DEMOGRAPHIC RESEARCH
A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 29, ARTICLE 4, PAGES 85-104
PUBLISHED 10 JULY 2013
http://www.demographic-research.org/Volumes/Vol29/4/
DOI: 10.4054/DemRes.2013.29.4

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OBJECTIVE
This paper provides recent cross-national evidence of the impact of the great recession on fertility in Europe in the context of the recent decade.

METHODS
Using data from the Human Fertility Database (HFD), from Eurostat, and from the OECD database, we employ fixed-effects modeling to study how changes in unemployment rates have affected birth rates across Europe.

RESULTS
We find that countries that were hit hard by the recession show reduced fertility when compared with a continuation of recent trends, especially at younger ages.

CONCLUSION
Our results indicate a strong relationship between economic conditions and fertility. However, there is variation by region, age, and parity suggesting the importance of life course and institutional factors.

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1. Recent fertility development in Europe: Between trend reversal and economic crisis

The relationship between economic conditions and fertility is one of the classic research questions in family demography. Since the work of Malthus, much of the empirical literature on the determinants of fertility dynamics has been motivated by the idea that economic hardship and labor market uncertainties will cause people to postpone or revise their fertility plans (e.g., Adserà 2004; Sobotka, Skirbekk, and Philipov 2011; Hofmann and Hohmeyer 2012; Schmitt 2012). Since the global financial crisis swept across Europe starting in 2007, there has been renewed interest in the question of whether increasing unemployment rates and growing labor market uncertainties will have repercussions for fertility development.

Unlike previous recessions and economic upheavals, the current recession is hitting Europe after a period during which the age at childbearing had continuously increased. Although a flattening out in the age at first childbearing has been reported for some European countries, it has leveled off at a relatively high level. Furthermore, the financial crisis hit Europe at a time when many countries had just started to see modest increases in their period fertility rates (Goldstein, Sobotka, and Jasilioniene 2009). In Greece, for example, an increase in the total fertility rate (TFR) that began at the turn of the century came to a halt in 2009 when the Greek economy started to crumble. From 2010 to 2011, Greece saw a decline in total fertility from 1.5 to 1.4. A similar reversal in positive fertility trends occurred in Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Romania and Spain. Most remarkable were the developments in Latvia: When unemployment rates skyrocketed, fertility rates plummeted from 1.6 in 2008 to only 1.3 in 2011. Meanwhile, the neighboring country of Lithuania, where unemployment increased at a similar pace, did not experience any strong reaction in annual birth rates over the same period. In Portugal and Italy, which were also harshly affected by the recession, the TFR has also not yet reacted to the surge in unemployment thus far. The Nordic countries of Europe, which were only mildly affected by the recession, saw an unexpected but very uniform decline in total fertility in 2011 (see Figure A1 in appendix).

This overview suggests that changes in fertility in response to the crisis have not been universal. It shows that fertility rates have declined in response to the crisis in several countries. In other countries, the economic crisis disrupted the positive fertility trend that began around the turn of the century. This positive trend has largely been attributed to a gradual end to fertility postponement, which had suppressed annual fertility rates (Goldstein, Sobotka, and Jasilioniene 2009). Researchers also noted that many European countries had implemented family-friendly policies prior to the onset of the crisis, which may have created an environment that is more conducive to fertility

(Thévenon 2011; Fagnani 2012). Ideational changes, particularly a resurgence of more traditional family values among the recent cohorts, have also been cited as potential reasons for the reversal in fertility trends (Goldstein, Kreyenfeld, and Rößger 2012). Thus, there appear to be important concomitant forces currently pushing fertility rates upwards, and these forces must be taken into account when assessing the impact of the economic recession. In order to understand how the economic recession is affecting fertility in Europe, it is important to consider how fertility would have developed in the absence of the crisis.

2. Method: How can we account for the overall trend in fertility?

In this paper, we seek to provide macro-level evidence on the role of the economic crisis in recent fertility dynamics in Europe. In our analysis, economic conditions are measured by the level of unemployment. Unemployment was chosen among other macroeconomic indicators as a proxy for the economic conditions and uncertainty faced by potential parents. For the purposes of this study, we have assembled fertility data for the period 2001–2010 and unemployment indicators for the period 2000–2010. The data come from the Human Fertility Database, Eurostat, and the OECD database. We wished to include more recent data from 2011 into our analysis, however many countries have updated their population counts in response to the new census estimates. For a few countries we were able to obtain corrected age- and order-specific fertility rates for the entire inter-censal period. For other countries, however, we were only able to retrieve corrected TFR-values for the period 2000–2011, but not corrected age-specific fertility data. Due to the break in the time series for many countries, we were unable to use fertility rates through 2011 in the multivariate model. However, we do report corrected TFR-values up to 2011 in the descriptive representation of general fertility trends in the appendix, when available.

The method we apply is fixed-effects modeling (Allison 2009). Fixed-effects modeling aims to identify causal mechanisms by exploiting within-country variations. A particular feature of our analysis is that we try to account for the overall trend governing fertility development in Europe. Obviously, it is very difficult to tell how fertility would have developed in the absence of the economic crisis. However, a large body of literature suggests that tempo effects are among the major factors responsible for suppressing fertility rates in recent decades (e.g., Kohler, Billari, and Ortega 2002; Sobotka 2004; Frejka and Sardon 2007; Goldstein, Sobotka, and Jasilioniene 2009). In order to understand fertility development, it is important to account for the postponement of fertility and the tendency for continued increases in birth rates at older ages among cohorts who postponed births at younger ages.

The dependent variable in our investigations is the age-specific fertility rate $f_k(x,t)$ for country k at age x and time t. In order to consider the underlying fertility trend associated with postponement, we insert a linear time trend. We also interact the time trend with country dummies in order to account for the fact that the tempo effect is likely to follow a different pattern across countries (for a similar specification used in the context of divorce rates, see Friedberg 1998). In order to depict the economic conditions in a country, we use the unemployment rate in the previous year. The dependent variable $f_k(x,t)$ and the major independent variable (lagged unemployment) are transferred into log format to allow us to interpret the estimates as elasticity. This leads us to the following specification:

$$\log(f_k(x,t)) = \alpha_{x,k} + t\beta_{x,k} + \gamma_x \log(unemp)_{t-1,k} + \varepsilon_{x,t,k}$$

Analyses are done for all birth orders combined, as well as separately for birth orders one to three. Unfortunately, we do not have order-specific data for all of the countries (see Table A1 in appendix). Therefore, the order-specific analyses had to be conducted with a restricted number of countries and a limited time frame. Having the five-year age-specific fertility rate as the dependent variable produces multiple observations per country and year. In order to correct for this, we use robust standard errors.

We have conducted various types of sensitivity analysis. Instead of the linear time trend, we have used a quadratic time trend. In another specification, we have used age-specific unemployment rates instead of overall unemployment rates. We have also conducted an analysis in which we used the TFR instead of the ASFR as a dependent variable. We have also experimented with the period of coverage, restricting the analysis to the most recent time period. It is noteworthy, however, that the overall pattern that we have obtained from these different specifications is similar to the one reported in this paper (see additional material).

3. Results

Figure 1 reports the results from an analysis for all birth orders combined, as well as separately for birth orders one through three (see additional material for full models). Focusing first on the pattern for all of the birth orders combined, we find a clear and consistent negative impact of unemployment on fertility rates (Panel 1). The impact seems particularly strong at younger ages, which suggests that first births are most strongly affected by increasing aggregate unemployment rates. Support for this notion can be found in Panel 2, which shows the order-specific pattern. Unemployment

reduces first birth rates at all ages (except for age 40–44). However, the greatest impact is found at younger ages. The first explanation could be that young people can more easily revise their fertility plans. The second reason could be that unemployment is higher for younger people. In fact, analyses with age-specific unemployment rates (see additional material, Table 9) reveal similar patterns. However, youth unemployment and overall unemployment are strongly related, making it difficult to disentangle age-specific effects. The pattern for the higher birth orders is more irregular than that of first births. No association seems to be present between unemployment and second birth behavior at younger ages. At ages 30 and higher, people seem to revise their plans if unemployment rates increase. The third birth pattern (Panel 4) is very irregular. Some negative effects of unemployment on third birth rates are, however, visible at ages 35–44.

Figure 2 displays the analysis by country cluster for all parities combined. Because the Southern and Eastern European countries have been affected more severely by the recession than other parts of Europe, we assumed that analyzing the differences between regions could help us determine whether the strength of the recession affects the relationship between economic conditions and fertility. Furthermore, the regions broadly fall into classical welfare state clusters, giving us the opportunity to understand the effect of institutions. Figure 2 shows clear regional variation. In the countries in which the economic crisis has not yet led to great economic hardships (i.e. most Western and Northern European countries), unemployment does not appear to have had a substantial impact on fertility. The welfare state appears to insulate fertility decisions from the relatively small variations in the economy seen in the Northern and Western European countries over the past decade. However, this does not mean that a larger recession might not impact fertility in these countries. Indeed, the experience from the fertility reaction in response to the Swedish finance and labor market crisis of the 1990s suggests the opposite (Andersson 2000). We find a significant relationship between fertility and unemployment in the Southern, Eastern and Central European countries. The strong association found in these areas suggests that unemployment does matter for fertility choices; fertility tends to decline when economic conditions deteriorate severely.

Figure 1: Estimated elasticities of unemployment on fertility, results by age and birth order

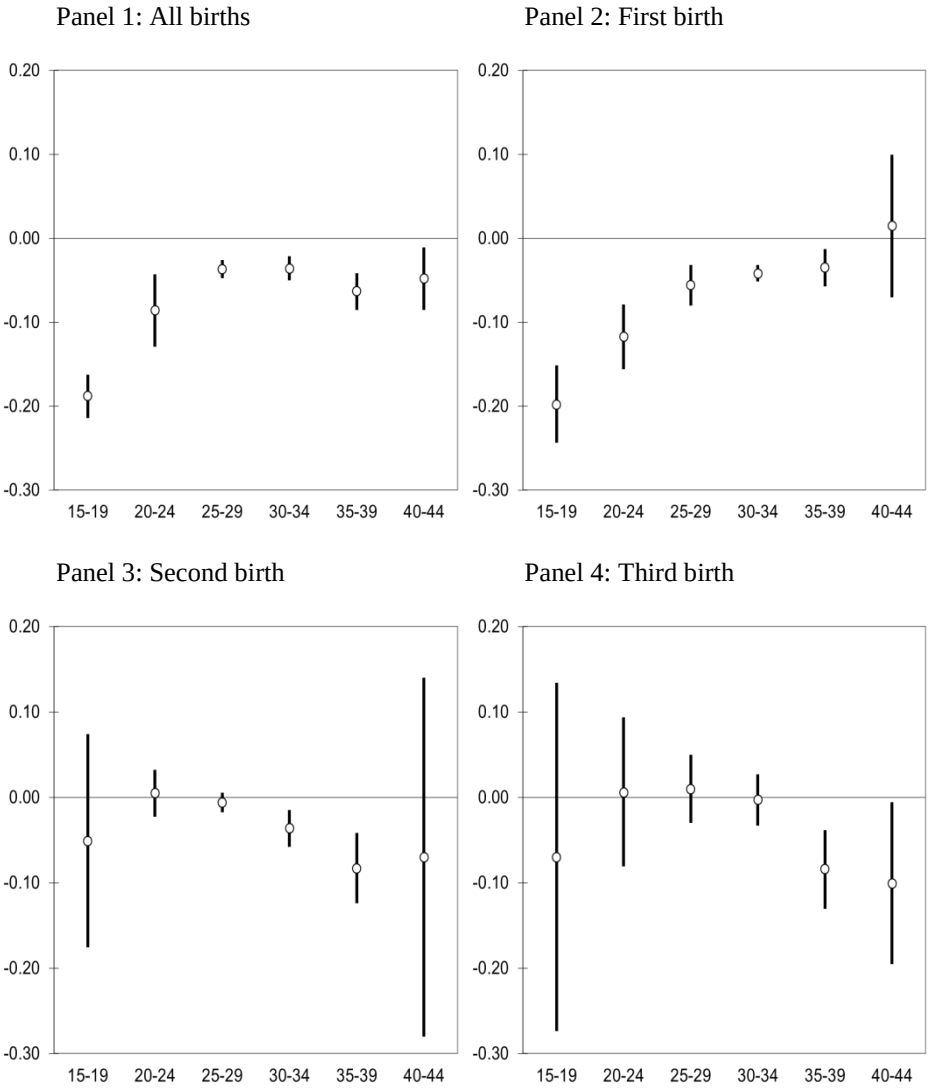
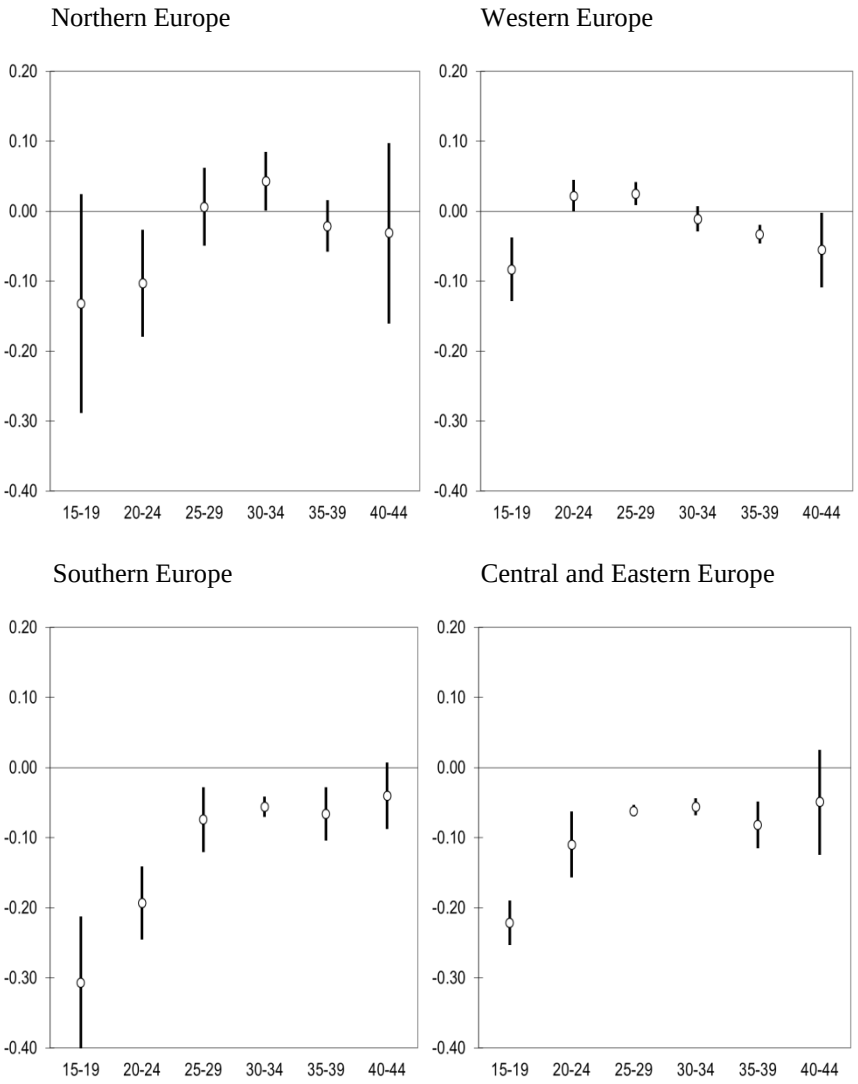


Figure 2: Estimated elasticities of unemployment on fertility, results by age and country cluster



Note: Central and Eastern Europe: Belarus, Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Russia, Slovakia, Slovenia. Western Europe: Austria, Belgium, France, Germany, Netherlands, Switzerland, United Kingdom, Ireland. Northern Europe: Denmark, Finland, Norway, Sweden; Southern Europe: Greece, Italy, Portugal, Spain.

4. Conclusions

The overall findings of this study suggest that the recent economic crisis has left an imprint on European period fertility patterns. For some countries, it put a halt to the positive fertility trend that had started to develop. In other countries, we see significant declines in period fertility. The results from the fixed-effects modeling that controls for differences between countries and trends over time showed that unemployment rates are closely associated with fertility development. In particular, fertility rates at younger ages seem to respond to adverse economic conditions. This finding is compatible with the idea that fertility plans can be revised more easily at younger ages than at ages closer to the biological limits of fertility. However, it is important to note that unemployment has reduced fertility in Southern Europe in particular. Southern European countries such as Italy and Spain are known for their unstable job entry patterns, and the recession has further exacerbated the problems young people face in this region (Müller and Gangl 2003; International Labour Organization 2012). A combination of the depth of the recession and the institutional arrangements in Southern countries appear to make the relationship between the economy and fertility the strongest in these regions.

When we look at the results for higher order births, the pattern becomes less clear-cut. It is only at older ages (30–44) that unemployment lowers second birth rates. At younger ages, unemployment does not seem to matter for second birth choices. We may be able to explain this pattern by considering the particularities of the population exposed to the risk of having a second or third child at younger ages. These women are usually a select group who are less educated and less career-oriented. Women who are at risk of having a second or third child at older ages are, to a greater extent, highly educated individuals who might respond more sensitively to economic downturns in making their reproductive choices (Kreyenfeld 2010). However, this is pure speculation; research on the micro-level would be useful to further investigate this issue.

A particular feature of this study is that we have accounted for the overall fertility trend by inserting country-specific linear time trends in the fixed-effects regression. Such a linear time trend seems reasonable for the one decade we consider. However, other specifications may be possible, and the correct way of accounting for the tempo distortions in period fertility is clearly open to debate. In the absence of counterfactuals, it is impossible to know for sure how fertility would have developed in the absence of the crisis. There are many other issues we were unable to address in this short descriptive paper. Most importantly, we suspect that the welfare state context is an important intervening factor that mitigates the impact of economic conditions on fertility. The Baltic countries might be quite telling in this respect. Whereas Latvian

fertility rates markedly declined in 2009, fertility in the other Baltic countries, which introduced quite generous parental leave schemes shortly before the economic crisis, showed no major downturn in fertility. In order to fully understand the repercussions of the economic crisis on Europe's fertility development, we need to consider that family policies may have softened the adverse affects of the crisis. Beyond the regional welfare state typology that we employed in our paper to capture the social policy context, further analysis should incorporate more detailed measures of the family policy context. We have shown that fertility of the Southern European countries most rigorously responded to the economic crisis. With our analysis we were, however, unable to tell whether this may be due to limited family policies or to the fact that the governments in Southern Europe were unable to protect their younger members from economic uncertainties during the early life course. The macro-level analysis in this paper provides a first step in the analysis of the recession, which we hope will be buttressed by a continuation of the tradition of detailed micro-level studies in the years ahead.

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Appendix

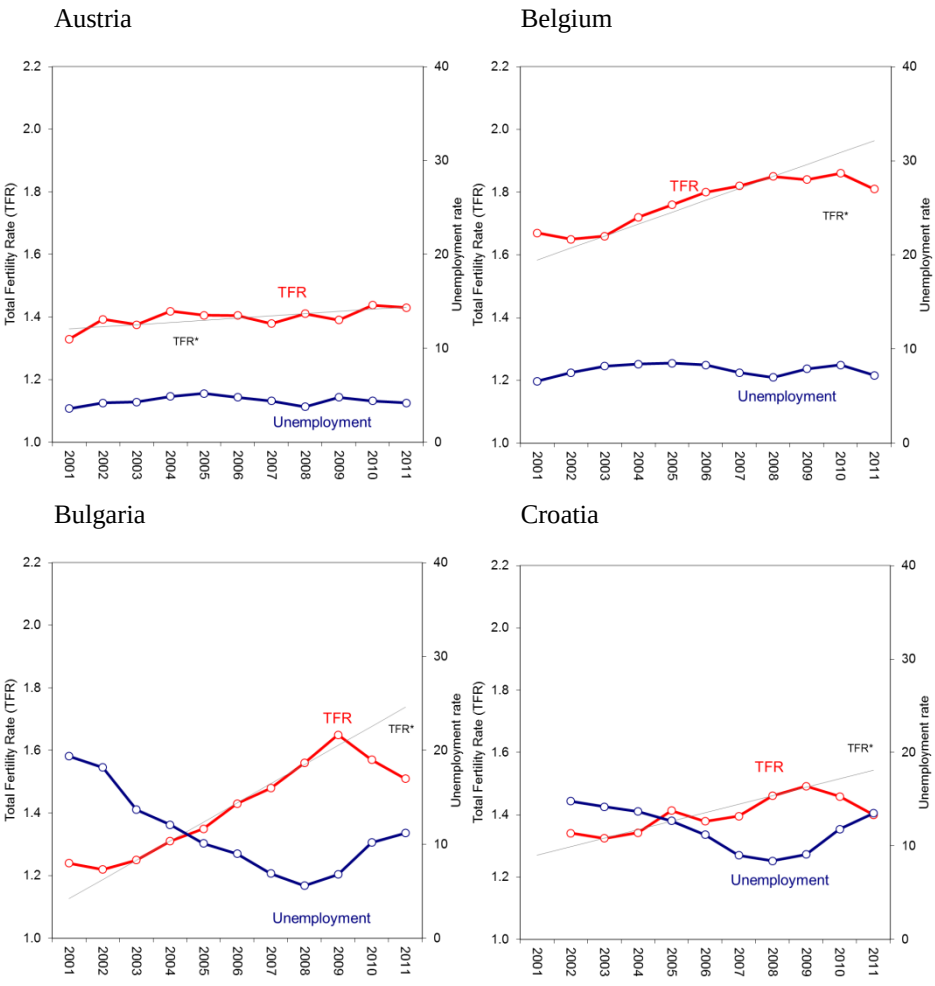
Table A1: Countries included in the analyses

Country	Unemployment rate	Age-specific fertility	Order and age-specific fertility*)
Austria	Eurostat 2000-2010	HFD 2001-2010	HFD 2001-2010 Eurostat 2011
Belgium	Eurostat 2000-2010	Eurostat 2001-2010	Eurostat 2001-2009
Bulgaria	Eurostat 2000-2010	HFD 2001-2010	HFD 2001-2010
Croatia	Eurostat 2002-2010	Eurostat 2002-2010	Eurostat 2002-2010
Czech Republic	OECD 2000-2008 Eurostat 2009-2010	HFD 2001-2010	HFD 2001-2010
Denmark	Eurostat 2000-2010	Eurostat 2001-2010	Eurostat 2001-2005
Estonia	Eurostat 2000-2010	HFD 2001-2010	HFD 2001-2010
Finland	Eurostat 2000-2010	HFD 2001-2009 Eurostat 2010	HFD 2001-2009 Eurostat 2010
France	Eurostat 2000-2010	HFD 2001-2010	Eurostat 2001-2006
Germany	Eurostat 2000-2010	HFD 2001-2010	HFD 2009-2010
Greece	Eurostat 2000-2010	Eurostat 2001-2010	Eurostat 2001-2010
Hungary	Eurostat 2000-2010	HFD 2001-2009 Eurostat 2010	HFD 2001-2009 Eurostat 2010
Ireland	Eurostat 2000-2010	HFD 2001-2009 Eurostat 2010	HFD 2001-2009 Eurostat 2010
Italy	Eurostat 2000-2010	Eurostat 2001-2010	NA
Latvia	Eurostat 2000-2010	Eurostat 2002-2010	Eurostat 2002-2010
Lithuania	Eurostat 2000-2010	HFD 2001-2010	HFD 2001-2010
Netherlands	Eurostat 2000-2010	HFD 2001-2009 Eurostat 2010	HFD 2001-2009 Eurostat 2010
Norway	Eurostat 2000-2010	HFD 2001-2009 Eurostat 2010	HFD 2001-2009 Eurostat 2010
Poland	Eurostat 2000-2010	Eurostat 2001-2010	Eurostat 2001-2010
Portugal	Eurostat 2000-2010	HFD 2001-2009 Eurostat 2010	HFD 2001-2009 Eurostat 2010
Romania	Eurostat 2000-2010	Eurostat 2001-2010	Eurostat 2001-2010
Russia	OECD 2000-2010	HFD 2001-2010	HFD 2001-2010
Slovakia	Eurostat 2000-2010	HFD 2001-2009 Eurostat 2010-2010	HFD 2001-2009 Eurostat 2010-2010
Slovenia	Eurostat 2000-2010	HFD 2001-2009 Eurostat 2010	HFD 2001-2009 Eurostat 2010
Spain	Eurostat 2000-2010	Eurostat 2001-2010	Eurostat 2001-2010
Sweden	Eurostat 2000-2010	HFD 2001-2010	HFD 2001-2010
Switzerland	OECD 2000-2010	HFD 2001-2010	HFD 2001-2010
U.K.	Eurostat 2000-2010	Eurostat 2001-2010	NA

Note: *) Age-specific fertility rates by birth order for which the Eurostat database is indicated as the source were computed by the authors using the Eurostat data on live births and population on January, 1st.

Sources: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database; http://www.humanfertility.org; http://stats.oecd.org/.

Figure A1: Total Fertility Rate (TFR) and unemployment rate by country



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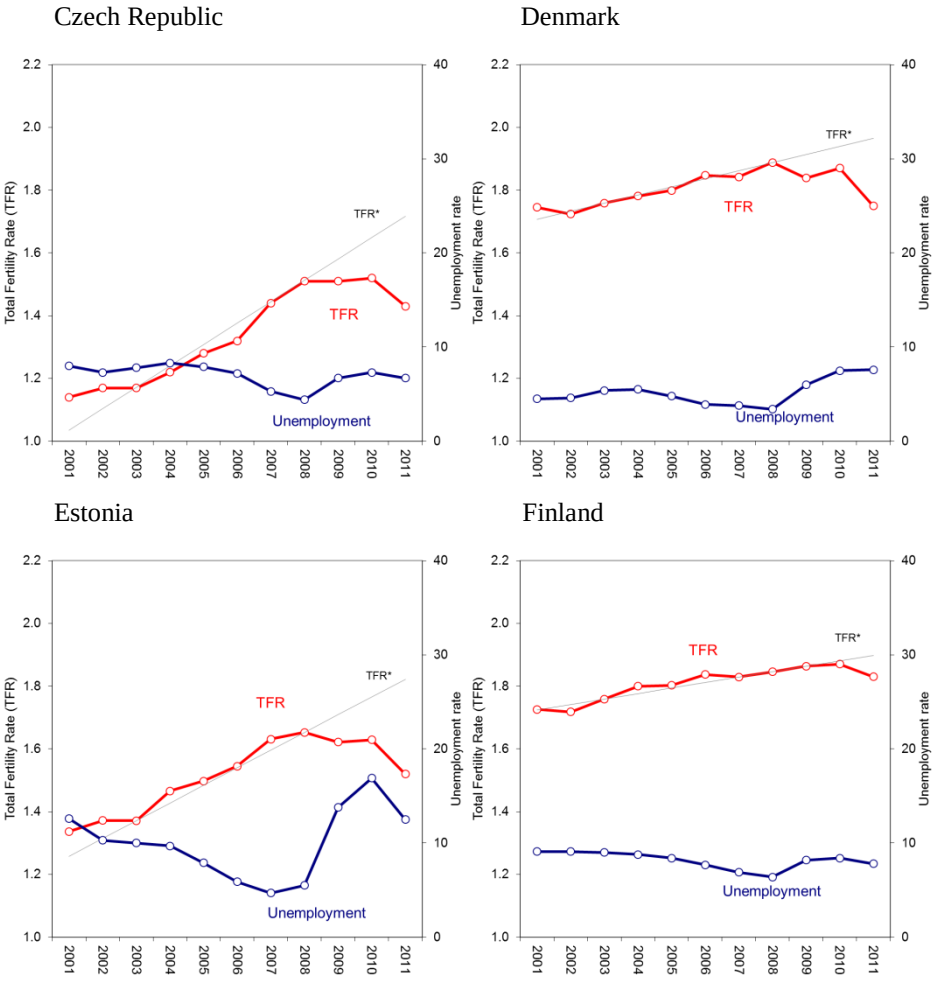

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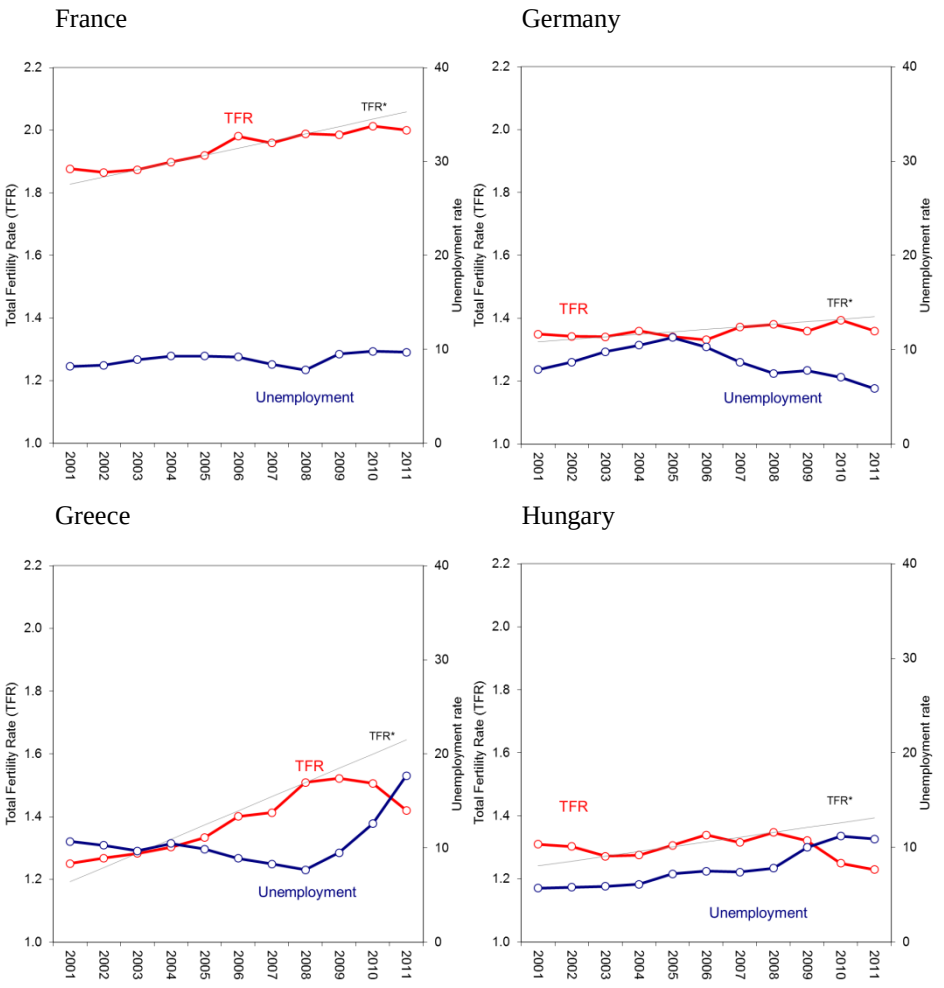

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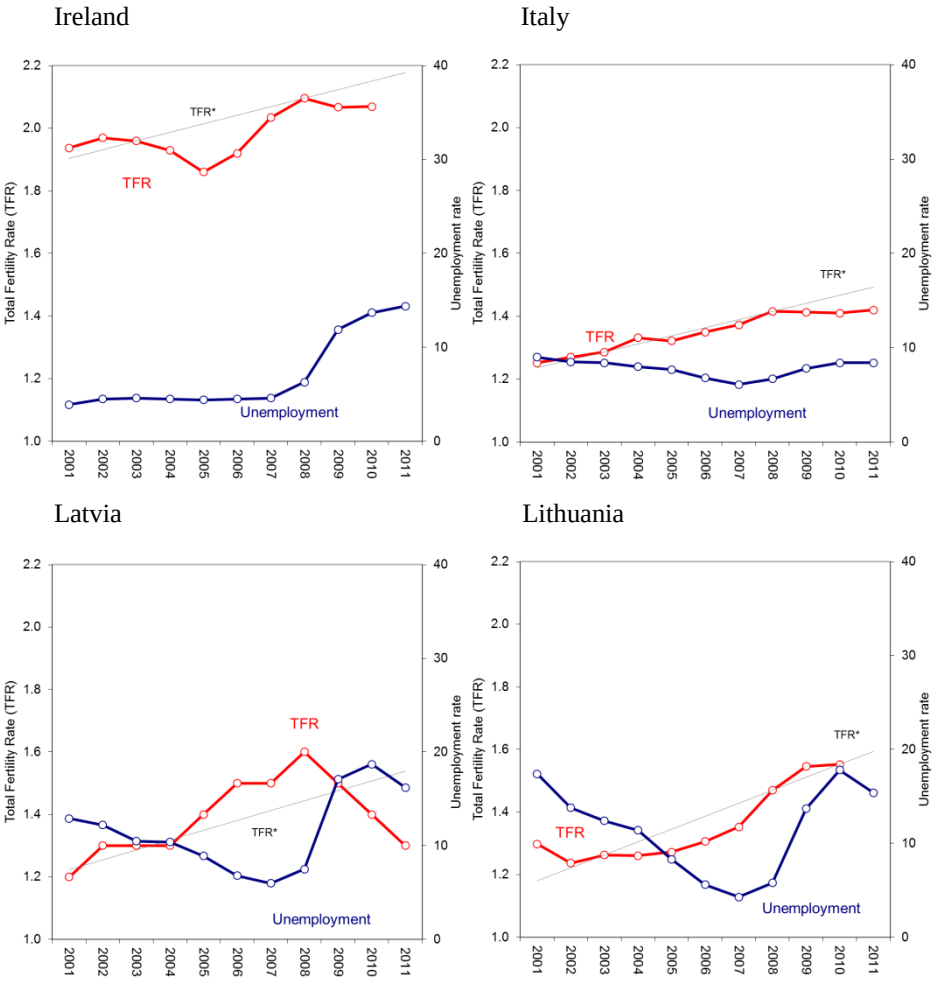

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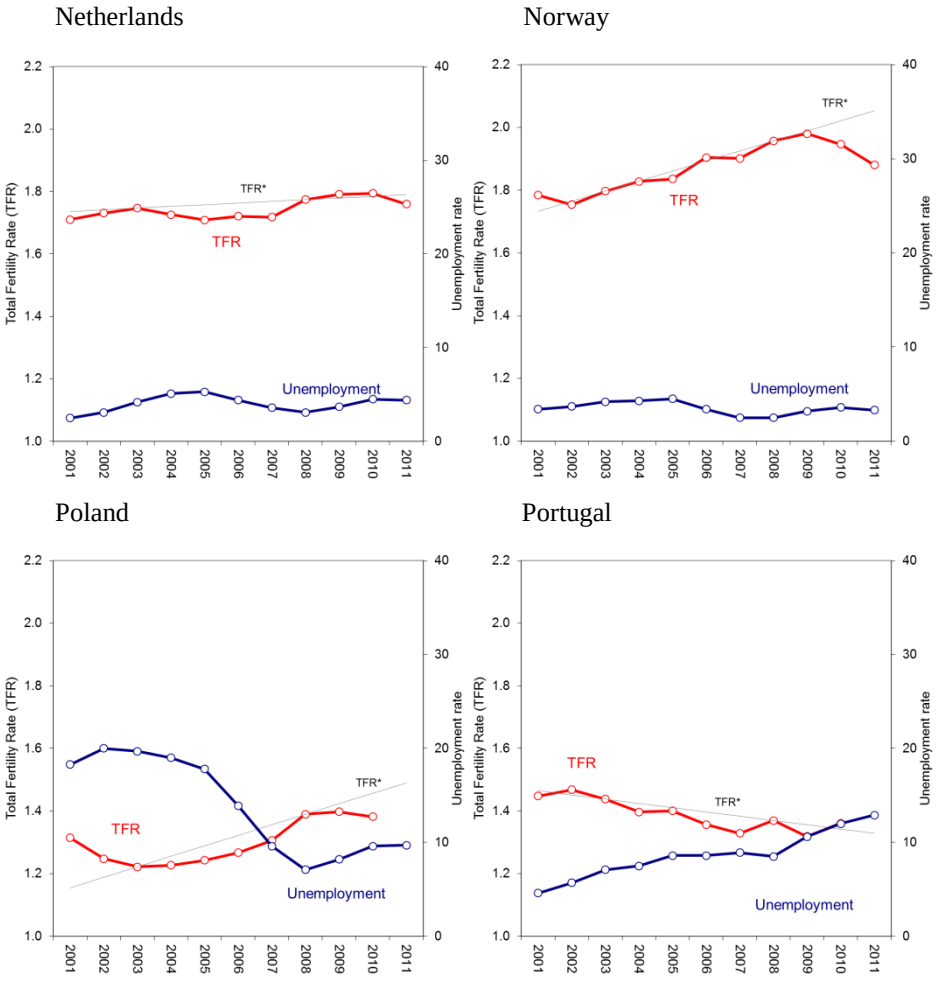

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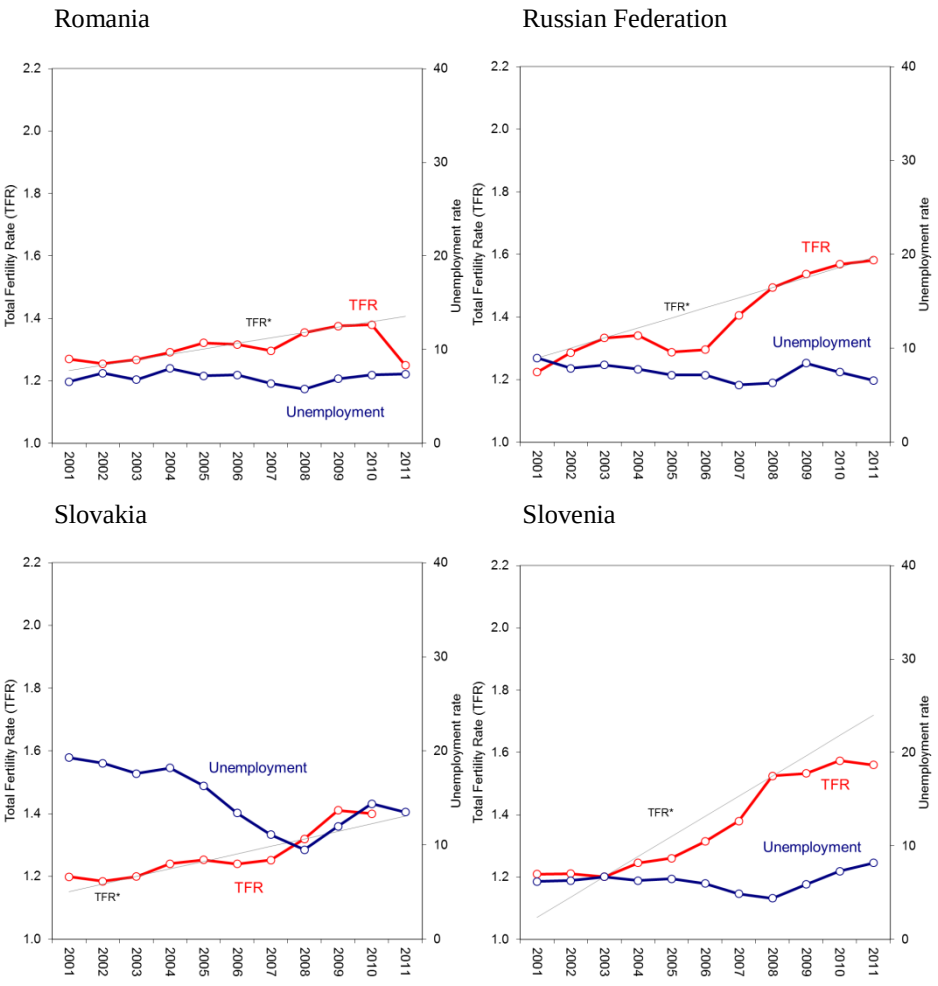

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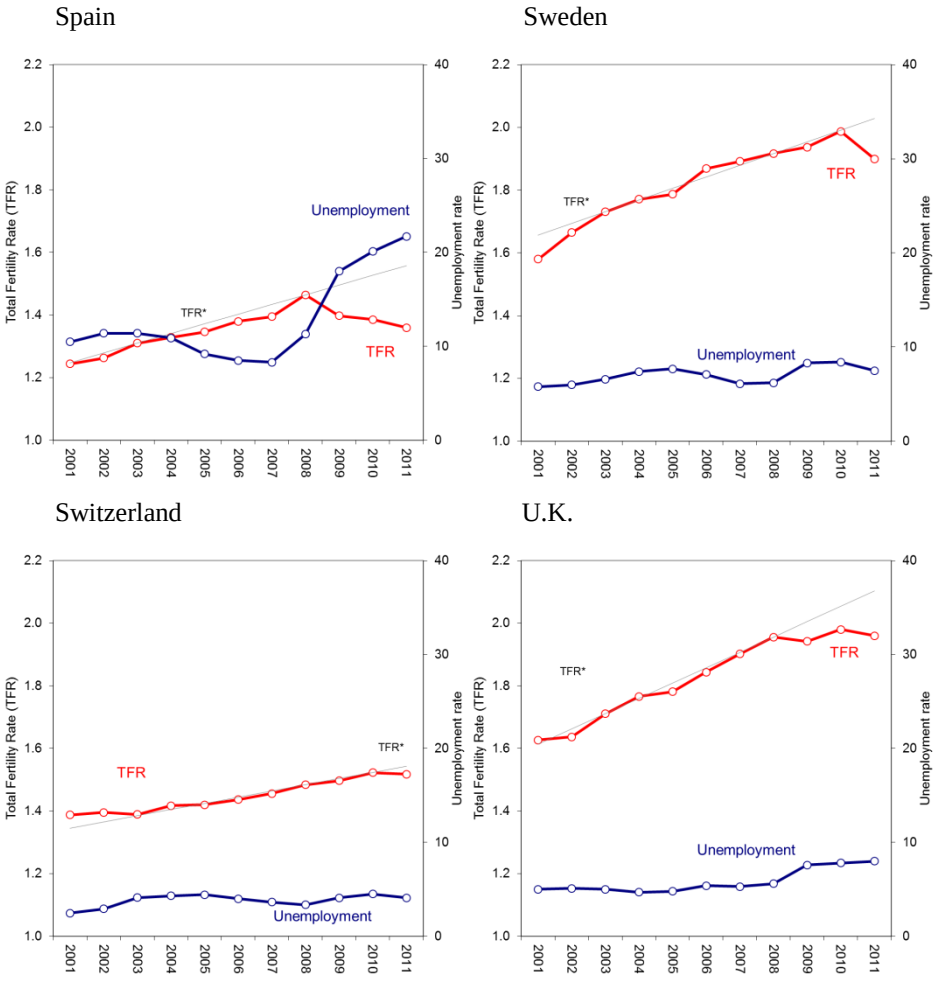

Note: Belarus, Ukraine and Serbia are not represented, as we lack official unemployment rates for these countries. TFR* represents the predicted TFR based on five-year extrapolations.