OPTIMAL LEVEL AND STRUCTURE OF PUBLIC EXPENDITURES IN THE ENDOGENOUS GROWTH THEORY OF OPEN ECONOMY

1. Research project objectives/ Research hypothesis

Rapid economic growth in Poland is accompanied by dynamic influx of foreign capital and intense growth of export and import, and, on the other hand, public expenditures – in part financed by the EU funds – become increasingly important: for transport infrastructure, education, research and development, etc. Meanwhile, vast majority of theoretical literature on endogenous growth, and in particular models of optimal public spending, is dedicated to the "closed economy". There are no capital flows between countries, no FDI, and even export and import is absent. On top of that, the issue of external debt is also often neglected.

Therefore, the primary aim of this project is to use this large pool of knowledge and extend the most important results to the case of small open economy (SOE). The world literature related to the role of fiscal policy in the SOE endogenous growth theory is very scarce, and in Poland it is literary non-existent. Within the framework of the project we will seek out the optimum level and structure of public expenditures on:

- public consumption (so-called unproductive public spending)
- infrastructure investments (public expenditures that increase *the stock* of public capital),
- public services (*the flow* of public services, not subject to accumulation)
- investments in human capital (education, research and development)

An additional, important goal of this project is the calibration of the model with macroeconomic data for Poland, and creating simulations regarding the long-run and temporary (transitional) effects of various types of public spending.

This project is a continuation of and (in our opinion) the indispensable complement of research carried out by us in the last few years, that focused on the other side of the coin, that is, the optimal tax policy at SOE, with application for Poland. In particular, we were searching for optimal tax rates of 5 types, the optimal size of the budget deficit (in % of GDP) and public debt structure (the share of foreign creditors). The results of this work have been published, inter alia, in the book by Konopczyński (2015), which was awarded in 2016 by Polish Economic Society with the Prof. Edward Lipinski Prize.

2. Research methodology

Modern growth theory is constructed with microfoundations. The economy consists of rational representative agents – producers maximizing profits and consumers maximizing the discounted utility of the stream of consumption, usually in the infinite time horizon (Ramsey-type models). Decisions made by consumers and producers are influenced by various fiscal instruments. We intend to construct the model(s) possessing the following characteristics:

a) microfoundations – the system of consumer preferences and the aggregate production function with physical capital, human capital, raw labor and technological progress,
b) accumulation and depreciation of private capital, public capital, and human capital
c) public sector (government) with deficit financed by foreign and domestic debt,
d) the interest rate on debt (private and public) either exogenous (perfect mobility of capital serving as a benchmark), or an increasing function of the debt-to-GDP ratio,
e) several types of income and consumption taxes ,
f) several categories of public expenditures (see above)

This setting will certainly yield complex dynamics, requiring the use of numerical methods. We have experience in the field of numerical methods to solve and simulate so complicated models. Therefore, we expect that it will be possible (although very labor-intensive) to obtain normative (qualitative) proposals on, inter alia: the existence and uniqueness of the equilibrium, the stability of an economic system, the optimal ratio of government deficit to GDP, the optimal structure and level of government spending. The method of mathematical modeling will be used, with the support of calculus, the theory of differential and difference equations, and (deterministic) dynamic optimal control. Numerical simulations will be implemented in specialized computer application Mathematica.

The project may initiate similar research by other scholars in Poland. So far, to the best of our knowledge, nobody in Poland carries out (or has carried out) research on optimal public expenditures in the SOE endogenous growth theory. Also, the world literature related to this research area is relatively scarce.