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THE GDP PER CAPITA AND FERTILTY NEXUS IN BOSNIA AND HERZEGOVINA

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ABSTRACT
The gdp per capita and fertilty nexus in Bosnia and Herzegovina
This paper presents an overview of the relationship between fertility patterns and income per capita in Bosnia and Herzegovina. Given the complicated political situation the complete results of a long-delayed Census in Bosnia and Herzegovina, which was held in 2013, are not available and therefore we addressed the data on the female population of the last relevant Census held in 1991with some recent overview. The widespread transition from high to low fertility was strongly pronounced in Bosnia and Herzegovina. Among others, one of the purposes of this paper is to supplement the ongoing debate about the `true`nature of the income - fertility nexus with evidence from panel dataset of 109 municipalities in Bosnia and Herzegovina.The analysis presented in the paper are based on statistical data from population censuses, more recent estimates from official source and via fieldwork.

KEY WORDS
Fertility patterns, income per capita, Bosnia and Herzegovina, fertility changes, income - fertility nexus

1.Introduction

According to Eurostat (2012) three-quarters of Europeans in 2010 lived in countries with total fertility rates below 1.5, and there are many reasons to be seriously concerned about population trends in Europe. In 2015, 5.1 million children were born in the EU-28, corresponding to a crude birth rateof 10.0. For comparison, the EU-28 crude birth rate had stood at 10.6 in 2000, 12.8 in 1985 and 16.3 in 1970 (Eurostat, 2016). Very low fertility levels in many countries and population decline in some are the consequence of voluntary childlessness as widely accepted lifestyle choice and small family sizes as usual in contemporary Europe. Contemporary population projections are based on better data, analytical tools and methods that can avoid many errors but unfortunately do support fears voiced about Europe's demographic future. (Pobric,2015). According to Giannakouris (2008) nearly half of the population of Western Europe will be over 50 years old and almost a quarter of the population of the European Union will be aged 65 and more by 2030.

Various authors (e.g. Lesthaeghe and Wilson, 1986; Coale and Treadway, 1987) have suggested patterns of fertility change as a result of urbanization and the occupational changes that accompany industrialization and rising income per capita. Knodel (1974) suggests that urbanization may not have been the cause of fertility decline, but instead considers urbanization a response to the already changing social and economic structures within society. Sharlin (1986) argues that shift from rural living to urbanization has been one of the dominant arguments for understanding the transitions in fertility in Europe.

The relationship between fertility and income has been regarded as an issue of high importance in development economics and policy. A popular concept is the idea that that the fertility-income relationship takes the form of an inverted U, which is raised by Birdsall (1980) and subsequently displayed in the 1984 World Development Report. Ehrlich and Lui (1991), and Galor and Weil (2000) have provided theoretical justifications for an inverted U shaped path of fertility transition.

The purpose of this paper is to supplement the ongoing debate about the 'true' nature of the income-fertility and nexus with evidence from a panel dataset of 109 municipalities in Bosnia and Herzegovina, observed in 1991. So, the chapter provides an overview of this investigation, though it should be noted that analysis of this dataset focuses only on certain variables and that these possibly exclude a considerable variety of other socio-economic factors, which may possess significant explanatory power for human fertility.

In the database (initially collected by the author), the income variable equals the real GDP per capita in 1991 (GDP-The gross domestic product (GDP) or value of all final goods and services produced within a nation in a given year), and fertility is measured as the total fertility rate (children per woman), as compiled by the Institute of Economics in Bosnia and Hercegovina and the Federal Office of Statistics.

2. Measuring Associations

For a more precise measurement and understanding of the levels of total fertility in the municipalities in Bosnia and Herzegovina some statistical analyses were performed. As has already been mentioned,one of the aims of this research is to investigate the existence and the strength of bivariate relationships between fertility and urbanization and the relationships between fertility and GDP ($ per capita). The investigation of the strength of the relationships between these variables is developed via regression analysis.

3. Regression analysis of total fertility and GDP ($ per capita)

In order to investigate the form of the relationships between two variables, when one variable is deemed to be dependent upon another (in this case fertility is the dependent variable and GDP is the independent variable), it was important to analyse them for all 109 municipalities in Bosnia and Herzegovina in 1991. The relationship is statistically significant at the 0.05 (95%) level indicated by calculated the correlation coefficient **r = -0.30421 (C.V. = 0.197).** Furthermore, the municipalities were also divided into five groups, with membership of each group expressed as a value of the GDP (between $523 and $6122 in 1991).

The representation of the statistical relationships on scattergraphs, as shown in the Figure below, provides an opportunity to incorporate a visual display as an integral part of analysis together with the calculation of the correlation coefficient (Robinson, 1998).
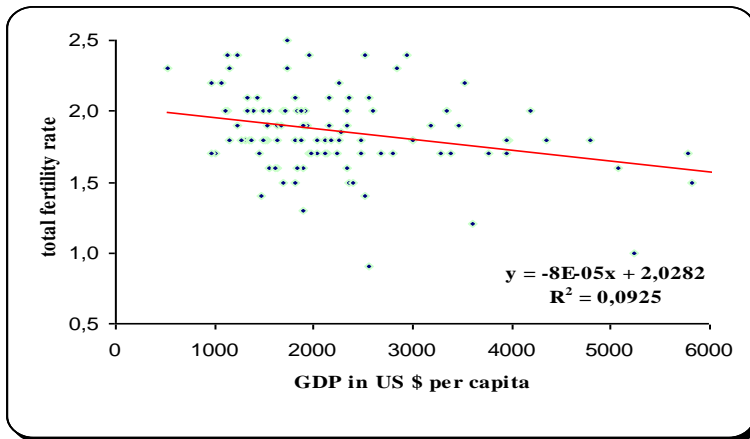
n = 109 r =-0.304 *C.V. = 0.197   Sy =0,267393

*C.V.= Critical values of the correlation coefficient at the selected significance level for a sample size of n.

Figure 1:The relationship between GDP and TFR in Bosnia and Herzegovina

Table 1: Municipalities grouped by GDP in US $ per capita

GDP $ p.c.	Number of municipalities	Total fertility ($\bar{\ }$)	Total fertility (σ)	GDP $ p.c. ($\bar{\ }$)	GDP $ p.c. (σ)
less than 1500$ (18%)	25	2.0	0.25	1217	220
1500-2000 (8%)	23	1.9	0.26	1762	145
2000-3000 (11%)	30	1.8	0.31	2396	267
3000-4000 (9%)	13	1.8	0.23	3518	311
4000 and more (13%)	8	1.6	0.30	5170	708

Source: Author's calculation based on the data from Institute of Economics in Bosnia and Herzegovina and Federal Office of Statistics

The full interpretation of the bivariate relationships begins with elementary statistical description, namely the arithmetic mean and two other commonly used measures, the mode and the median as well as the standard deviation. The values of the arithmetic mean lie in the range from 1.6 to 2.0 children per women (Pobric, 2010). It is perceived clearly that the average deviation of observations about the mean expressed as a standard deviation are the smallest for the total fertility (0.23) and GDP ($311 or 9%) in the group of municipalities where GDP was between $3000 and $4000. The variation of the number of children (σ = 0.31) is highest in the group with GDP between $2000 and $3000. The analysed data predict that if income increases by $500, total fertility would decline by about 0.0005 children.

For the group of 8 municipalities, with the highest income per capita a $500 GDP per capita increase is followed by a decline in the number of children of about 0.0002, with a weak relationship $R^2= 0.1551$. The standard error of regression in the decline of the number of children for this population is small $(Sy = 0.29517)$. The statistical relationship for this group is not significant, with a negative correlation coefficient $r = -0.39384$ (C.V.= 0.707).

4. Recent fertility trend

The further intention is to supplement the recent situation about the nature of the income-fertility and nexus with evidence from a panel dataset of 143 municipalities in Bosnia and Herzegovina after the Dayton PeaceAgreement of 1995 came into force and new administrative arrangement, observed in 2013. The last two decades are characterized by decreased birth rates and fertility level and that contributes population ageing and population decline. Some phenomena that characterize the concept the second demographic transition (SDT) have found their place in BiH. So, numerous structural and cultural changes marked by the expansion of higher education, the rise of individualistic values are occurring.

The influence of family and reproductive behavior on the trend of fertility in Bosnia and Herzegovina is the consequence of the unfavorable economic and political situation that contributes significantly to low fertility. Should be pointed that the value of fertility depends on various factors and not just related to the value of GDP per capita. The main causes and explanations for such trends are: reduced the number of population in reproductive age due to increased emigration, population ageing and recently more emphasized depopulation process of rural areas in particular. Therefore, some municipalities with low GDP have very low fertility, while on the other hand some municipalities with high GDP have higher fertility level (Figure2).
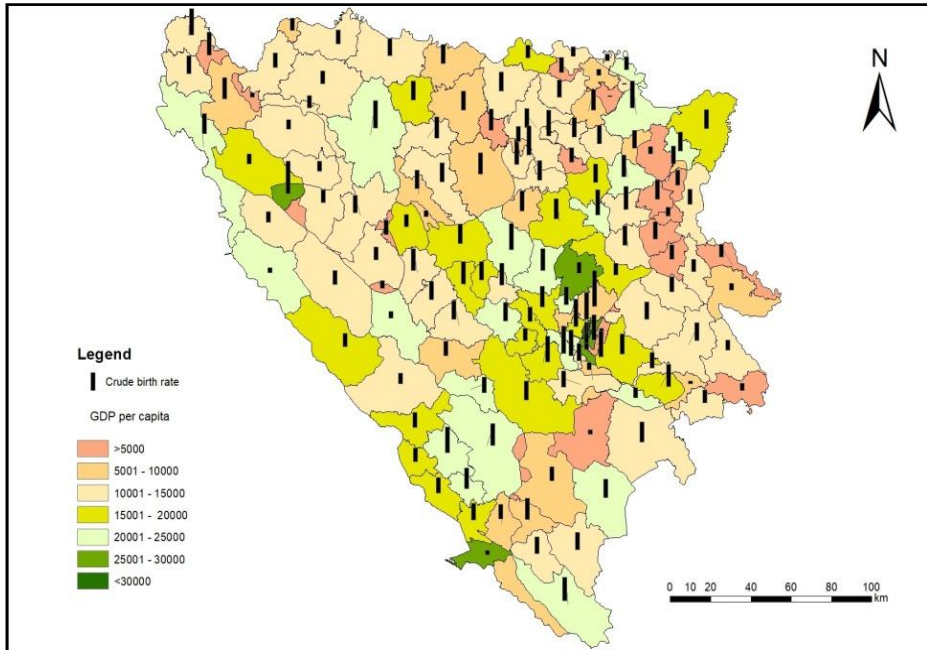
Figure 2: GDP in US $ per capita and Crude Birth Rates in 2016
Source: Author made based on the data from Agency for Statistics BiH

5. Conclusion

The findings suggest that the low fertility rate is not due simply to increased GDP per capita, but rather to changes in attitudes and cultural and traditional heritage. Most of the discussed relationships are not statistically significant. The relationship between income per capita with fertility within all 109 municipalities shows that as income rises then the fertility rate falls. For particular municipalities grouped on the basis of income the relationship with the fertility rate is statistically significant only in the group with the smallest GDP per capita. As presented above, a popular concept is that there is stagnation equilibrium with high fertility and low per capita income, as is the case in less developed countries on the one hand, and growth equilibrium with increasing per capita income and low fertility in developed countries on the other. Bosnia and Herzegovina has some peculiarities as a country in economic transition where the shift from agriculture to urban occupations and from rural to urban residence has not had an immediate impact on fertility decline. In the post war period, which is characterized by many problems and economic stagnation decline of fertility decline is most pronounced. All municipalities in BiH have very low of fertility. This low fertility is correlated with unstable economic and political situation in the country.

Population from municipalities with weak economy move in the larger urban centres, while young people who have the ability to leave the country go to the European countries. Moreover, the estimates show that there exists a certain income threshold connected with more or less some other socio-economic conditions that impact fertility patterns in Bosnia and Herzegovina.

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