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On the changing correlation between fertility and female employment over space and time: A pooled time-series analysis on the impact of social indicators

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Abstract: In OECD countries the cross-country correlation between the total fertility rate and the female labour force participation rate turned from a negative value before the 1980s to a positive value thereafter. Based on pooled time series analysis the literature seems to agree that this change is due to unmeasured country and time heterogeneity with respect to female employment. However, the determinants of this heterogeneity remain unclear. Using data of 16 European countries from 1960-2005, I estimate pooled time series models of fertility and female labor force participation by applying Prais-Winsten regressions with fixed country- and time-effects and investigate the changing effect of female labor participation for a set of labor market, educational and demographic variables and indicators of social policy. The empirical findings reveal that the change in the correlation seems to be due to increasing proportion of females employed part time, increasing educational attainment of females, increasing age at first birth and increasing gross enrollment ratio of children in pre-primary education.

Key words: cross-country correlation, female employment, fertility, pooled time series, country- and time-specific heterogeneity

1 Introduction

During the last two decades two main developments have taken place in OECD countries that should capture the attention of sociologist, demographers, economists, policy-makers and the public alike. On the one hand, the fertility rate has sharply decreased in most developed countries – in correspondence with an increase in female labor participation rates – and is now below the replacement rate. The average total fertility rate plummeted down from 2.9 in 1960 to 1.6 in 2005. Female labor force participation rates had climbed to 60.4% in 2005 up from 25.3% in 1960.

In accordance with these socio-demographic developments, the standard expectation in the social science literature has been that women have to decide between children and employment due to difficulties in combining both. Indeed, numerous studies on female labor supply show that women with children do have lower labor participation the childless women. On the macro level, this decision process for children or employment should result in a negative relation between fertility and female employment (Becker 1960, 1991; Mincer 1963; Willis 1973; Butz and Ward 1979).

In the last decade, though, the thitherto factum of the negative relation between fertility and female employment has been questioned. Various authors find that in OECD countries the cross-country correlation between the total fertility rate (TFR) and the female labor force participation rate (FLP) turned from a negative value before the 1980s to a positive value thereafter (e.g. Ahn and Mira, 2002; Brewster and Rindfuss, 2000; Esping-Andersen, 1999; Pampel, 2001; Rindfuss et al., 2003). The commonly well-known negative relationship seems to be reversed: The countries that now have the lowest levels of fertility are those with relatively low levels of female labor force participation while the countries with higher fertility levels tend to have relatively high female labor participation rates. Figure 1 illustrates this change for 16 European countries.

This change in the sign of the cross-country correlation between TFR and FLP has often been mistakenly associated with a change in the time series association between TFR and FLP (Brewster and Rindfuss, 2000; Esping-Andersen, 1999; Rindfuss et al., 2003). Recent studies by Kögel (2004) and Engelhardt et al. (2004) show that neither the causality nor the time series association between TFR and FLP has in fact changed over time. Kögel (2004) offers two convincing elements which may explain change in the cross-country correlation. These are (a) the presence of unmeasured country-specific factors and (b) country heterogeneity in the magnitude of the negative time-series association between fertility and female employment. For instance, labor supply was higher in Sweden than in Italy both in 1965 and 1995

(country-specific heterogeneity) and the increase in FLP is associated with a much stronger decline of the TFR in Italy than in Sweden (difference in relation between the two variables) (Engelhardt and Prskawetz 2004). By means of six industrialized countries Engelhardt et al. (2004) find Granger causality in both directions, which is consistent with simultaneous movements of both variables brought about by common exogenous factors.

Though studies provide econometric evidence that the time series association has not changed its sign, they do not investigate the confounding factors that may actually explain the change in the cross-country correlation coefficient. The studies by Adsera (2004), Ahn and Mira (2002), Castles (2003), Pampel (2001), Engelhardt and Prskawetz (2004) and De Laat and Sevilla-Sanz (2007) offer some theories that may explain why the sign of the cross-country correlation between TFR and FLP changed. Based on family economic theories and considerations regarding role incompatibility, country-specific institutional differences and unsecure labor market conditions are mentioned, that simultaneously influence the decision for children and female employment. Empirically, no study empirically investigates the effect of these conjectural factors on the time- and country-specific changes in the relation between fertility and female employment.

The present study is according to my best knowledge the first to analyze the effect of female employment on fertility explicitly considering time- and country-specific heterogeneity and controlling for a set of labor market, educational and demographic variables and indicators of social policy that influence both, fertility and female employment. The paper is organized as follows: In section 2, I give a brief overview on recent theoretical approaches on the relation between fertility and female employment and present my analytical framework. In section 3, I use a panel of European countries to study the interaction the interaction between the total fertility rates and female employment controlling for selected social indicators. Finally, section 4 summarizes the main results and gives an outlook for future research.

2 Analytical framework

In economics, two contrasting schools have emerged to explain the relationship between the changes in fertility and female labor force participation over time: the New Home Economics model and the Easterlin model. Both approaches attempt to put forward explanations for a negative relationship between female employment and fertility. They differ in their identification of the driving force, as indicated by the respective labels used to describe them: the ‘value of time’ model and the ‘relative

income' model (Sanderson 1976). The New Home Economics (e.g. the model by Willis 1973 and its application by Butz and Ward 1979) focuses primarily on changes in the value of a women's time whereas Easterlin (1980, 1987) focuses on changes in relative income due to the demographic cycle (the baby boom and bust).

Because both the neoclassical model and the Easterlin story based on wage structures poorly explain either common time trends or cross-national variation in fertility and female employment, the emerging alternative hypothesis in the demography literature is that societal level responses have eased the incompatibility between childrearing and female employment (Brewster and Rindfuss 2000; Rindfuss et al. 2000; Rindfuss and Brewster 1996; Engelhardt et al. 2001). The three mentioned theories are well-known and are discussed in detail for instance in Engelhardt and Prskawetz (2002). All three approaches aim to explain simultaneously the development of fertility and female employment and fail, though, in explaining the negative relation between fertility and female employment on the individual level, the positive correlation on the macro level, as well as the change in correlation.

de Laat and Sevilla-Sanz (2005) set up a model of household production that focuses on the heterogeneity in attitudes towards women's home time and the externalities associated with a man's willingness to participate in home production. Within their framework they are able to explain the negative association between female labour force participation and total fertility at the micro-level as well as the positive association between female labour force participation and total fertility at the macro-level. More specifically, they show that households with less egalitarian attitudes have a more unequal division of household tasks, lower female labour force participation and more children and term this relation the household attitude effect. However, at the macro-level the social externality effect works: households living in less egalitarian countries have, ceteris paribus, a more unequal division of household tasks, lower female labor force participation and also fewer children. The interaction of the household attitude and the social externality effect can cause the change in the cross-country correlation. In particular, they show that in egalitarian countries when relative female wages rise men's contribution to the household production becomes higher allowing the social externality effect to dominate. To summarize, the paper by de Laat and Sevilla-Sanz is the first one to provide a unified theoretical underpinning of the negative micro-level correlation, the positive macro-level correlation as well as the change in the correlation of total fertility and female labour force participation over time. Their basic argument is that changes in socio-economic trends, like the increase of female labour force participation, may have caused the underlying differences across countries in attitudes, social norms and culture to uncover. Put differently, changes in the socio-economic context may help to uncover long-term

cultural and institutional differences across countries. Since the socio-economic context may change faster as the underlying cultural and social norms, a change in the cross-country correlation of the total fertility and female labour force participation results.

A key argument in de Laat and Sevilla-Sanz is the micro-macro interactions, i.e. individual choices, opportunities and constraints interact with their social context (cf. also Billari 2004). Several authors have emphasized the importance of social interactions for fertility choices (Bongaarts and Watkins 1996; Montgomery and Casterline 1996; Bernardi 2003). A recent contribution that emphasizes the relevance of social interactions in the context of low fertility is Kohler et al. (2002 and 2006). Social interactions (either impersonal through e.g. labour market, or personal ones through e.g. peer groups) may induce multiplier effects, multiple equilibria and status-quo enforcement and path dependence (Billari 2004). Similarly, Aberg (2003) found positive effects of the proportion of peers married on the marriage rate, indicating that social interaction is in part driving individuals' marital decisions.

A further, indeed rather similar, interpretation of the reversal in the association between fertility and fertility related behaviour is given by McDonald (2000). The author postulates that current low fertility in advanced societies is "the outcome of a conflict or inconsistency between high levels of gender equity in individual-oriented social institutions and sustained gender inequity in family-oriented social institutions" (p. 427). The author focuses on the progress toward gender equity in a) family-oriented institutions, and b) individual-oriented institutions. The fertility transition from high to low levels is primarily associated with women acquiring rights within the family and, in particular, the possibility to adapt the number of births to their desires. However, the extraordinary increase of gender equity in individual-oriented institutions during the twentieth century, i.e. the opportunity for women to access formal education and participate in the labour market, produced a conflict with women's roles as wives and mothers because of continuing low levels of equity in the family sphere. "But in a context of persistent relatively low gender equity in family-oriented institutions, high gender equity in individual-oriented institutions results in very low fertility. […] In a context of high gender equity in individual-oriented institutions, higher gender equity in family-oriented institutions will tend to raise fertility" (p. 438).

To sum up, previous evidence suggests that the effect of the traditional fertility determinants, such as female employment, acts together with the influence of different social, cultural, institutional and economic characteristics (or path-

dependencies) which have to be taken explicitly into account when analysing fertility dynamics.

Therefore, existing studies on the change in correlation between fertility and female employment focus on the causes of the decline in fertility (Adsera 2004; Ahn and Mira 2002; Castles 2003; Pampel 2001; De Laat and Sevilla-Sanz 2003). In an extension of the theoretical model by Butz and Ward (1979), Ahn and Mira (2002) stress the importance of income effects, inflexible working times, unemployment and child care. Empirical evidence is only presented for aggregated unemployment yielding the bulk of discussion on theoretical considerations. Based on a family economic approach Adsera (2004) estimates the effects of labor-market conditions (sex-specific unemployment and activity rates, duration of maternity leave and wage-replacement ratios during maternity leave, and the gross national product) on pooled fertility rates of 23 OECD countries. Pampel (2001) estimates the effect of female employment on total fertility assuming changing preferences using pooled time-series of 18 countries. Castles (2003) restricts his analysis on the bivariate relation between total fertility and selected indicators like the share of tertiary education, the share of Catholics und the divorce rate in the years 1980 and 1998. The empirical prove of the theoretical model by De Laat andSevilla-Sanz (2007) on the changing preferences on gender roles (discussed above) is based on internatioal comparative cross-sectional data from a single year. Engelhardt and Prskawetz (2004) employ a set of labour market, educational and demographic variables and indicators of social policy to explain the change in correlation. Thereby, they consider not only the correlation between these indicators and total fertility but also the time series interaction of the variables with female employment. The analysis is purely descriptive though, describing the time-series of the indicators for countries with low, middle, and high female labor participation.

The present study make-up here with an empirical analysis of the change in fertility controlling for time- and country-specific heterogeneity in the effect of female employment and considering social, economic, and institutional factors, which influence both, fertility and female employment. The methodological approach is to pool cross-sectional time series. This technique incorporates the cross-sectional association of the independent variables and fertility as well as the time-series associations within nations. The critical assumption of pooled cross-sectional times series models is that of pooling, i.e. all units are characterized by the same regression equation at all points in time: To deal with unobserved heterogeneity across space, fixed regional effects (υ_i) and fixed time effects (ν_t) are assumed. Moreover, variation of the effect of FLP over time is explicitly modeled by an interaction between time and FLP:

$$TFR_{it} = \alpha + \beta_1 FLP_{it} + \beta_2 FLP_{it} \times t + \upsilon_i + \nu_t + \varepsilon_{it}, \qquad i = 1, \ldots, N; t = 1, \ldots, T.$$

To deal with temporally and spatially correlated errors (ε_{it}) often contained in pooled time series models and causing seriously inefficient estimates, the Prais-Winsten estimator is applied (Prais and Winsten, 1954). Here, the nuisance in the residuals is modeled as a first-order autoregression or AR(1) process (for details see Engelhardt and Prskawetz 2005).

To sum up, in the empirical analysis I estimate a base model with fixed country effects to account for unobserved country-specific heterogeneity and fixed time-effects to account for time-specific heterogeneity. Moreover, in order to detect country and time-specific heterogeneity in the association between total fertility and female employment, we include in the models an interaction term between female employment and time. The base model is in the following extended by characteristics of the labor market and the education system, as well as demographic factors and indicators of social policy. Hereby, the interaction between these variables (Z) and female labor participation is modeled explicitly:

$$TFR_{it} = \alpha + \beta_1 FLP_{it} + \beta_2 FLP_{it} \times t + \beta_3 FLP_{it} \times Z_{it} + \beta_4 Z_{it} + \upsilon_i + \nu_t + \varepsilon_{it}.$$

The change in the varying effects of female labor participation over time controlling for joint determinants of fertility and female employment yields evidence on the causes of the changing relation between fertility and female labor participation.

3 Empirical analyses

Data

In the empirical analysis, we assembled annual time series of the TFR and female labor participation from 1960 to 2005 for 16 European countries, for which the series were complete Included are four countries each from Western Europe (Belgium, France, the Netherlands, United Kingdom), Northern Europe (Denmark, Finland, Norway, Sweden), Southern (Greece, Italy, Portugal, Spain), and Central Europe (Luxemburg, Germany, Austria, Switzerland). The selection of countries is based on the availability of data for the control variables (see below).

Displaying country-specific levels of fertility and female employment for selected years, Figure 2 shows how the change in the relation between fertility and female employment has occured over time. At the beginning of the 1960s fertility in all countries is above replacement rate showing a variation between 2.2 and 3.15.

Accompanied by a decrease in variation, fertility dropped continuously in the 1970s and 1980s while female employment increased at the same time. In the mid of the 1980s in almost all countries total fertility was below 2.0 with a relatively small variation while female employment varied in a range between 30 and 80%. In the beginning of the 1990s, fertility increased in some countries, accompanied by a decrease in variation in female employment at the beginning of the new century.

Figure 3 shows the country-specific time-series association between TFR and FLP. In all countries, there was a negative relation between the two variables turning to a non-relation at a certain level of female employment. Although female labor participation is still increasing in all countries, the decline in TFR leveled off since beginning or mid of the 1980s.

To analyze the changing correlation between fertility and female employment, I use a set of labor market, educational and demographic variables, and indicators of social policy - theoretically well-known determinants of fertility and female employment - are used as controls variables. Among the labor market indicators are male labor participation rates, male and female unemployment rates and the share of women in part time. Among the educational variables are the female tertiary gross enrolment rate and the average years of school of females aged 25+. Among the demographic indicators are first marriage rate, total divorce rate, mean age at birth and at first birth. Indicators from social policy are the gross enrolment ratio of children in pre-primary education, the family allowances the first child, the duration of maternity leave (or parental leave), and the maternity (parental) leave benefits expressed as a percentage of women's wages in manufacturing. For an overview of data, definitions, and sources see the Appendix. Unfortunately, the time series are not complete for all indicators. Single missing data in the time series are imputed by linear interpolation. Missing data at the beginning or the end of a time series are excluded from the analysis. Since data are only available since the beginning of the 1970s, the following analyses are restricted to the period 1970 to 2005. Figure 4 provides an overview on the pooled time series of these variables.

Multivariate analyses of pooled time series

To evaluate the effect of these social indicators on the effect of female employment on fertility, I estimate a base model which serves as a reference in the following analysis. In this model, time- and country-specific fixed effects as well as interaction effects of female employment and time are included. The estimated coefficients are not displayed here due to the numerous parameters. Though, the effects of female employment, the results are visualizes in Figures.

Figure 4 shows the time-varying effect of FLP on TFR using Dummy-Trend terms and applying the Prais-Winsten estimation method. Like Figure 1, the estimated coefficients suggest a changing relation between TFR and FLP. Since the mid of the 1980s the effects of FLP on total fertility are constant to a greater or lesser extent.

How do the effects of FLP vary when controlling the selected labor market indicators? The models presented in Figure 5 each extend the base model for a single indicator (e.g. male unemployment) and allowed for interaction between these indicator and female employment (e.g. male unemployment * FLP). In the Figure, the estimated net effects of FLP are displayed, that is the main effect of FLP (β_1) corrected for the interaction of FLP and time (β_2) and the interaction of FLP and the labor market indicator (β_3).

The empirical analysis starts with an investigation of the change of the economic position of men. Indicators of male economic position include labor participation and unemployment. While FLP has increased across time and space, the male labor participation shows a clear downward trend till the mid 1990s mainly due to decreasing participation at older ages (Gruber and Wise 1999). Additionally, the male unemployment rate increased with some ups and downs during time (Figure 4). These developments suggest that the economic position of males weakened over time. According to family economics, these developments can explain the decrease in fertility. In my model, however, neither the male employment rate nor the male unemployment rate shows a significant effect on fertility. Thus, the effect of FLP on TFR - controlling for potential interactions - remains more or less constant over time and the change in the relation between FLP and TFR remains.

Concerning female unemployment rate, which has also increased over time in most countries, I do not find a significant effect. Thus, like male unemployment, female unemployment does not influence the relation between FLP and TFR. As Figure 5 shows, the effects of FLP with and without considering female employment are more or less the same. Thus, the change in correlation is not due to the specific definition of FLP, which includes both employed and unemployed women, because the effect remains when controlling for unemployment.

Contrary to the prediction of family economics and the role-incompatibility hypotheses, the share of women in part time has a significant negative effect on fertility. That is, the higher the share working part-time the lower is fertility. Interestingly, the interaction effect between share in part time and FLP is significantly positive: the higher the part time rate, the higher is fertility with

increasing FLP. Controlling for females working part time, the effect of FLP on TFR is reduced, and remains negative during the whole time period. Thus, the increasing share of women working part time in most countries has contributed to the change in correlation between TFR and FLP.

Another family economic explanation of declining fertility is increasing educational attainment of females, due to increasing opportunity costs of childbearing and -rearing. Both for the average years of schooling of females aged 25+ and for the female tertiary gross enrollment ratio I find a significant negative effect on total fertility, indicating decreasing fertility with longer education (Figure 6). Controlling for educational attainment, which is strongly positive correlated with female employment, the effect of FLP on TFR is reduced and remains negative over the whole time period. Moreover, after decreasing, the effect is increased since the mid of the 1990s. Thus, increasing educational attainment of females contributed to the change in correlation between TFR and FLP.

In the following we look at the effect of proximate determinants of fertility, which may also interact with female employment. As Billari and Kohler (2002) and Mamolo et al. (2008) show, there is also a change in correlation between TFR and first marriage rate during the same period of time. In countries in which long-term partnerships are still the norm (e.g., in Italy), the decrease in 1st marriage rate should come with a decrease in fertility. My empirical results show a significant positive effect of 1st marriage rate of fertility and a significant negative interaction effect with FLP (Figure 7). The time-dependent effects of FLP on TFR change hardly when controlling for first marriage rate and be alike the effects from the base model. Thus, the decline in first marriage rate did not contribute to the change in correlation between TFR and FLP.

A further proximate determinant of fertility is the total divorce rate, for which I find a significant negative effect on fertility. The divorce rate is strongly positive correlated with FLP. Controlling for the interaction between FLP and divorce, I find a positive effect of FLP on fertility. Interpreting increasing divorce rates as an indicator for an increasing number of egalitarian partnerships and financial independence of women, the results fit to the explanation of de Laat and Sevilla-Sanz where changing attitudes towards homework are assumed to cause the change in correlation.

The third proximate determinant of fertility is the mean age at birth. Here, the age at 1st birth is of particular interest regarding the postponement of births to higher ages, resulting in a systematic pattern of „lowest low“ fertility (Billari and Kohler 2002).

The empirical analysis suggests a significant negative effect for the mean age at 1st birth on total fertility. The increase in age at birth has resulted in decreasing period fertility. However, mean age at birth increases the negative effect of FLP on fertility, resulting in a negative effect during the whole period of time. Interestingly, compared the mean age at birth, the mean age at 1st birth obviously has a stronger impact on the effect of FLP (results not shown here). Since the beginning of the 1990s, the impact of age at 1st birth on the effect of FLP is less obvious.

Finally, I consider the impact of indicators from social policy. For this, I calculate the amount of family allowances for the 1st child using purchasing power parities in US $. In this model, the effect of family allowances on TFR is not significantly different from zero, and the effect of FLP on TFR remains largely constant controlling for interaction of FLP and family allowances (Figure 7). Thus, the amount of family allowances should not be a factor contributing to the change in correlation.

The same holds true for the duration of maternal (paternal) leave and for the maternal (paternal) leave benefits (expressed as a percentage of women's wages in manufacturing). The effects on TFR are not significant and there is no change in the effect of FLP on TFR.

The opposite holds true for the share of children in pre-primary education, which clearly increased in most countries under investigation (see Figure 4). Herewith, the compatibility of children and female employment increase remarkably, and should have resulted both in an increase in female employment and fertility, displayed in the opposing trend in the two time series. However, the effect of TFR on FLP is reduced by the share of children in pre-primary education since the beginning of the 1970s and is only slightly negative since then. Thus, the increase in public daycare seems to have contributed to the change in correlation between TFR and FLP since the mid of the 1980s.

4 Discussion

In this study I have tried to indentify the factors that may explain the changing cross-country correlation between fertility and female employment over time. The empirical analyses are based on a sample of 16 European countries for which data for fertility and female employment where available for the time period 1960 to 2005. Prais-Winston panel regression models with AR(1)-error terms account for methodological problems of pooled time series. Controlling time- and country-specific heterogeneity the panel-estimations also reveal a negative effect of female

employment on fertility till the mid of the 1980s, which turned to a positive effect thereafter.

To explain the reversal of the effect I use a set of labor market and educational variables, indicators of social policy and proximate determinants of fertility. The estimated models include these variables as exogenous variables and account for the fact that the effect of female labor participation may interact with these factors.

The graphical presentation of the results clearly suggest, that the change in correlation between fertility and female employment is determined by increasing part time work and educational attainment of females, the increasing age at birth (in particular age at 1st birth), and the increasing share of children in pre-primary education. These changes may be accompanied by a change in attitudes towards gender-specific division of work in the household, which theoretically explain the negative relation between fertility and female employment on the micro level, the positive relation on the macro-level, as well as the change in the correlation. Political measures such as direct monetary transfers to families with children, does not seem to have contributed to the reversal of the relation between TFR and FLP. Also the explanation by Adsera (2004) according to which the increase in unemployment particularly in the Southern European countries is responsible for the changing correlation cannot be verified in the present study.

As noted earlier, a daunting problem in the analysis comes from the crude measure of female labor force participation. Measures that distinguish between rates by age and hours worked would allow to take a closer look into the components of fertility changes. Moreover, the total fertility rate should be corrected for so-called tempo effects (that is, postponement of births to higher ages), since postponement of births leads to decreasing fertility rates. Also, time- and country-specific heterogeneity in the effects of the macro-indicators on fertility should be studied in detail. Finally, a broader set of macro indicators would be desirable to find further factors mediating the relation between fertility and female employment.

Most interestingly, not only the correlation between fertility and female employment has changed, but also a change in sign between the relation with other social variables like the mean age at first marriage, the mean age at first birth and the total divorce rate (Prskawetz et al., 2009; Monnier and de Guibert-Lantoine, 1996), the share of of-of-wedlock births and the educational attainment of women (Sleebos, 2003), as well as human development (Myrskylä et al., 2009).

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Appendix: Variables, definitions und sources

Dependent variable:

- Total fertility rate = Average number of children that would be born alive to a woman during her lifetime if she experiences a given set of age specific fertility rate observed in a population during a given year.
  Source: Eurostat (http://epp.eurostat.ec.europa.eu).

Labor market indicators:

- Female and male labor participatioon rate = Number of females (males) working part- or full-time or actively seeking employment at ages 15-64 divided by the total female (male) population aged 15-64.
  Source: OECD Labour Force Statistics (http://stats.oecd.org/wbos).
- Female and male unemployment rate = Number of females (males) aged 15 to 64 actively seeking employment divided by the respective number of persons aged 15 to 64 in the labor force.
  Source: OECD Labor Force Statistics (http://stats.oecd.org/wbos).
- Proportion females in part time = Number of females working less than 30 hours per week as a share of the female employment.
  Source: OECD Labour Force Statistics (http://stats.oecd.org/wbos).

Educational indicators:

- Female tertiary gross enrolment ratio = Percentage of the official school population corresponding to the same level of education in a given school year.
  Source: Unesco, on-line statistics: http://stats.uis.unesco.org.
- Average years of school of females aged 25+.
  Source: de la Fuente and Doménech (2002), Barro and Lee (2001), online: http://www.cid.harvard.edu/ciddata/ciddata.html.

Demographic indicators:

- First marriage rate = The probability of first marriage for a person if he or she were to pass through his/her lifetime conforming to the age-specific first marriage rates of a given year.
  Source: Council of Europe (2005).
- Total divorce rate = The probability of divorce for a married person if he or she were to pass through his/her marriage years conforming to the duration-specific divorce rates of a given year.
  Source: Council of Europe (2005).

- Mean age of mother at first birth.
  Source: Eurostat Datenbank (http://epp.eurostat.ec.europa.eu).

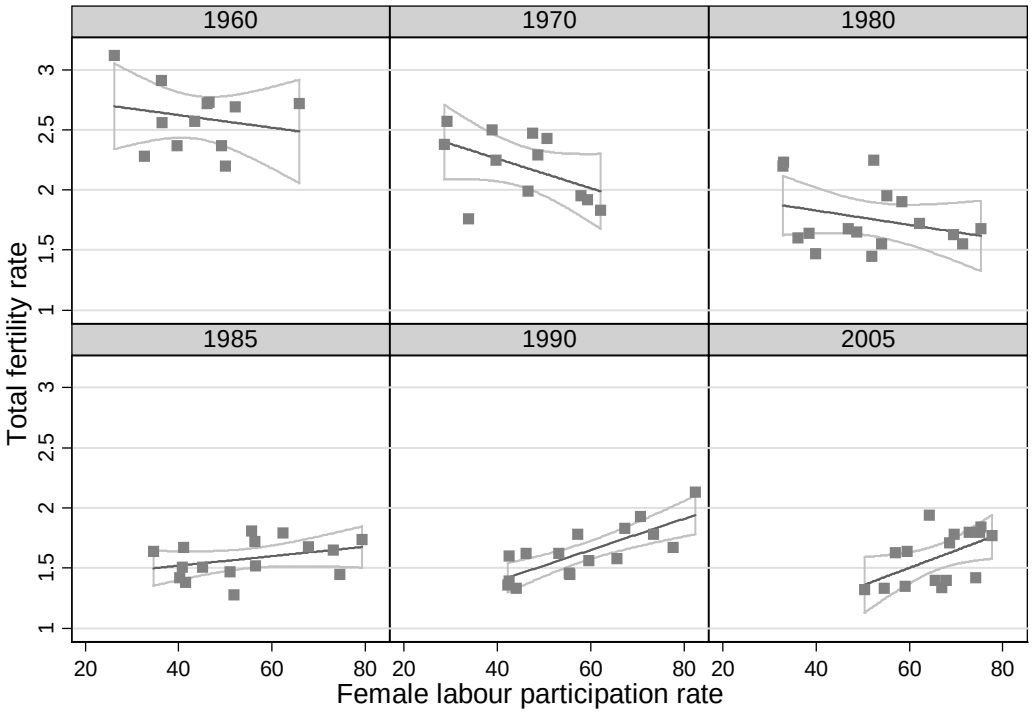
Indicators of social policy:

- Gross enrolment ratio of kids in pre-primary education = Total gross enrolment pre-primary education, regardless of age, expressed as a percentage of the official pre-school-age population in a given school-year.
  Source: Comparative Family Benefits Database (Gauthier 2002) und ab 1999 UNESCO Data Centre (http://stats.uis.unesco.org).
- Family allowances for 1st child (PPP in US $).
  Source: Comparative Family Benefits Database (Gauthier 2002).
- Maternity/parental leave duration (in weeks).
  Source: Comparative Family Benefits Database (Gauthier 2002).
- Maternity/parental leave benefits (expressed as a percentage of women's wages in manufacturing).
  Source: Comparative Family Benefits Database (Gauthier 2002).

Figure 1: Correlation between fertility and female employment in 16 European countries, 1960-2005

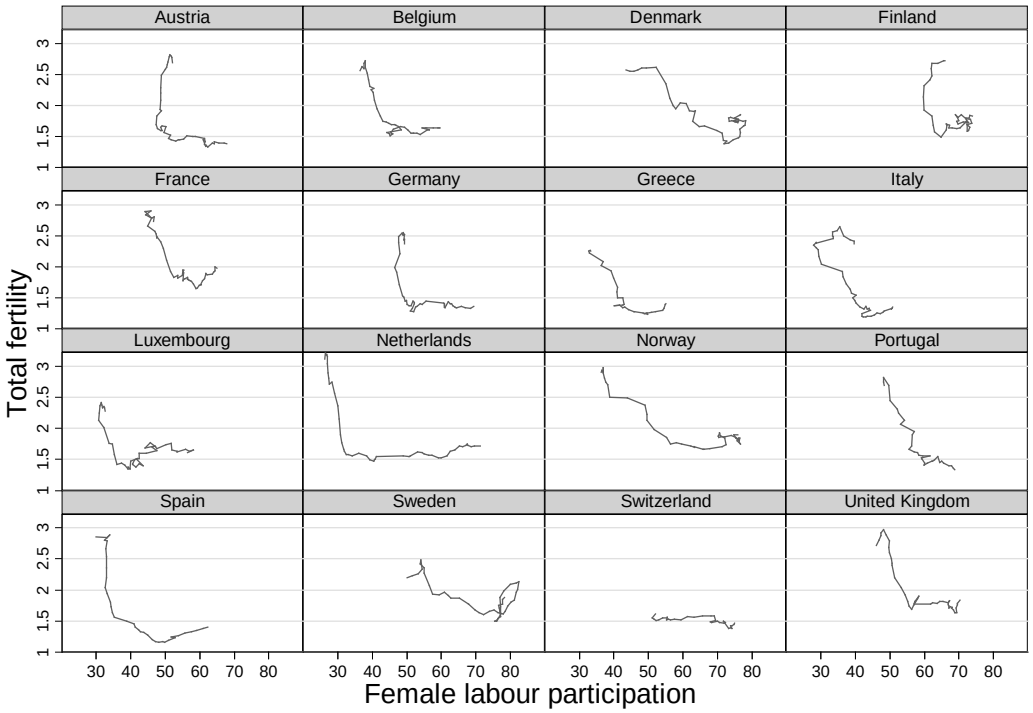
Data: See Appendix; own calculations

Figure 2: Fertility and female employment in selected years between 1960 and 2005 in 16 European countries; estimated linear relationship and 95%-confidence intervals



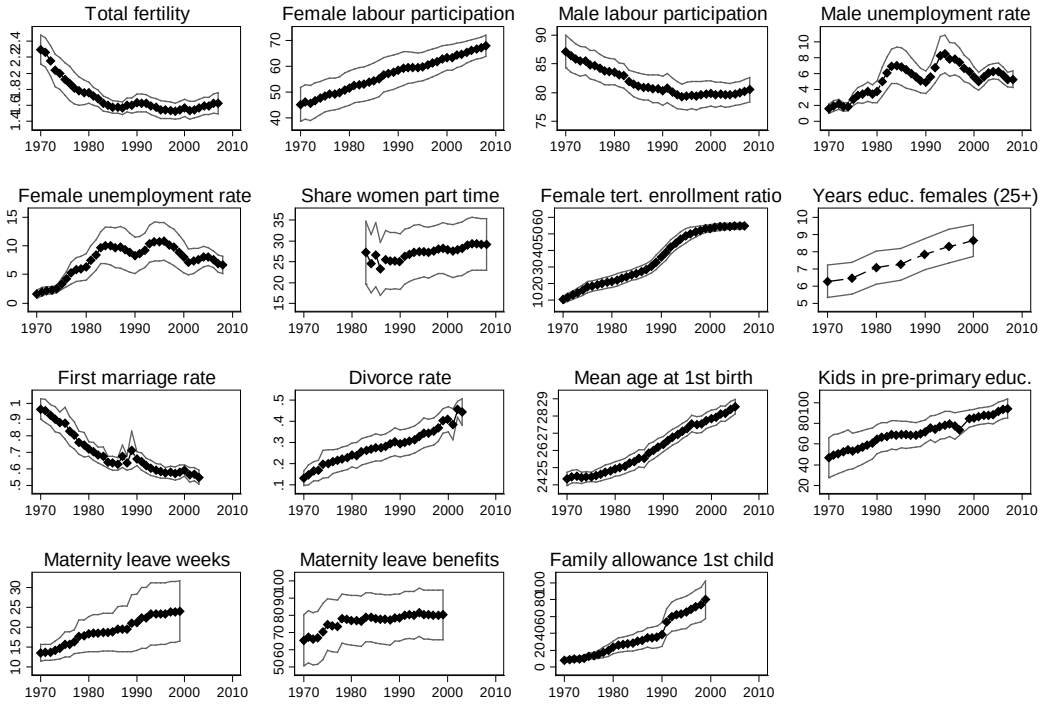
Data: See Appendix

Figure 3: Time-series association between fertility and female employment from 1960 to 2005 in 16 European countries



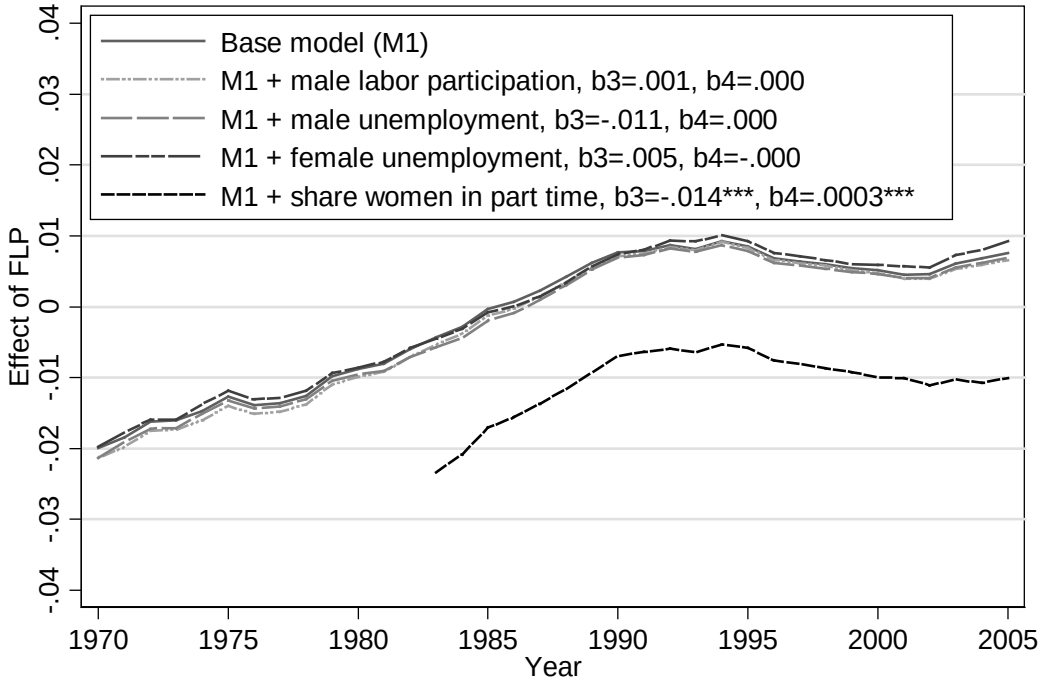
Data: See Appendix

Figure 4: Pooled time series of selected social indicators in 16 European countries since 1970



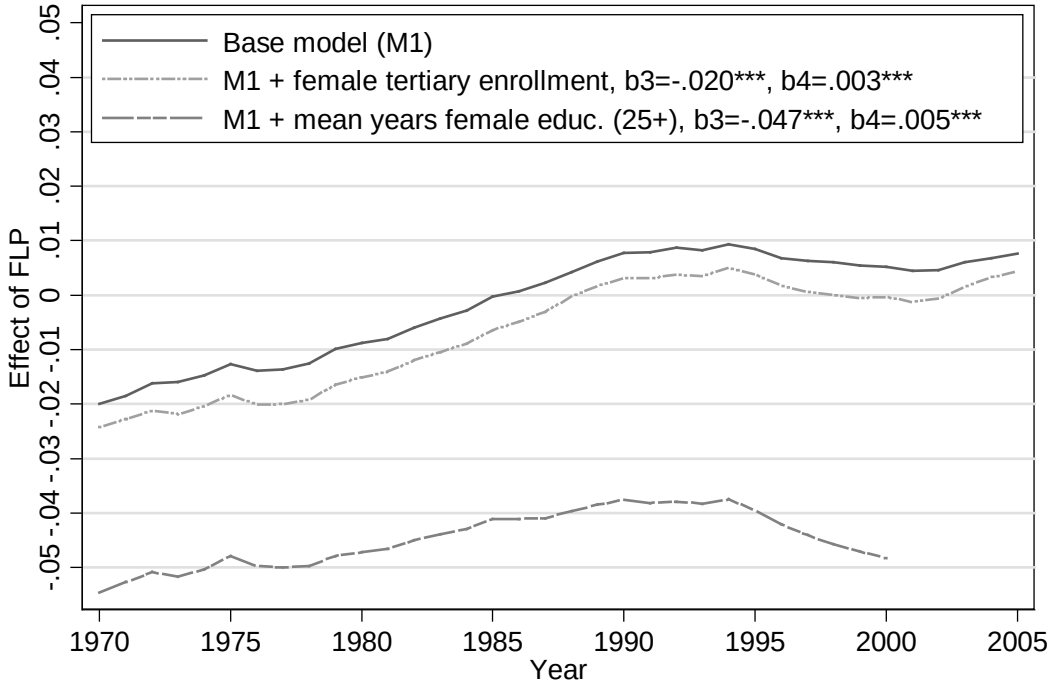
Data: See Appendix

Figure 5: Effect of female employment on fertility controlling for selected indicators from the labor market



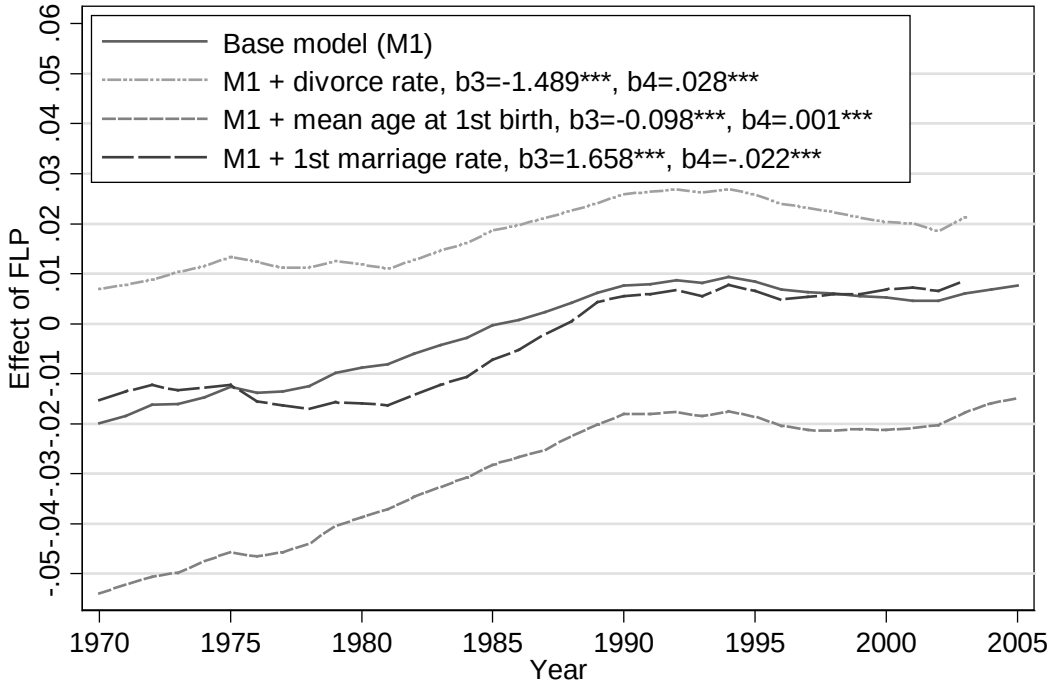
Note: *** p < .001
Data: See Appendix; own calculations

Figure 6: Effect of female employment on fertility controlling for selected indicators from the educational system



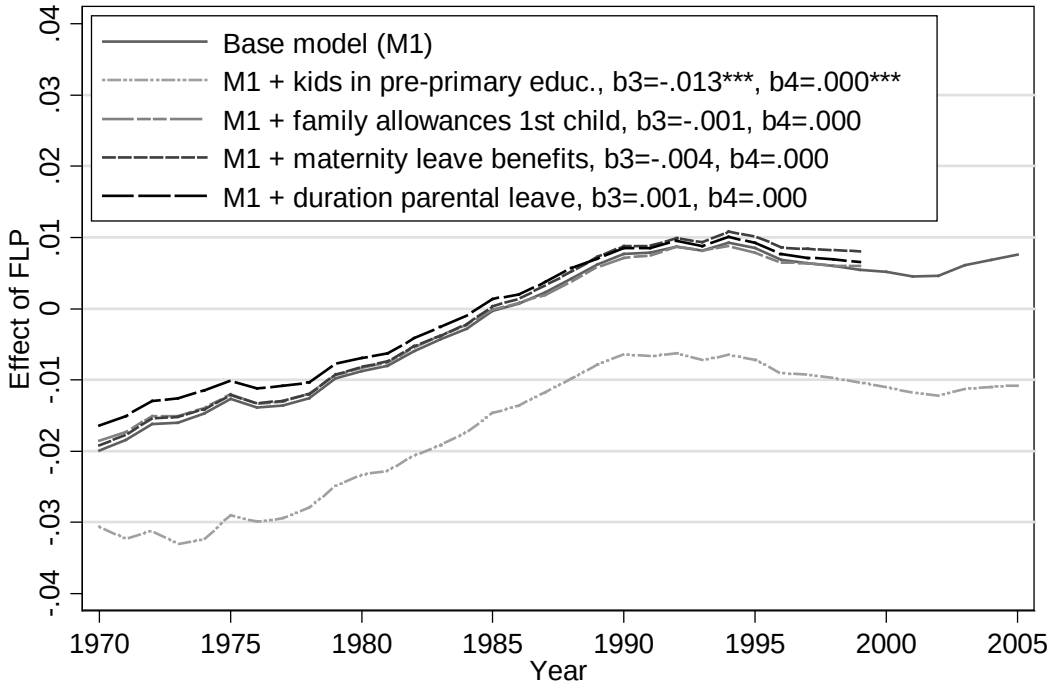
Note: *** p < .001
Data: See Appendix; own calculations

Figure 7: Effect of female employment on fertility controlling for selected demographic indicators



Note: *** p < .001
Data: See Appendix; own calculations

Figure 8: Effect of female employment on fertility controlling for selected policy indicators



Note: *** p < .001
Data: See Appendix; own calculations