Relationship between Economic Development and Age-Specific Fertility Rates in the European Union

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Introduction

Recent evidence suggests that fertility-development relationship among high-income countries may reverse from negative to positive at high level of development.. Some studies examined fertility-development relationship reversal at the sub-national level, and document a weakening of the negative relationship within many countries, and among some countries the emergence of a positive relationship. The goal of this work is to continue examination of fertility-development relationship at the sub-national level and further, to examine a relationship between development and age-specific fertility rates within European Union countries.

Methods

In this work, by conducting simple linear regression, we examine relationship between economic development, as measured by GDP per capita, and age-specific fertility rates using 5-years cohorts among European Union countries in 2015. A particular emphasis is placed on 20-39 years cohorts. The relationship is analyzed for each 5-years cohort and each of the 26 European countries individually, covering 1358 NUTS 3 regions.

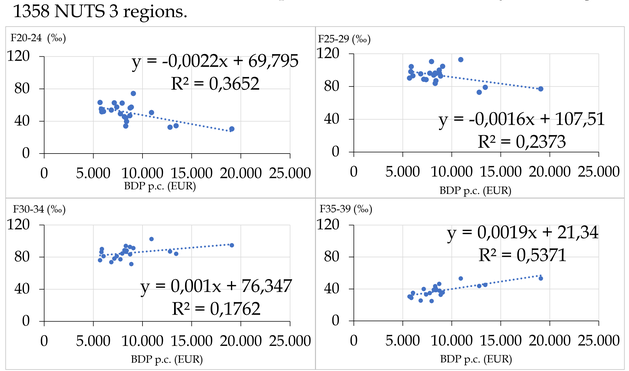

Figure 1. Relationship between GDP per capita and age-specific fertility rates – the example of Croatia (NUTS 3 regions, 2015)

Results

Although we only use the one-year data, fertility decomposition into age groups revealed that fertility-development relationship is generally formed by two opposite direction relationships. GDP per capita is in a negative relationship with age-specific fertility rates of the 20-24 age group. With the age group of 25-29 years in most countries a negative relationship is weakened. With the age group of 30-34 years a relationship reverses to weak positive, and with the group 35-39 years a positive relationship becomes strong. There are a few exceptions, but we can notice general a pattern – there is a negative relationship between GDP per capita and age-specific fertility rates until the age of 30. After the age of 30 a relationship is positive. Documented pattern suggests that the reversal of the development-fertility relationship can be attributed to fertility at ages above 30, which is higher in high developed regions.

Results

We especially examine the Beta coefficient using simple linear regression. Figure 2. shows the Beta coefficient obtained from the relationship between GDP per capita and age-specific fertility rates in relation to GDP per capita focusing on 20-39 years cohorts. In all four age groups the results indicate that as national GDP per capita increases, impact of GDP per capita on specific fertility rates on sub-national level decreases. The strongest impact of GDP per capita on fertility rates is noticeable in younger cohorts in countries with GDP per capita lower than 20 000 Euros.

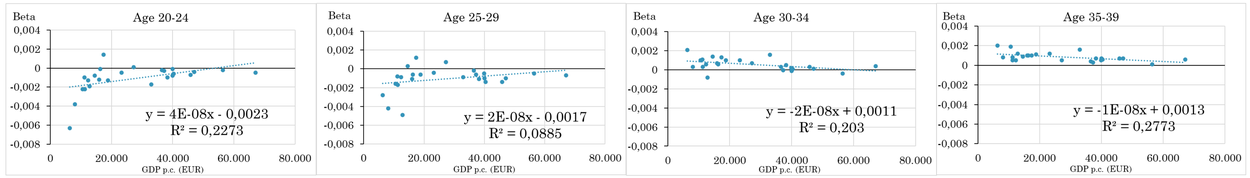

Figure 2. The Beta coefficient obtained from the sub-national relationship between GDP per capita and age-specific fertility rates (y axis) in relation to national GDP per capita (x axis) among 26 European countries in 2015.

Figure 3a. shows the dependence of Beta coefficients obtained from the sub-national relationship between GDP per capita and age-specific fertility rates on national fertility rates. The scatter plot shows well separated age cohorts denoted by different colors and gives a contribution to understanding fertility-development relationship. The placement and grouping of points reveals an interesting trend in the fertility dynamics from young age to older age and forms fertility-development *loop pattern*.

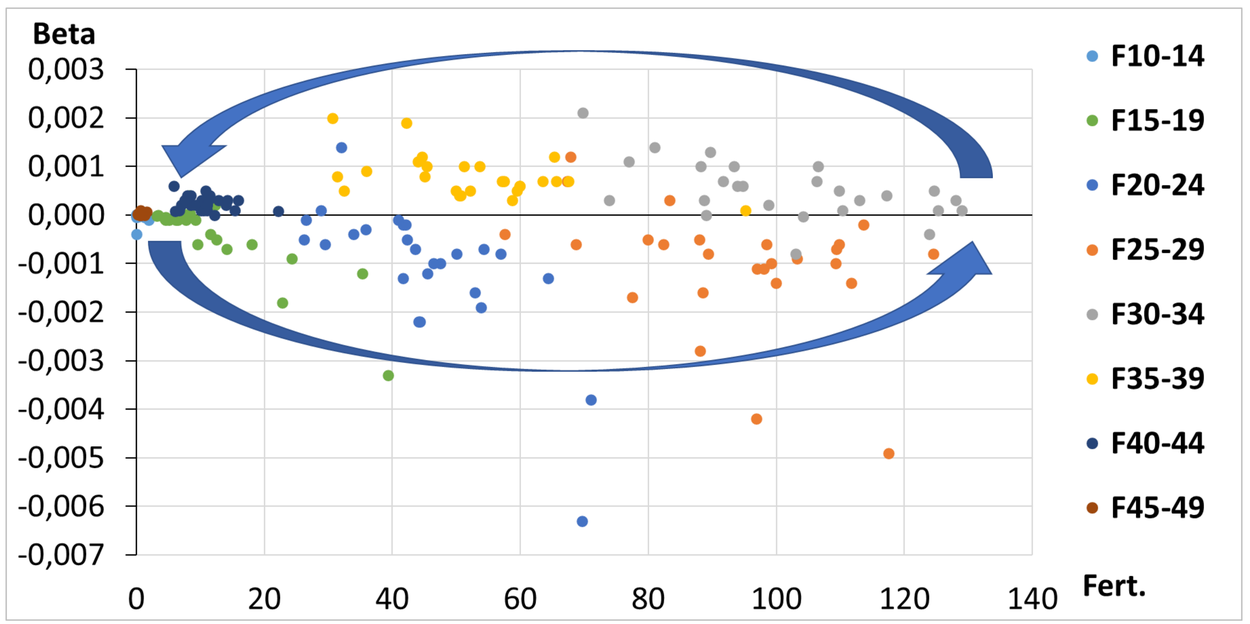

Figure 3a. The dependence of Beta coefficient obtained from the sub-national relationship between GDP per capita and age-specific fertility rates (y axis) on to national fertility rates (x axis) among 26 European countries in 2015.

Furthermore, we can split countries into those with less and those with more than 20 000 Euros per capita (Figure 3b). Fertility-development *loop pattern* is more pronounced in less developed countries. In all four age groups impact of GDP per capita on fertility rates is weaker in more developed countries.

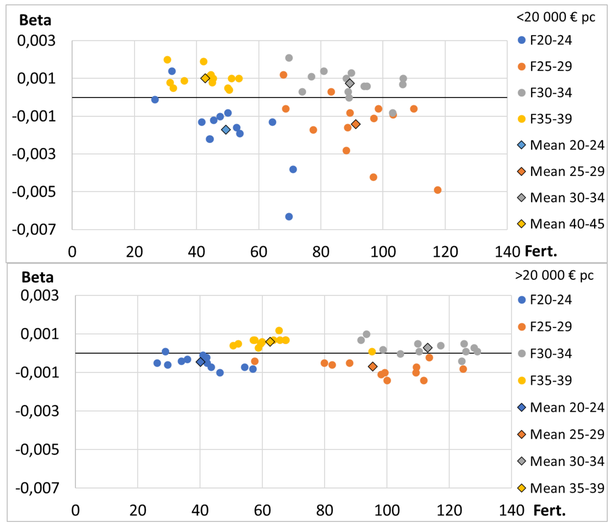

Figure 3.b The same scatter plot as Fig. 3.a; countries splited into two groups: < 20 000 Euros per capita (above), > 20 000 Euros per capita (below)

Conclusion

In younger cohorts and among less developed European Union countries, the impact of GDP per capita on age-specific fertility rates is greater. With the further economic development, the impact on age-specific fertility rates is diminishing. Since the relationship transition from negative to positive largely depends on births at later ages, countries with a higher share of births after 30 have a more positive relationship. Following such a finding, direction of the fertility-development relationship depends on share of birth of pre 30 subpopulation and after 30 subpopulation. For further research it would be interesting to examine the longitudinal relationship between economic development and age-specific fertility rates.

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