Abstract

mgr Elżbieta Pliś

The thesis aims to examine the relationships between a change in the diversity of an economic system and its evolution. The subject of the research was the economic system as a model of an economy and its evolution, understood as a process of endogenous transformation of the system that is possible to observe in time. Using the diversity function of a set, the concept of the diversity of the economic system was formalized and implemented in two different models of an economy with finite number of products. The first model was inspired by general equilibrium theory, while the second – by evolutionary game theory.

The research is theoretical. In its first part, the impact of the evolutionary change on the economic system's diversity was considered in a discrete model of the economic evolution in which a finite number of agents operate. In this model, a function of diversity in the product space was defined, based on products' attributes, that are relevant from the consumers' point of view. This function was next used to analyze evolutionary changes in the economy, modeled by economic mechanism design tools. In the second part of the research, the consequences of changes in the diversity in the economic system for the evolution of this system were analyzed. In this part of the study, the evolution of the economy with the continuum of agents was studied in continuous time, using the evolutionary game theory approach. Schumpeterian competition was presented in the form of a population game, in which the increase in diversity associated with innovation was reflected in the payoffs. By determining the evolutionarily stable population state, it was examined how the increase in diversity associated with innovation changes the structure of the economic system, and in particular, how it affects the percentage of innovators in the population of firms.

The study showed that innovation is a necessary condition for increasing the diversity of an economic system with a finite number of agents. Introducing an innovation can increase the diversity of the economic system, provided that new technological solutions possess attributes that are relevant to consumers. It was shown that the disappearance of outdated technological solutions need not lead to a decrease in the diversity of the economic system. The study showed that in the Schumpeterian game,

there is a fixed relative frequency of producers who decide to innovate, and it depends on the increase of diversity connected with innovation. The greater the increase in diversity caused by the innovation, the more producers decide to innovate in the evolutionarily stable state of population, called the Schumpeterian state.