ESTIMATING THE CYCLICAL EVOLUTION OF THE FERTILITY RATE IN ROMANIA

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Abstract

The phenomena of fertility defines the potential of human resources for each country, thus the study thereof is important in assessing the premises of economic development.

This paper aims to identify the cyclical patterns in the fertility's evolution in Romania between 1960 and 2011, emphasizing the political, social and economic influences which have had an important impact on both the general fertility rate (GFR) and the total fertility rate (TFR).

The time series was examined by employing the Hodrick –Prescott filter for annual data and the results highlighted the existence of four peaks in the years 1967, 1974, 1981 and 1989, included in a general downward trend, followed by a proclivity towards stability at a low fertility level after 2000.

This inquiry has shown that fertility exhibits a cyclical behaviour determined mainly by political and social changes, with a significant impact on the economical growth. Further studies intend to investigate the existence of a correlation between the business cycle and the cyclical oscillation of the fertility.

Key words: cyclicity, fertility rate, Hodrick –Prescott filter

JEL Code: J13, E32, C51

Introduction

The human capital is one of the most valuable assets, either at micro or macro level; therefore fertility could be regarded as a demographic phenomenon which plays a key role in the economic development of a country. Its influence is notable first hand in the population dynamics and furthermore in the labour force size.

Nowadays, most of the world's countries are converging towards alarmingly low fertility levels as the world's population is experiencing a fertility rate that is near or below the replacement level.

The fertility rate dynamics in Romania in the last five decades emphasizes the existence of cyclical oscillations.

This paper aims to identify a statistical model concerning these cyclical patterns in the fertility's evolution in Romania between 1960 and 2010, focusing on the political, social and economic influences which have had an important impact on both the general fertility rate (GFR) and the total fertility rate (TFR).

In order to separate the cyclical fluctuations from the raw data, the Hodrick-Prescott filter was employed, after selecting an appropriate value for the parameter, in accordance with the data frequency.

After the collapse of the economy and the political system in the former socialist countries of Eastern Europe, the fertility level in these countries has also witnessed a dramatic decrease, from a TFR above the replacement level (2.1), to a TFR of less than 1.5.

In Romania, the fertility rate decreased continuously during the period 1960-2010 excepting for the years 1967 and 1968 as a consequences of the Decree no. 770 from 1966 prohibiting abortion. The effects in the fertility rate are noticeable only on short term. In 1967 the Romanian the birth rate doubled and during 1967 and 1968 the fertility rate reached an all-time peak, compared to the previous years or the following years. Within ten years it was nearly as low as it had been before, though there was no corresponding change in the policy.

The remainder of the paper is structured as follows: the first section highlights existing studies tackling the problem of fertility in relationship to the economic growth, hence the business cycle, the second part offers the description of the empirical approach, while the last two sections deal with results and conclusions.

1 Background and prior research

The distinction between "developed" and "developing" fertility regimes is almost disappearing in global comparisons concerning fertility levels ((Bongaarts & Bulatao, 2000); (Lutz, Sanderson, & Scherbov, 2001); (Wilson, 2001)).

Previous studies ((Thomas, 1925); (Silver, 1965); (Wilkinson, 1973)) proved that the fertility rate is pro-cyclical, namely emphasizing that changes in the economic performance and those in childbearing levels have been positively correlated with each other. While the relationship between business cycles and fertility is positive, it follows that the fertility rate is negatively correlated to the unemployment rate. The analysis of time series on fertility and earnings (Wilkinson, 1973) showed the direct effect of economic constraints on fertility over time.

The debate in the literature on the fertility relationship to business cycle started with Butz & Ward's paper (1979). They showed for US a positive correlation between fertility and the female participation rates. Their thesis is that changes in fertility from 1960's onwards are primarily related to female earnings.

A re-estimation of Butz and Ward's model on more recent data (Macunovich, 1996) reinforced the idea of a pro-cyclical fertility in the US during the period 1958-1984 based on the analysis of time series on childbearing and unemployment rates.

A micro-level study based on Swedish data (Thomson & Hoem, 1998) shows that childbearing levels are positively related to earning levels, consequently, women with a higher income also have higher first-birth risks, compared to women with low incomes.

Sobotka et al. (2011) analysed the influence of economic recessions on fertility and found that policies and institutions may modify or even reverse the relationship between recessions and fertility. Recession has brought a decline in the number of births and fertility rates, often marking a sharp halt to the previous decade of rising fertility rates.

Adsera & Menendez (2011) dealt with the childbearing decline during economic downturns in countries from Latin America. The downturn was mainly associated with increasing unemployment rather than slowdowns in the growth of the gross domestic product, although there was a positive relationship between first-birth rates and economic growth. In these countries the effects of income on fertility were predominant.

2 Statistical approach

2.1 Variables and data description

The general fertility rate (GFR) is defined as the total number of live births in a year divided by the mid-year population of women aged 15-49 years, while the total fertility rate (TFR) represents the number of children that a women will have in her fertile life if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates. It is obtained by summing up the age-specific fertility rates over the ages from 15 to 49 years (Hinde, 1998).

The TFR is an indicator of the population growth in a country. A rate of two children per woman is considered the replacement rate for the population, resulting in relative stability in terms of total numbers. If the TFR in a population exceeds 2.0, we can suppose that that population will increase in size as time goes on. If the TFR falls below 2.0, the population

will decline (populations are decreasing in size and are ageing). Global fertility rates are in general decline and this trend is most pronounced in industrialized countries, especially those from Western Europe, where populations are projected to decline dramatically over the next 50 years.

Data was retrieved from the web-site of Romania's National Statistics Institute.

2.2 Method

The evaluation of cyclical components can be employed by using filters, which remove the trend component from the studied time series, leaving only the oscillation, perceived as a deviation from the general growth trend. The literature presents an array of filtering methods, out of which, the most widely used is the Hodrick – Prescott (1997) filter (HP), which we also employ in the current study.

Although disputed, (Cogley & Nason, 1995), (Harvey & Jaeger, 1993), the HP filter is generally accepted as a landmark in the study of business cycles and is now widely used for the quantification of patterns displayed by various other time series.

The HP approach assumes that the time series y_t consists of a trend component g_t and a cyclical component, c_t, hence: $y_t = g_t + c_t$.The method employed by Hodrick and Prescott is to isolate the cyclical component c_t by the following minimisation problem:

$$\min\left\{\sum_{t=1}^{T} c_t^2 + \lambda \sum_{t=1}^{T} \left[\left(g_t - g_{t-1}\right) - \left(g_{t-1} - g_{t-2}\right)\right]^2\right\}.$$

The reasoning can be regarded as a generalization of the least squares method, the difference being represented by the parameter $\lambda > 0$, used to smooth out the variance of the series around the trend.

The value of λ is highly dependent on the frequency of the observed data, in relation to the volatility of the time series y_t. For annual data, a low value (under 100) is recommended, Nilsson and Gyomai (2011) suggest that $\lambda = 7.02$, while Ravn and Uhling (Ravn & Uhlig, 2002) previously advised that $\lambda = 6.25$ is suitable for yearly records, hence we select $\lambda = 6.25$ in Eviews 7.1.

The motivation for selecting the HP filter compared to the previously stated, alternative, methods is twofold. First, the HP filter is frequency sensitive, a feature necessary to evaluate the data sets according to their nature; second the HP filter has been statistically

proven superior to the band-pass filter and phase-average trend methods as shown in the paper of Nilsson and Gyomai (2011).

This study does not suffer from the usual drawbacks of employing the HP filter because the analysis is historical and the domain of the series closed, namely we do not use the filter to make predictions, it is used only to indentify the cycles in past data.

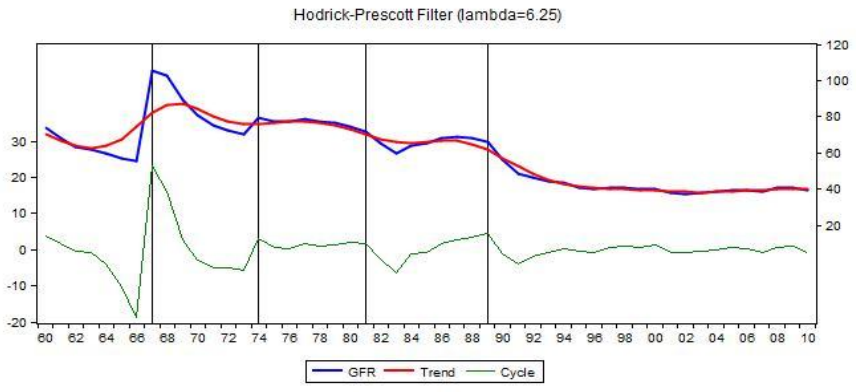
3 Results and discussion

Fertility is a natural phenomenon with vast implications stretching over multiple areas of interest, including economy, healthcare and social development. The particular nature of fertility carries significance due to the fact that it dictates the necessary actions in order to propose efficient demographic policies.

The analysis of the fertility rate dynamics' in Romania between 1960 and 2010 by making use of the HP filter shows that both the GFR and TFR series enlist four maximum points (1967, 1974, 1981 and 1989) which are years followed by a significant decrease in the fertility rate.

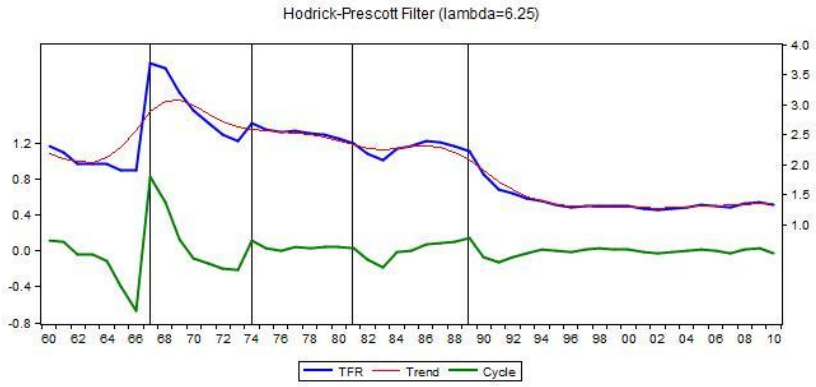
The original series and the outcome of the filtration method are presented in Figures 1 and 2.

Fig. 1: Cyclical components of GFR for Romania, 1960-2010



Source: own computation, EViews 7.1.

Fig. 2: Cyclical components of TFR for Romania, 1960-2010



Source: own computation, EViews 7.1.

The year 1967 clearly marks the beginning of a new impulse on Romanian fertility, following 1966, when the lowest TFR was recorded as regards the period considered for this study. The Decree no. 770 from 1966 that banned abortion was one of the pro-natalist policy tools of the communist regime, necessary due to the fact that before 1967 the fertility rate decreased significantly while the number of abortions rose. The outcomes of this coercive method were significant, as the TFR almost doubled in 1967 (3.7 children) and also in 1968 (3.6 children) compared to 1966. Though the repressive measures were severe, the fertility intensity dropped to 2.9 in 1970; hence the result was short lived. The decreasing fertility over the years that followed 1967 could also be explained both by economic and social factors specific to Romanian society of that times that had an impact over the evolution of fertility. The main factors are the industrialization process, the urbanization and women emancipation (Muresan, 2008).

After 1973, the fertility rate dynamics changed once again under the influence of the ideological component of the Romanian political regime. Fertility rate started to increase until 1974 when it reached a new maximum point. This period is characterised by new enforcements in the communist demographic policy regarding high fertility as a result of a closer orientation to other communist regimes such as North Korea and China (1971) and the Soviet Union (1972-1973) (Keil & Andreescu, 1999). The aim of increasing fertility in Romania in order to obtain more working force is proclaimed at the World Population Conference that took place in 1974 in Bucharest. The fertility rate decreased slowly after 1974, thus the TFR levelled off to around 2.5 during the period 1975-1979.

The year 1981 marks the start of a period with more important decrease in fertility. After this moment, the TFR dropped continuously to a level of 2.06 in 1983. This decline in the Romanian fertility rate in the 1980's may be accounted by the economic recession due to the national austerity program. The economic constraints imposed by the political regime, especially the rationalisation of water, electricity, and natural gas made even harsher the living conditions and put pressure on Romanian families, thus affecting the fertility levels (Keil & Andreescu, 1999). In this context, the political regime tried to enforce its control again on fertility and try to increase it. As a result, TFR started to increase after 1983 to a level around 2.3 until 1989. The maximum level attained is 2.39 in 1986.

The year 1989 is the last peak followed by two decades of constant low fertility. The TFR shrank from 2.2 children for a woman in 1989 (the generation replacement level) to a TFR of 1.3 children for a woman in 1995 and remained constant until present. The decrease of the fertility rate after 1989 is explained mainly by the legalization of abortion in 1990 as a consequence of the fall of the communist regime. The fertility rate reduced suddenly to 1.83 in 1990 while the number of abortions increased as compared to the previous period. Since 2010, the TFR remained low, approximately 1.3 children for a woman. In the years that followed the abortion law, more than 1 billion abortions were registered, three times higher than the number of live births. The effect of abortion on fertility has decreased over time as the population became more informed about the negative effects of abortion on women's health and the increased access to modern contraceptives. The low fertility rate in Romania after 1990 is also the effect of social and economic factors specific to Romanian transition to a market economy and more recently to the Romanian status of EU member states. Therefore, high migration, changes in the cultural norms and life styles, the employment characteristics are some of the factors with an important impact on fertility.

Conclusion

This paper has investigated the nature of the fertility's variation in Romania, in the last five decades, focusing on the cyclical fluctuations thereof and concluding that such an intriguing behaviour is not dictated by natural factors but is a result of demographic policies and economic constraints.

Returning to the hypothesis posed at the beginning of this study, it was proved, using the HP filtering method, which removes the trend and provides the cyclical component, that

Romania witnessed four maximum points in the fertility rates (GFR/TFR), starting with 1967, continuing with 1974 and 1981 and closing with 1989 and two plateau states, covering the time span 1975-1980 and after 1992 until present.

The findings suggest that in general, the oscillations in the fertility rates are caused by political reasons, like the 89% increase of the GFR in 1967 following the Decree banning abortion, or the 12% increase in 1974 as a result of the discussions at the World Population Conference held in Bucharest.

It was also shown that a relatively fixed level of both the GFR and TFR reached between 1975 and 1981 was destabilized by the introduction of the rationalization of food and natural resources, which led to a minimum of the GFR and TFR in 1983, reaching values comparably low to those recorded after 1991.

The results of this investigation show that after the abolition of the communist regime in 1989, the liberalization of abortion and the access to birth-control methods influenced the fertility rates to have a steep decline until they reached a fix level of about 1.3, a critical value, much below the replacement level.

Taken together, these results suggest that during the considered time span, while fertility has a natural tendency to settle at a fix level, and has a secular downward trend, the cyclical pattern is mostly policy-induced and affects the outcomes only on short term, hence demographic reforms should focus on incentives rather than coercive methods.

Finally, a number of important limitations need to be considered. First, the fact that the study was conducted for only one country suggests that the sample should be enlarged with more Eastern European countries, in order to assess the influence of the communist regimes on fertility on a wider model. Secondly, the variables taken into consideration are limited to fertility rates; a future analysis should also include indicators of the general economic climate as the GDP/GNP, and a division by age groups of the fertility behaviour in order to explain the educational, psychological and medical factors.

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