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LONG-TERM MACRO-ECONOMETRIC MODELS

In the last decades the growth of “new” modern market economics was associated with the rapid development of knowledge capital. Its impact became the major factor of economic growth, outperforming the investment in fixed capital and labour increase. Hence, the economic community has come to a common conclusion that the contemporary economies gravitate to a structure known as a knowledge-based economy. This concept has been formulated in contrast to an industrial economy system that prevailed in the last centuries. Even though the earlier economic systems also took advantage of knowledge that determined their technological progress, at the turn of the 21th century the role of knowledge capital started to dominate in the functioning of economies as a result of automation of manufacturing processes, speedy distribution of management information (recently via the Internet), and in economic growth related to the development of the Information and Communication Technology (ICT).

Long-term forecasts and scenario analysis should be based on macroeconometric models. The core of longterm models is extended by

introducing production functions generating potential output. Their specification includes total factor productivity (TFP) being representative of technological progress. It depends on knowledge capital, i.e. human capital, domestic and foreign R&D. Several channels of transfer of foreign R&D can be distinguished. The potential output differs from the effective output, representing final demand, underlying business cycle fluctuations. To study potential disequilibria a system of equations explaining final demand must be established.

Thus the long-term macroeconomic model must be a complete model. Its use may cover long-term forecasts and scenario analysis based on model simulations. The paper outlines the above specifications of the long-term model using as example a new model of the Polish economy. The model is medium-sized. It covers demand and supply side, including prices and financial flows. The results of multiplier analysis are shown revealing model feedbacks, including generation of business cycles. The results of its application are shown: long-term forecasts up to the year 2030 as well as scenarios of development of the Polish economy, including recession scenario

The construction of the new macroeconomic model of a knowledge-based economy helped to launch a new series of long-term forecasts and scenario analyses underpinned by the model-based simulations. Two basic scenarios were distinguished: optimistic and pessimistic. In the optimistic variant, the research took into account the impacts of long-run increases in investments, in domestic R&D expenditures, better absorption of transferred foreign expenditures on R&D, and growth of human capital stimulated by larger financial allocations to the tertiary and postgraduate education. In the pessimistic variant, it revealed a deterioration of these factors. It has opened the way for evaluating the likely effects of realization of particular scenarios that the administrative authorities and scientific community might wish to draw up. The simulation analyses open the floor for constructing many alternative scenarios that would take into account factors of development other than investment in fixed capital and knowledge capital. However, the advantage the presented framework has is that it allows drawing a clear distinction between the factors of growth and the results of the exercise.

One of the important applications of this exercise is the possibility of calculating the time in which a particular economy might reach the GDP per capita levels of developed, industrial economies. For instance these calculations show that Poland may have a chance to reach the average level of UE-15 countries in 2030 only in the optimistic scenario, while in the pessimistic scenario it would remain at the 46% level. There are many other possible applications that support the construction of the visions of future growth.