Long-term economic consequneces of changing fertility – analysis using OLG model

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Low fertility is the key driver of population ageing. The aim of this paper is the estimation of the benefits that can result from the increase in fertility due to potentially successful family policy. In order to do this we combine the detailed analysis of the potential drivers of fertility with an advanced Overlapping Generation Model (OLG). This paper adds to the literature on the topic at least in three points. First, the estimation of the costs and benefits of the change in fertility is done using economic model which allows to take into account relationships between households, firms and government. Secondly, standard OLG model is extended by adding the heterogeneity of households with different number of children. Thirdly, scenarios of the fertility changes in this model include the information about the order of birth of children. It also allows to take into account the potential results of family policies that distinguish between the families with different number of children. This information also help to utilize the projections an information about the gap between desired and actual fertility.

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1. Introduction

In the long-run only the increase in fertility in can stabilise age proportions of the population and detain further population ageing. The assumption about the achieving sooner or later fertility close to the replacement level is also present in almost all population projections and long-term economic forecasts (European Commission 2014, OECD 2012). However it is usually not clear how this improvement in fertility can be reached even in the horizon of decades. In the countries with still relatively high desired number of children the natural answer seems to be the successful family policy that will close the present gap between desired and actual number of children. However such policy generates costs that should be compared with the benefits of the more balanced population age structure in the medium and long run.

In this paper we are going to answer the question how generous can be the family policy in comparison with the expected benefits from the increased fertility. Our analysis differ from the accounting of the benefits and taxes of the generations used in Generational Accounting (GA) because of the using of Overlapping Generation Model (OLG) approach which allow to simulate the behavioural reaction of the different household types on the changes in family policy. In order to prepare the scenarios of the successful family policy that allows to fulfil the desired number of children for families that already have 0, 1 or 2+ children we use population projections prepared using microsimulation model that used the idea similar to Feeney (1985). Introducing fertility parity into the analysis allows not only to better model differences in family benefits but also to separate from the population projections the potential tempo effects in fertility that can improve future fertility even without additional incentives (Bongaarts and Feeney 2000).

2. Methods and data

In our study we use the OLG model (Hagemejer, Makarski, and Tyrowicz 2013) with additionally introduced the heterogeneity of households within the cohorts. Households are differentiated by the number of children and it determine their utility function and labour market behaviour in the model.

The simulations in the model base on the assumed scenarios that reflects the effects of introducing successful family policy that increase fertility of selected types of households. In order to do this we use microsimulation model that allows us to prepare and input to the OLG model: the consistent projections of the size of the new generations and the shares of the households with different number of children within each generation.

Our analysis is prepared for Poland but the simulations can be done also for other countries after calibration of the model.

3. Scenarios of the simulation

In order to compare the effects of the increased number of children one have to define the baseline scenario and the possible alternative scenarios based on the literature. The input required to OLG model with gender need to be defined as the total number of births and the table that illustrates what are the changes of the shares of households (mothers) that experienced a shock $\kappa \in \{0, 2\}$ which denotes the number of children. In order to have comparable baseline scenario that takes into account only the possible exogenous future fertility increase we decided to use the Eurostat's EUROPOP 2013 population projection. It means that we assumed that we assumed the convergence of fertility rate to replacement level until the year 2125 (Lanzieri 2010). After this period TFR is at replacement level which enables the stationary population and solution of the OLG model. However the approach used in the OLG model requires additional assumption about the order of births of children (parity progression) and resulting the frequencies of women in each cohort by the number of children. It is required to define what type of shock they experience at the beginning of their labour market career.

4. Expected results

The comparison of the set of simulations prepared using different fertility scenarios should allow to calculate the cost that society can bear today in order to improve the age structure of the population in the future.

Literature

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