non-fraud cases. This high value indicates that the model does not favor one class over the other, ensuring that it is equally effective at identifying fraud and correctly classifying non-fraudulent cases. This balanced performance is particularly important in contexts where both false positives and false negatives carry significant costs.

6.9.6 The OLS Regression Results and Variance Inflation Factor (VIF)Table (The Final Model)

Table 13: The OLS Ordinary Least Squares (OLS) Regression Analysis

Source	SS	df	MS		
				Number of obs	= 213
				F(30, 182)	= 9.08
Model	16.7158475	30	.557194918	Prob > F	= 0.0000
Residual	11.1714764	182	.061381738	R-squared	= 0.5994
				Adj R-squared	= 0.5334
Total	27.8873239	212	.131543981	Root MSE	= .24775

	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
insider_fillings	-.0276972	.0167308	-1.66	0.100	-.0607084	.0053141
ranking_shareholder	-.0137812	.0663835	-0.21	0.836	-.1447615	.117199
restatements	.0021834	.0016973	1.29	0.200	-.0011656	.0055323
financial_diss_proceed	.0109049	.0048728	2.24	0.026	.0012906	.0205193
litigation_and_procedings	8.92e-06	.0051506	0.00	0.999	-.0101537	.0101716
irip_award	-.0272095	.0172375	-1.58	0.116	-.0612206	.0068016
supervisoryboard_size_small_bin	-.173432	.0698646	-2.48	0.014	-.3112807	-.0355833
manag_size_small_bin	-.0002778	.0559654	-0.00	0.996	-.1107023	.1101467
female_sb_manag_small_bin	-.0227064	.044584	-0.51	0.611	-.1106744	.0652615
dpsn_comply_ratio	-.0277813	.0702115	-0.40	0.693	-.1663145	.1107519
dpsn_non_report	-.2372558	.1503323	-1.58	0.116	-.5338741	.0593625
wig_div_occ	.0010921	.0010147	1.08	0.283	-.0009099	.0030942
esg_gpw_respect_index	.0010801	.0012519	0.86	0.389	-.00139	.0035502
indeces_wig_20_40_80	-.0001931	.0006357	-0.30	0.762	-.0014473	.0010612
frm_prone_industr	.0007561	.0005947	1.27	0.205	-.0004172	.0019294
avg_litigation_costs	-1.09e-08	3.84e-09	-2.84	0.005	-1.85e-08	-3.31e-09
incidence_fsd_divergence	.0537712	.0245118	2.19	0.030	.0054075	.102135
neg_cash_from_investing	-.0034891	.0008703	-4.01	0.000	-.0052063	-.001772
neg_cash_from_financing	-.002574	.000973	-2.65	0.009	-.0044939	-.0006541
neg_cash_from_operating	-.0052543	.0009852	-5.33	0.000	-.0071983	-.0033104
neg_changes_in_working_capital	-.0005583	.0011222	-0.50	0.619	-.0027725	.001656
positive_fcff	.0000918	.0008557	0.11	0.915	-.0015966	.0017801
ocfr	-.0017115	.0012327	-1.39	0.167	-.0041436	.0007206
pca_factor1	-.0014562	.0126123	-0.12	0.908	-.0263414	.0234289
index_tbvbs	-.0117572	.0029205	-4.03	0.000	-.0175196	-.0059948
index_arrr	.0025584	.0007955	3.22	0.002	.0009888	.004128
index_fcfrr	.0008243	.0010001	0.82	0.411	-.0011489	.0027975
index_ocflldr	-.0005659	.0004998	-1.13	0.259	-.0015522	.0004203
cv_ta	2.80e-12	5.53e-12	0.51	0.613	-8.11e-12	1.37e-11
cv_mcap	-1.14e-11	7.83e-12	-1.45	0.148	-2.68e-11	4.08e-12
_cons	.8629961	.08445	10.22	0.000	.6963692	1.029623

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software

Table 14: Variance Inflation Factor (VIF)Table

Variable	VIF	1/VIF
cv_mcap	11.31	0.088386
avg_litiga~s	10.60	0.094315
cv_ta	9.53	0.104974
irip_award	8.44	0.118520
index_arrr	7.50	0.133363
index_fcfrr	7.16	0.139643
financial_~d	3.09	0.323127
ocfr	3.00	0.333344
neg_change~l	2.81	0.355314
litigation~s	2.81	0.355896
dpsn_compl~o	2.55	0.391866
neg_cas~cing	2.54	0.393244
index_tbvbs	2.52	0.396792
neg_ca~ating	2.47	0.404394
neg_ca~sting	2.39	0.418744
indeces_w~80	2.35	0.425266
supervisor~n	2.16	0.462462
wig_div_occ	2.01	0.497760
ranking_sh~r	1.95	0.512236
positive_f~f	1.88	0.532199
manag_size~n	1.84	0.543382
esg_gpw_re~x	1.83	0.545701
dpsn_non_r~t	1.45	0.692003
frm_prone_~r	1.41	0.711658
index_ocfl~r	1.35	0.738064
restatements	1.33	0.753697
female_sb_~n	1.32	0.756905
incidence_~e	1.30	0.767242
insider_fi~s	1.29	0.775793
pca_factor1	1.10	0.910490
Mean VIF	3.44	

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software

The OLS Regression Results

Table 13 presents the OLS Ordinary Least Squares (OLS) Regression Analysis. The statistical output presents the results of an Ordinary Least Squares (OLS) regression analysis based on 213 observations, representing the total number of cases included in the regression analysis.

Sum of Squares (SS): Model Sum of Squares: The Model row represents the variation explained by the independent variables included in the regression, with a sum of squares (SS) of 16.7158475. This reflects the total variation in the dependent variable that is accounted for by the predictors. Residual Sum of Squares: The Residual row represents the variation not explained by the model, indicating the unexplained or error variance, with a sum of squares of 11.1714764. Total Sum of Squares: The total sum of squares, combining both the model and residual variations, is 27.8873239, representing the total variation in the dependent variable across all observations.

Degrees of Freedom (df): Model Degrees of Freedom: The degrees of freedom for the model is 30, corresponding to the number of predictors. Residual Degrees of Freedom: The residual degrees of freedom is 182, calculated as the total number of observations minus the number of parameters estimated (N - k). Total Degrees of Freedom: The total degrees of freedom is 212, representing the total number of observations minus one.

Mean Square (MS): Model Mean Square: The mean square for the model is 0.557194918, calculated as the model sum of squares divided by its degrees of freedom. Residual Mean Square: The residual mean square is 0.061381738, representing the average variance of the residuals.

F-Statistic: Value: 9.08 p-value: 0.0000 Interpretation: The F-statistic tests whether the independent variables collectively explain a significant amount of variance in the dependent variable. A value of 9.08, with a p-value of 0.0000, indicates that the predictors significantly contribute to explaining the variation in the dependent variable. This result provides strong evidence that the model is statistically significant overall, and the predictors included are meaningful contributors to the outcome. The high F-statistic confirms that the regression model provides a good fit to the data and that the independent variables collectively have a substantial impact on the dependent variable.

R-Squared and Adjusted R-Squared: R-Squared: 0.5994, indicating that approximately 59.94% of the variation in the dependent variable is explained by the model. Adjusted R-Squared: 0.5334, accounting for the number of predictors and providing a more conservative

estimate of model fit. Interpretation: The R-squared value indicates that the model explains a significant portion of the variability in the dependent variable, suggesting that the independent variables chosen for the model have a strong relationship with the outcome. The adjusted R-squared, slightly lower than the R-squared, adjusts for the number of predictors in the model, ensuring that only variables that truly add explanatory power are contributing to the model's fit. The relatively high values of both metrics suggest that the model effectively captures the underlying relationships within the data.

Root Mean Square Error (Root MSE): Value: 0.24775 Interpretation: The Root MSE of 0.24775 suggests that, on average, the predicted values differ from the actual values by approximately 0.248 units. This metric provides an indication of the typical size of the errors made by the model in predicting the dependent variable. The lower the Root MSE, the better the model's predictions align with the actual data. In this case, the Root MSE indicates a fairly precise model, reflecting its ability to predict the dependent variable with reasonable accuracy.

6.9.7 The Final Remarks on Model Refinement and Evaluation. ROC and PRC Plot Analysis and Interpretation

Improvements and Stability: The initial model, while showing strong predictive power, suffered from significant multicollinearity, particularly between index_current_ratio and index_quick_ratio, as highlighted by the VIF analysis. This issue was addressed by implementing PCA, which combined these collinear variables into a single factor (pca_factor1). This adjustment led to a marked improvement in the VIF values, significantly reducing multicollinearity and enhancing the stability of the model.

Impact on Model Performance: Despite the slight reduction in pseudo R-squared and log likelihood values, the overall model performance remained robust. The model continued to demonstrate strong predictive accuracy, with high values in sensitivity, specificity, and precision metrics. The use of PCA to mitigate multicollinearity ensured that the model's coefficients are more reliable, allowing for more accurate interpretation and prediction of the likelihood of fraud.

Significant Predictors: Several variables, including restatements, financial_diss_proceed, incidence_fsd_divergence, and avg_litigation_costs, were found to be significant predictors of fraud. These findings align with existing literature and theories on the factors that contribute to fraudulent behavior in organizations, reinforcing the model's validity and relevance.

Table 15: The Receiver Operating Characteristic (ROC) Data

Obs	ROC area	Std. err.	Asymptotic normal [95% conf. interval]	
213	0.9783	0.0125	0.95377	1.00000

```
. lroc

Logistic model for zmienna_zalezna_fraud

Number of observations =      213
Area under ROC curve   =   0.9783
```

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software

Table 16: Precision-Recall Curve (PRC) Plot Data

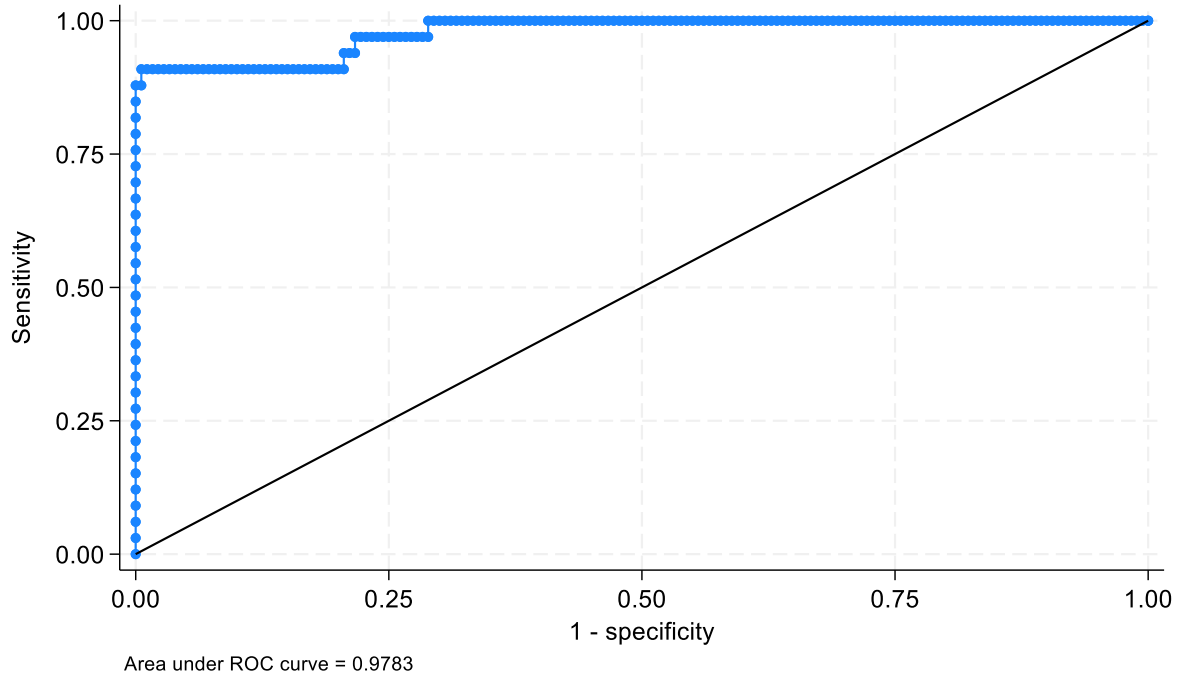
```
                Number of observations       =  213
                Unique values of classifier  =  210
                Number of positive cases     =  33
                Portion of positive cases    =  0.1549

    Recall =  0.1212     0.2121     0.3030
Precision     1.0000     1.0000     1.0000

Area under precision-recall curve:  0.8827
```

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software

Graph 1 : The ROC (Receiver Operating Characteristic) Curve Analysis



Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software

Graph 1 - ROC (Receiver Operating Characteristic) curve analysis was conducted to evaluate the discriminative power of the logistic regression model in predicting the likelihood of fraud (zmienna_zalezna_fraud). Graphically evaluation of models through ROC Analysis/(AUC) is extensively justified in the literature (Bonte & Vercauteren, 2018; West & Bhattacharya, 2016, 2015; Han et al., 2012; Powers, 2011; Fawcett, 2006). The analysis provided the following key results:

Area Under the Curve (AUC): Value: 0.9783 Standard Error: 0.0125 Interpretation: The AUC value of 0.9783 indicates that the model has excellent discrimination ability. This means that there is a 97.83% chance that the model will correctly distinguish between a randomly chosen fraudulent case and a randomly chosen non-fraudulent case. The AUC is close to 1, which suggests that the model is highly effective in differentiating between positive (fraud) and negative (non-fraud) outcomes. The narrow confidence interval further supports the reliability of this measure, indicating that the model's performance is consistently high across the dataset.

ROC Curve Plot: Description: The ROC curve graphically represents the trade-off between sensitivity (true positive rate) and specificity (true negative rate) across different threshold

levels for predicting fraud. The curve plotted using the lroc command in Stata shows how well the model can distinguish between the two classes (fraud and non-fraud). Interpretation: The ROC curve of the model is close to the top left corner of the graph, which corresponds to a high true positive rate and a low false positive rate. This indicates that the model has a very high sensitivity and specificity, reinforcing its ability to correctly classify cases as either fraud or non-fraud.

The ROC analysis (Graph 1) confirms that the logistic regression model provides a robust and reliable tool for predicting fraud, with an AUC of 0.9783 indicating excellent discriminatory power. The model's ability to accurately distinguish between fraudulent and non-fraudulent cases is nearly optimal, as evidenced by both the high AUC value and the shape of the ROC curve. This strong performance suggests that the model can be effectively used in practical applications where identifying fraud is crucial, such as in financial audits or compliance monitoring. The results from this analysis further validate the model's utility and effectiveness in real-world scenarios.

Precision-Recall Curve Analysis and Interpretation

The PRC Plot (Precision-Recall Plot) is presented as Graph 2**.** Other alternative measures with increased information for unbalanced samples were used, such as PPV (Positive Predictive Value described above) and the related PRC plot (Precision-Recall Plot) (Saito & Rehmsmeier, 2015; Davis & Goadrich, 2006; Swamidass et al., 2010; Drummond & Holte, 2003, 2000). The Precision-Recall Curve (PRC) analysis was conducted to evaluate the performance of the logistic regression model, particularly given the imbalanced nature of the dataset, where the number of fraud cases is significantly lower than non-fraud cases. The key findings from this analysis (Graph 2) are as follows:

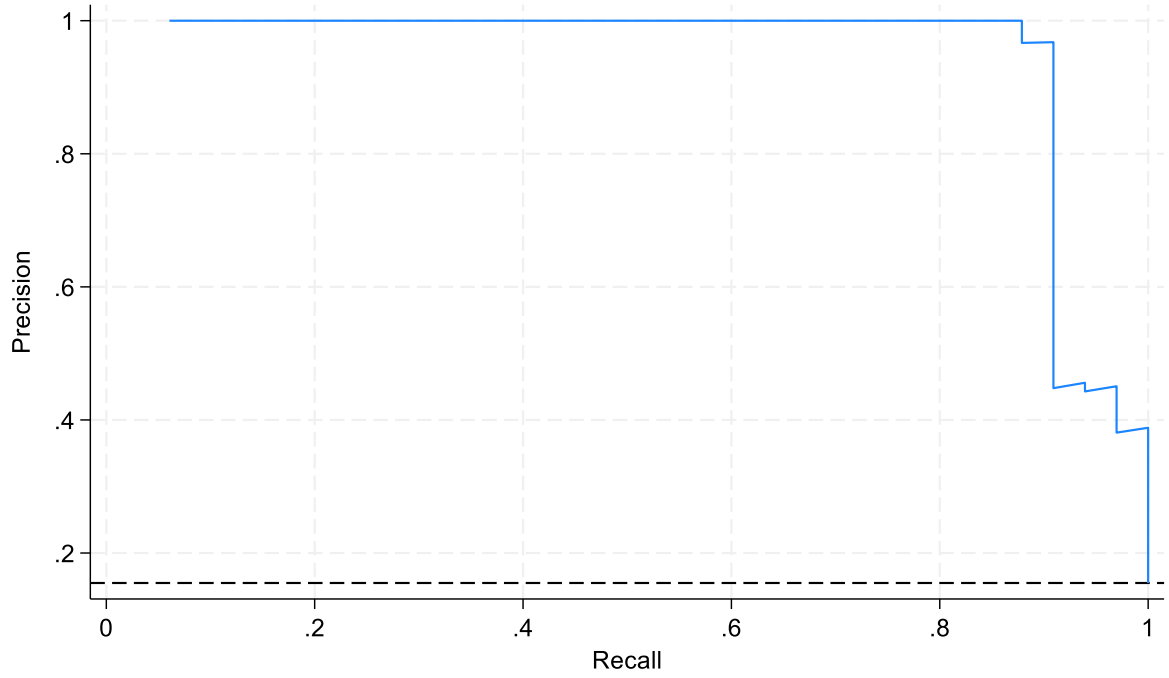
Area Under the Precision-Recall Curve (AUC-PRC): Value: 0.8827 Explanation: The AUC-PRC value of 0.8827 indicates that the model has a strong ability to accurately identify fraudulent cases while maintaining a high level of precision. In situations with imbalanced data, the AUC-PRC provides a more precise measure of model performance compared to the traditional ROC curve, as it focuses on the balance between precision (the accuracy of the positive predictions) and recall (the ability to detect all positive instances). A value of 0.8827 suggests that the model is effective in distinguishing between fraud and non-fraud cases, even when fraudulent cases are relatively rare.

Precision and Recall at Key Thresholds: Recall = 0.1212, Precision = 1.0000: At this low recall level, the model achieves perfect precision, meaning that all cases predicted as fraud are indeed fraud, but only a small fraction of the actual fraud cases are identified. Recall = 0.2121, Precision = 1.0000: As recall increases slightly, precision remains perfect, indicating that the model is beginning to capture more fraud cases while still avoiding false positives. Recall = 0.3030, Precision = 1.0000: The model continues to maintain perfect precision as recall increases further, although it still only identifies about 30% of the actual fraud cases.

Precision-Recall Trade-Off: Interpretation: The results demonstrate that the model is highly effective at identifying fraud cases with perfect precision at low recall levels. However, this comes at the cost of missing many actual fraud cases, as indicated by the low recall. As the recall increases, precision is expected to decrease (though this is not directly shown in the specific results presented), reflecting the common trade-off in imbalanced datasets where increasing the identification of true positives can lead to an increase in false positives.

The Precision-Recall Curve analysis provides important insights into the performance of the logistic regression model in detecting fraud within an imbalanced dataset. With an AUC-PRC of 0.8827, the model demonstrates a strong ability to correctly identify fraudulent cases while minimizing false positives, especially when the focus is on precision. This performance makes the model particularly suitable for applications where the cost of false positives is high, and maintaining a high level of precision is crucial. The high precision observed across various levels of recall suggests that the model is conservative in its fraud predictions, which can be advantageous in avoiding false accusations of fraud. However, the model may need to be adjusted if the priority shifts towards capturing a higher percentage of actual fraud cases, balancing the need for precision with the need for broader detection coverage. This analysis confirms that the model is effective and reliable for fraud detection, particularly in situations where fraud is rare, and the emphasis is on making accurate and trustworthy predictions.

Graph 2: The PRC Plot (Precision-Recall Plot)



Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software

6.9.8 The Marginal Effects of Independent Variables on Fraud Likelihood (The Final Model)

Table 17: Marginal Effects of Independent Variables on Fraud Likelihood with Delta-Method Standard Errors

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
insider_fillings	-.0710263	.0409682	-1.73	0.083	-.1513225	.0092699
ranking_shareholder	.1049222	.0619766	1.69	0.090	-.0165497	.226394
restatements	.0037135	.0012508	2.97	0.003	.0012619	.006165
financial_diss_proceed	.009464	.0041228	2.30	0.022	.0013835	.0175445
litigation_and_procedings	-.0007014	.0035166	-0.20	0.842	-.0075939	.0061911
irip_award	-.0365606	1.900696	-0.02	0.985	-3.761856	3.688735
supervisoryboard_size_small_bin	-.1643067	.0828753	-1.98	0.047	-.3267394	-.001874
manag_size_small_bin	.0647902	.0568201	1.14	0.254	-.0465752	.1761556
female_sb_manag_small_bin	-.0535257	.045935	-1.17	0.244	-.1435566	.0365052
dpsn_comply_ratio	-.0575627	.0732518	-0.79	0.432	-.2011337	.0860082
dpsn_non_report	-.2714688	.2863757	-0.95	0.343	-.8327549	.2898172
wig_div_occ	.0012611	.0010511	1.20	0.230	-.000799	.0033212
esg_gpw_respect_index	.001726	.0008108	2.13	0.033	.0001368	.0033152
indeces_wig_20_40_80	-.0004732	.0007393	-0.64	0.522	-.0019221	.0009758
frm_prone_industr	.000799	.0005839	1.37	0.171	-.0003454	.0019433
avg_litigation_costs	-3.42e-08	1.45e-08	-2.36	0.018	-6.27e-08	-5.77e-09
incidence_fsd_divergence	.0972676	.0268839	3.62	0.000	.0445761	.1499592
neg_cash_from_investing	-.0026703	.0010335	-2.58	0.010	-.0046958	-.0006447
neg_cash_from_financing	.0002378	.0011502	0.21	0.836	-.0020166	.0024922
neg_cash_from_operating	-.0056514	.0017137	-3.30	0.001	-.0090103	-.0022926
neg_changes_in_working_capital	-.0000299	.0014161	-0.02	0.983	-.0028054	.0027456
positive_fcff	.0014325	.0011272	1.27	0.204	-.0007768	.0036419
ocfr	-.0041962	.0020651	-2.03	0.042	-.0082438	-.0001487
pca_factor1	-.0434866	.0312383	-1.39	0.164	-.1047125	.0177393
index_tbvbs	-.0241802	.00925	-2.61	0.009	-.0423099	-.0060505
index_arrr	.0027782	.0016295	1.70	0.088	-.0004156	.0059721
index_fcfrr	.0005387	.0021393	0.25	0.801	-.0036543	.0047317
index_ocflldr	.0001327	.000786	0.17	0.866	-.0014079	.0016733
cv_ta	-4.86e-11	3.63e-11	-1.34	0.181	-1.20e-10	2.26e-11
cv_mcap	-3.88e-11	3.57e-11	-1.09	0.278	-1.09e-10	3.13e-11

Source: Own elaboration, based on own data base. Statistical software Stata (own license). Chart generated directly from Stata software

Table 17 presents the marginal effects of various variables on the probability of fraud occurrence, holding other factors constant. These marginal effects are calculated using the Delta-method, which provides standard errors for the estimated effects

Restatements: Restatements have a statistically significant positive effect on the likelihood of fraud, indicating that companies with restatements are more likely to be involved in fraudulent

activities. Specifically, the presence of restatements increases the probability of fraud by approximately 0.37%.

Financial Distress Proceedings: Companies undergoing financial distress have a significantly higher probability of committing fraud, with financial distress proceedings increasing the probability of fraud by about 0.95%. This finding highlights the pressure that financial strain can place on companies, potentially leading them to manipulate financial statements.

Negative Cash Flows from Investing Activities: There is a significant negative association between negative cash flows from investing activities and fraud. Specifically, negative cash flows from investing activities reduce the probability of fraud by approximately 0.27%. This suggests that companies facing issues with liquidity might be less likely to engage in fraudulent practices if they are consistently reinvesting in assets.

Negative Cash Flows from Operating Activities: A significant negative association is also observed between negative cash flows from operating activities and fraud. In this case, negative cash flows from operating activities decrease the probability of fraud by about 0.57%. This indicates that companies with negative cash flows from their core operations might be more transparent and less likely to engage in fraud.

Incidence of FSD Divergence: A highly significant positive association exists between the incidence of FSD divergence (deviations from Benford's Law) and the likelihood of fraud. Higher FSD scores increase the probability of fraud by approximately 9.73%. This finding suggests that firms deviating from expected financial patterns are more prone to manipulation and fraudulent activities.

Operating Cash Flow Ratio (OCFR): There is a statistically significant negative association between the operating cash flow ratio and the likelihood of fraud. A lower operating cash flow ratio increases the probability of fraud by about 0.42%. This underscores the importance of cash flow analysis in detecting potential fraudulent activities.

Average Litigation Costs: Higher litigation costs relative to total assets are significantly associated with an increased likelihood of fraud. Specifically, an increase in litigation costs reduces the likelihood of fraud by about 0.0034%. This relationship may reflect the legal consequences of fraudulent activities or the financial strain that leads companies to engage in fraud.

The refined logistic regression model, incorporating PCA and addressing multicollinearity, presents a reliable and robust tool for predicting the likelihood of fraud. The model’s high accuracy, balanced classification performance, and the identification of key predictors make it

a valuable asset in understanding and mitigating fraud risk. The careful application of PCA and VIF analysis has not only improved the model's interpretability but also enhanced its practical applicability in real-world scenarios, where multicollinearity and variable stability are common challenges. The results from the OLS regression further support the strength of the model, indicating that the predictors included explain a substantial portion of the variance in the dependent variable, with significant overall fit. The combination of these statistical techniques and thorough evaluation metrics ensures that the model is well-equipped to provide meaningful insights into the factors influencing fraud, making it a powerful tool for both academic research and practical application in fraud detection and prevention efforts.

6.10 Conclusions, Implications and Avenues for Further Research

This study makes a significant contribution to the academic literature on fraud detection in emerging markets, particularly in the Central and Eastern European (CEE) region. By developing and empirically validating a fraud detection model specifically tailored to the Polish market, it addresses a critical gap in the existing literature, where comprehensive models for these markets have been notably absent. Emerging markets, especially those in the CEE region, present unique challenges and characteristics that differ significantly from more mature economies. As such, constructing a region-specific model introduces a more nuanced understanding of fraud dynamics in transitional economies like Poland, as explored in earlier chapters. Current trends in fraud detection emphasize the need for dedicated tools and frameworks that address the specific characteristics of local markets. In post-transitional economies like Poland, the heterogeneity and challenges associated with economic and regulatory transitions often render fraud detection tools developed for mature markets ineffective. The model developed in this thesis fills this gap by considering local legal, economic, and regulatory environments. It is particularly necessary in Poland, where the number of publicly traded entities is relatively small, enforcement actions are limited, and supervisory responses are delayed. Therefore, the model provides a much-needed customized approach to detecting financial reporting misconduct (FRM) in emerging markets, addressing the unique market dynamics of post-transitional economies. CEE markets are characterized by evolving institutions, which creates a research gap in terms of disclosure requirements and detecting FRM (Murcia & Borba, 2007; Kanapickiene & Grundienie, 2015; Yao et al., 2019). This gap is significant given the limited coverage of CEE markets in contemporary international

literature (Albu et al., 2017), especially compared to other emerging regions like Asia (Ozcelik, 2020; Yao et al., 2019; Yendrawati et al., 2019).

This thesis contributes to filling that gap by presenting an empirically validated model tailored specifically to Poland, addressing key factors that are often overlooked in global models. The practical applicability of the model extends across the financial ecosystem. Financial institutions, such as investment and pension funds, can utilize it to safeguard their investments by detecting early signs of fraud in companies they invest in. Additionally, the use of advanced statistical techniques, such as Financial Statement Divergence (FSD) from Benford's Law, and text-mining methodologies (e.g., extracting information using custom C# programs), marks a new direction in developing more comprehensive and effective FM detection models in Poland. This is particularly critical for long-term vehicles like pension funds, where investment security is essential for ensuring stable returns. For stock exchange operators, particularly the Giełda Papierów Wartościowych w Warszawie (GPW), the model offers predictive power to identify potential misconduct before it escalates into larger financial scandals. This approach can also be extended to other stock markets in the CEE/CESEE region, including the Zagreb, Budapest, Prague, and Bucharest Stock Exchanges. By validating the model with empirical data from these exchanges, financial transparency and oversight across the region could be significantly improved. Individual investors, particularly those represented by Stowarzyszenie Inwestorów Indywidualnych (SII), stand to benefit as well. Retail investors often rely on publicly available data and have limited resources for detecting fraud. This model provides them with an additional layer of protection by enabling early detection of potential misconduct, democratizing access to sophisticated fraud detection techniques typically reserved for institutional investors. It allows them to mitigate financial risks and improve the safety of their portfolios. The model is also highly relevant for financial professionals, including bankers, stockbrokers, financial advisors, and wealth management specialists. Since it is based on publicly available data, it is applicable across a range of institutions regardless of their size. This is particularly important in CEE markets, where foreign fraud detection models often fail to address local conditions. Even popular tools like Eikon Refinitiv's "smart ratios" do not comprehensively cover the Polish market, and their ESG data offerings are selective, limited mainly to large companies like those in the WIG20. In this context, the model fills a crucial gap by offering more accurate fraud detection based on a broader dataset. In addition to financial professionals, regulatory and law enforcement agencies such as the Central Bureau of Investigation (CBŚP), Internal Security Agency (ABW), and Central Anti-Corruption Bureau (CBA) can use the model to enhance their investigative capabilities. The model provides these

agencies with a tool to detect fraud more effectively in real-time, an issue discussed at the LEAF (Law Enforcement Analysis of the Future) conference, where agencies like CBA, ABW, CBŚP, and Europol emphasized the importance of advanced tools for early detection and prevention of financial crimes. The model's application helps strengthen the strategic competencies of law enforcement in detecting financial misconduct, not just at the national level but also within the broader European context. For Stowarzyszenie Certyfikowanych Specjalistów ds. Badania Nadużyć (ACFE Poland), the Association of Certified Fraud Examiners Poland Chapter #183, this model offers a vital tool in detecting fraudulent financial reporting. As an active member of ACFE Poland, the author has consistently presented tools and frameworks for fraud detection, aligning with ACFE Global's direction in Texas, where structured data models are extensively used. However, the Polish market poses challenges, such as small sample sizes and limited instances of FRM penalties, which restrict the application of structured data-based detection methods. This model provides an alternative structured approach suitable for these market conditions. Institutional investors, including investment funds, pension funds, and private pension schemes, will find this model particularly useful in ensuring the security of their investments. Early detection of financial misconduct is crucial in reducing exposure to risky companies, particularly in long-term investment vehicles like private pensions. The model helps institutional investors reduce risks associated with fraud, thereby safeguarding the financial well-being of their beneficiaries.

The model's relevance extends beyond Poland and into the broader CEE/CESEE region, where locally tailored fraud detection tools are equally essential. The financial markets in these regions share many of the transitional characteristics of Poland's market, such as evolving corporate governance structures and regulatory environments. Future research could expand the model's scope by testing its applicability across other CEE/CESEE post-transitional markets, including Hungary, Romania, Croatia, and the Baltic states. Conducting cross-market validation studies could enhance the model, allowing for comparative insights and identifying potential regional variations in fraud dynamics. This thesis also contributes significantly to the academic literature on fraud detection. By integrating non-financial indicators, such as board structure and ESG-related factors, industry, legal, organizational factors, it enriches the academic discourse on how corporate governance and sustainability measures can be used to detect fraud. The inclusion of Benford's Law, a statistical method for fraud detection endorsed by ACFE and AAA literature, further elevates the model's methodological sophistication. In conclusion, this thesis offers a robust tool for detecting financial reporting misconduct in post-transitional and emerging markets. Its structured, empirically validated model integrates

financial and non-financial predictors, addressing a critical gap in existing frameworks. The model's wide applicability—across financial institutions, regulatory bodies, individual investors, and professional associations—demonstrates its potential to significantly improve financial transparency and governance in Poland and the broader CEE/CESEE region. Through this tool, financial misconduct can be prevented, corporate governance enhanced, and a more transparent and secure market environment fostered. Due to missing data, numerous red flags were discarded, as the lack of data could have compromised the reliability of the predictor. Consequently, many of the identified red flags were set aside pending the collection and analysis of sufficient data. Once the ESAP is fully implemented the potential for reliable analysis will increase. Data were retrieved in various formats and multiple files, programs were written in C# to extract and standardize data from files in different formats, the editing was performed to standardize the data, allowing for subsequent import into a relational database, subsequently, the creation of tables in the database and the importation of data were carried out using SQL Server's built-in tools and custom programs developed in .NET, this allowed for the establishment of a relational database (with clean, structured data). The relevance of this thesis is further supported by the fact that the author received formal notification from the American Accounting Association (AAA) that their research proposal, based on a synthesis of the doctoral dissertation, was accepted in the "PhD Dissertation - Research in Progress" category for presentation at the 2024 Forensic Accounting Section Research Conference in Savannah, Georgia, USA. Despite receiving highly positive reviews from the Scientific Council Review Members, the author had to decline the invitation to present at the conference due to limitations of funding.

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