"Economic and Political Challenges in view of Demographic Changes in Developed Countries"

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Abstract

Several macroeconomic studies suggest that fertility starts to re-increase with income in highly developed countries. We propose a deeper insight in the mechanisms behind income and fertility on both the macro and the micro level. First, we analyze the impact of the decomposition variables of GDP per capita on total fertility rates in order to find out more about the driving motor of the fertility rebound in highly developed OECD countries. Second, we analyze the impact of aggregated measures of family policy instruments on total fertility in OECD countries (OECD Family Data Base). In a third step, we propose a first descriptive insight in the microeconomic mechanisms behind the pattern between income/education and fertility by focusing on individual fertility decisions. We analyze in how far birth postponement behaviour differs between women of divergent socio-economic categories. Based on the French Family Budget Database (BdF, 2006) and the German Socioeconomic Panel (GSOEP, 2010), we compare completed cohort fertility rates among different education and income groups (focus on quantum-aspects of fertility) and then analyze birth postponement behaviour of women (focus on tempo-aspects of fertility).

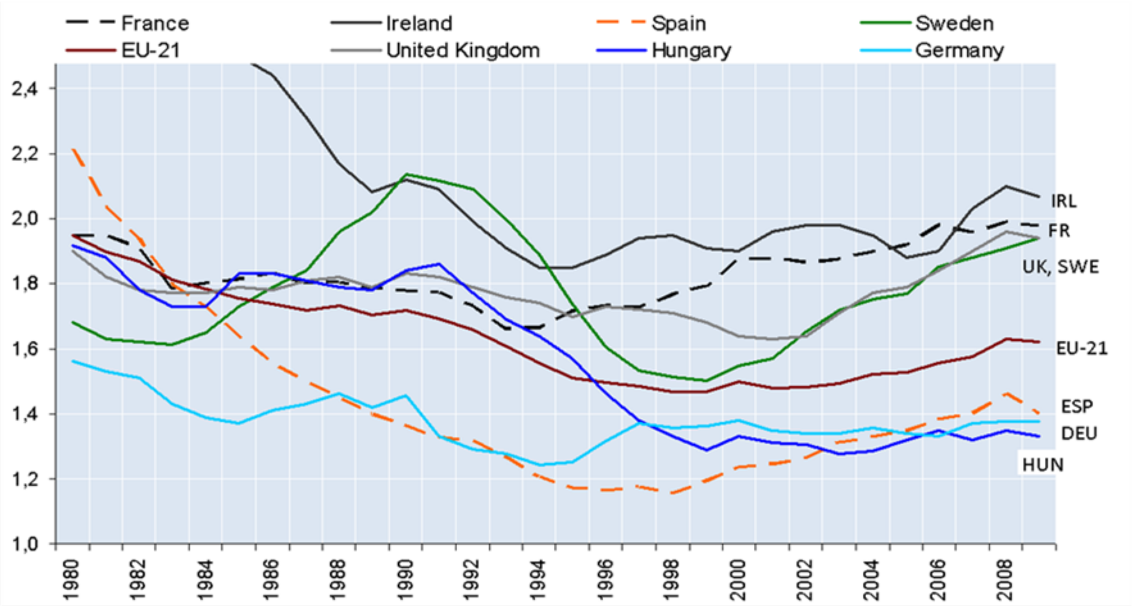
Keywords: fertility rebound, work-life balance, family policies, quantum fertility, tempo effects, completed cohort fertility, female employment

JEL: J11, J18

1. Introduction

Fertility, measured by the total fertility rate declined sharply in all OECD countries between 1960 and 2008, falling below the replacement level of 2.1 children per woman. "Lowest-low" fertility countries, e.g. with TFR below or around 1.3 on average since 2000, include Austria, Czech Republic, Germany, Greece, Hungary, Poland, Portugal, Slovak Republic, Spain and Switzerland, Korean and Japan.

Figure 1: Fertility Trends in selected European countries



Source : OECD Family Data Base (2010)

However, if we look separately at the periods before and after 1995, we see that after falling steadily until that year, fertility has since rebounded slightly in some countries. On average in OECD countries, fertility has risen from 1.69 children per woman in 1995 to 1.71 in 2008. The fertility rebound is especially large in France, Sweden, the United Kingdom and Ireland.

During the first period, the drastic decline in fertility was accompanied with increases in average income levels. At the same time, the re-increase of fertility, which can be observed for some countries during the second period, also comes along with continuing economic development.

This reversal of the fertility trend along the process of economic development in certain highly developed countries suggests that the impact of income on fertility is not strictly negative but ambiguous. Knowing whether and why, from a certain advanced level on, economic advancement is likely to provoke a rebound of fertility, is of major political, social and economic interest. As fertility affects population growth and the age structure of the population, changes in fertility in the immediate future have far-reaching consequences on economic development, productivity growth and aspects of welfare systems.

Myrskylä, Kohler and Billari (2009)[1] found a so-called "inverse J-shaped" relationship between the human development index (HDI) and total fertility rates for over 100 countries, suggesting a fertility rebound from a certain level of human development on. However, the use of a composite measurement of human development masks the particular contributions of each of the indicator's components (GDP per capita, life expectancy and school enrolment).

We want to know which component of development is likely to provoke a fertility-rebound in highly developed countries, and we want to know more about the intermediate and underlying mechanisms.

A closer look at the separate HDI components for OECD countries shows that for this limited group of countries, the variation is greatest for GDP per capita in comparison with life expectancy and school enrolment. This suggests that in OECD countries, changes of GDP per capita are more important for fertility variations than changes in life expectancy or school enrolment.

Therefore, we first empirically test a convex impact of GDP per capita on fertility, using data for 30 OECD countries that spans the years 1960 to 2007. In order to identify the driving factors behind the fertility rebound observed in several highly developed countries, we then decompose GDP per capita and estimate the impact of labour productivity, working hours and employment on fertility while taking into account the gender composition of each of these possible determinants[2].

In a second step, we analyze the extent to which the development of government policies towards families with children contributes to the re-increase in fertility trends. We use data for a period going from 1980 to 2007 (OECD Family Data Base) for 18 OECD countries

[1] Myrskylä, M., Kohler, H.P., Billari, F. (2009). Advances in development reverse fertility declines. *Nature*, 460(6), doi:10.1038/nature 08230.

[2] This part of the document contains unpublished results based on: A. Greulich Luci, O. Thévenon (2010): *"Does economic development drive the fertility rebound in OECD countries?"*, INED Working Paper n° 167.

(Denmark, Netherlands, Spain, Norway, Sweden, Portugal, France, New Zealand, Belgium, United States, Italy, Japan, Australia, United Kingdom, Ireland, Finland, Germany, Austria)[3].

In a third step, we propose a first descriptive insight in the microeconomic mechanisms behind the pattern between income/education and fertility by focusing on individual fertility decisions. We analyze in how far birth postponement behaviour differs between women of divergent socio-economic categories. For reasons of data availability (demographic variables, income, partner's income, education, occupation, social transfers on the household and individual level…) we limit our analysis to two European countries, which are Germany and France. In comparison to other European countries, Germany and France very similar in terms of socioeconomic functioning and demographic weight, but their fertility rates differ largely (both in terms of quantum and tempo). We first compare completed cohort fertility rates among different education and income groups (focus on quantum aspects of fertility) and then analyze birth postponement behaviour of women (focus on tempo aspects of fertility) based on the French Family Budget Database (BdF, 2006) and the German Socioeconomic Panel (GSOEP, 2010).

2. The impact of aggregated income on fertility in OECD countries

In order to identify the driving factors of the fertility rebound in OECD countries, we first analyse the impact of aggregated income and its components on total fertility rates. We want to know whether increases in GDP per capita go hand in hand with the recent fertility upswing that can be observed in some highly developed countries and if yes, what elements behind GDP drive the fertility rebound.

For testing whether the impact of GDP per capita on fertility is linear or non-linear in OECD countries, we use a macroeconomic panel data set that includes a large time dimension. As the variables vary over two dimensions, estimators are more accurate as they distinguish between within- and between-country variations. In addition, the time dimension of the data enables us to control for unobserved country-specific effects and to deal as well as possible with endogeneity caused by an inverse causality between economic development and fertility.

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[3] This part of the document contains results based on: A. Greulich Luci, O. Thévenon (2013): "The impact of family policy packages on fertility trends in developed countries", *European Journal of Population*, forthcoming.

Alternative specifications are tested to measure the effect of an increase in GDP per capita on fertility, including models with linear as well as non-linear specifications. This allows testing for a change in the magnitude or sign of the relation between per capita GDP and fertility levels. By applying pooled OLS with robust standard errors, a linear specification is first estimated, with total fertility rate (TFR) as endogenous variable and the log of GDP per capita (lnGDPpc) as exogenous variable. Then, we test an "exponential" specification where the log of total fertility rates (lnTFR) is modelled as a function of GDP per capita (GDPpc). A third specification with TFR expressed as a quadratic function of the log of GDP per capita is estimated. This model allows for a change in the sign of the effect of an increase in GDP per capita on fertility levels, which is compatible with a reversal of fertility trends. The robustness of the quadratic model is then checked by applying a Fixed Effects estimation with robust standard errors, which allows capturing unobserved time-constant variables which may affect fertility (i.e. country-specific characteristics linked to historical geography, population build-up or certain norms/attitudes, etc.). Controlling for these country-specific factors also moves the focus on within-country variations, so as to assess the impact of GDP per capita increases on fertility over time. Subsequently, to further test the existence of a nonlinear relation and -more precisely- to identify a structural break in the correlation between the two variables, we express total fertility rates as a piecewise linear function of GDP per capita by applying Fixed Effects with robust standard errors. Estimation results are presented in table 1.

Table 1: The convex impact of economic development on fertility in OECD countries

Type of regression:	Pooled OLS (robust SE)	Pooled OLS (robust SE)	Pooled OLS (robust SE)	Fixed Effects (robust SE)	Fixed Effects (robust SE)
Endogenous variable:	***TFR***	***lnTFR***	***TFR***	***TFR***	***TFR***
Specification:	linear model	exponential model	quadratic model	quadratic model	piecewise regression
Regressors:					
GDPpc		-0.0000166***			
		(-11.30)			
lnGDPpc	-1.013***		-15.63***	-16.94***	
	(-14.38)		(-9.45)	(-13.85)	
lnGDPpc²			0.760***	0.815*** £	
			(9.09)	(13.28)	
lnGDPpc (pre 10)					-2.02***
					(-24.30)
lnGDPpc (post 10)					0.13**
					(3.08)
constant	11.87***	0.943***	81.92***	89.99***	19,9***
	(16.89)	(28.57)	(10.02)	(14.77)	(-0,73)
N	1050	1050	1050	1050	1050
nb. of countries:	30	30	30	30	30
time period:	1960-2007	1960-2007	1960-2007	1960-2007	1960-2007
R²:	0.359	0.200	0.460 (overall)	0.542 (within)	0,544 (within)
R² adj.:	0.359	0.200	0.459	0.542	0,544
estim. minimum lnGDPpc:			10.28	10.39	10
estim. minimum GDPpc US$ (PPP):			29 228	32 600	22 000
estim. minimum TFR:			1.56	1.51	

t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001

£ Interpretation of the estimated coefficients of *lnGDPpc* and *lnGDPpc²* (Fixed Effects):

The opposite signs of the of the coefficients of lnGDPpc (negative) and of lnGDPpc² (positive) implies a convex impact of lnGDPpc on TFR. Total fertility rates are predicted to follow an U-shaped pattern along the process of GDP per capita increases. The minimum of this curve is situated at a GDP per capita level of 32 600 US$ PPP (lnGDPpc 10.39) and a TFR level of 1.51. This implies that at GDP per capita levels lower than 32 600 US$, an increase in GDP per capita is predicted to lead to a decrease in TFR. At GDP per capita levels above 32 600 US$, an increase in GDP per capita is predicted to lead to an increase in TFR. .

In comparison to the linear and the exponential specification (column 1 et 2), the goodness of fit (R^2) is highest for the quadratic model (column 3). The quadratic model allows a change in the sign of the association between GDP per capita and TFR. The fact that the estimated coefficient for $lnGDPpc^2$ is significantly positive reveals the existence of a minimum point in the relation between TFR and lnGDPpc. This suggests that the correlation between total fertility rates and GDP per capita is first negative up to certain threshold level of GDP per capita and then turns into positive for higher levels of GDP per capita.

The quadratic specification is then tested by a Fixed Effects estimation (column 4), which confirms a convex impact of GDP per capita on TFR. The fact that the FE regression results are significant indicates that the hypothesis of a convex impact of lnGDPpc on TFR is confirmed also when focusing only on within-country variation over time (and not caused by cross-country distortions). The higher goodness of fit as well as the higher significance of the Fixed Effects estimation compared to a Between Effects estimation (not presented here) suggests that the convex impact of economic development on fertility is actually dominated by within-country variation.

For the quadratic model,   the FE estimation results indicate that the critical GDP per capita level is located at US$ 32 600 (PPP) and a fertility level of 1.51 children per woman. This suggests that economic development decreases fertility until a relatively high income level, but from US$ 32 600 (PPP) on, economic growth is associated with a rebound of fertility. Slightly lower estimates of these critical values are given by the pooled OLS estimation , with a minimum TFR estimated at 1.56 and a corresponding GDP per capita at US$ 29 230 (PPP) for the quadratic model.

Results of the piecewise linear regression (with Fixed Effects) also confirm the change from a negative association between economic advancement and aggregated fertility levels to a positive relations from a certain level of GDP per capita onwards (column 5). Note that the convex impact of economic development on fertility is found robust when controlling for birth postponement (tempo adjusted fertility as endogenous variable and mean age of mothers at childbirth as exogenous variable – results are not shown here).

We illustrate the FE results of the quadratic model (column 4), as the quadratic model gives information about the estimated breakpoint levels of GDP per capita *and* TFR. Figure 2 compares the estimated pattern between GDP per capita and TFR with true within-country variations of selected OECD countries.

Figure 2: FE estimation (based on 30 countries, 1960-2007) against observed within-country variation in France, Germany, Portugal, the Czech Republic and the USA

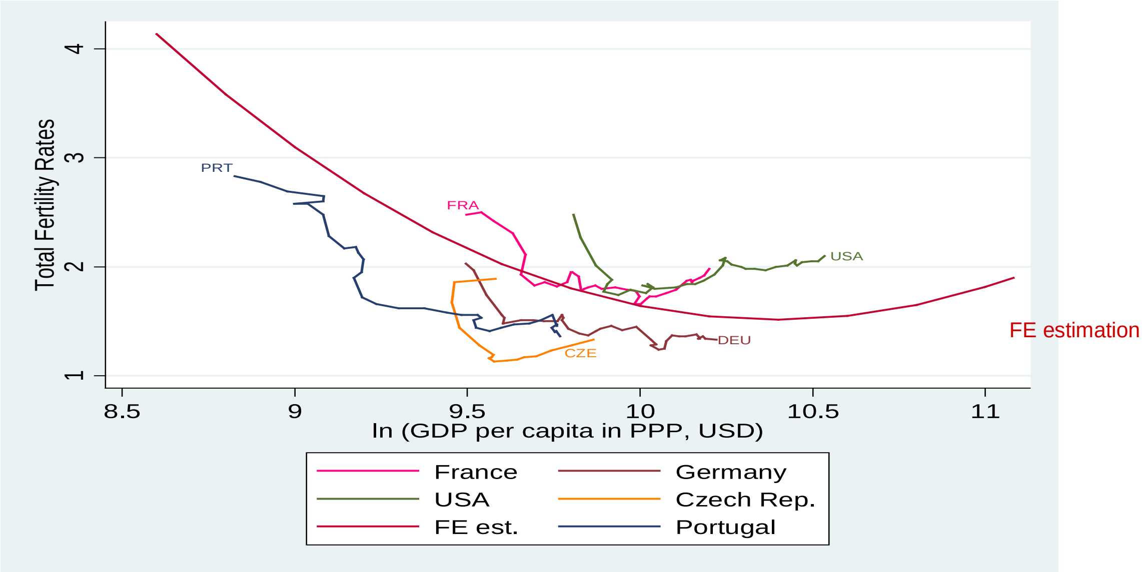


Figure 3 illustrates the cases of countries which mostly deviate from the expected path concerning the level of fertility. However, irrespective of periodical fluctuations, the pattern between fertility and income is rather inverse J-shaped in all these countries, which confirms that economic growth decreases fertility up to a certain relatively high level of income, and then increases it. The critical level of GDP per capita actually varies from country to country, these differences being smoothed by the FE estimation. The fertility rebound coming hand in hand with a certain level of economic development is particularly observable in France, the United States and the Czech Republic, whereas in Germany and Portugal, the impact of immediate further economic growth on fertility is quite inconclusive. It is striking that the German pattern is almost parallel to the French one. This means that in these two countries, changes in fertility are almost identically related to changes in income. Yet, the German pattern as a whole is situated on a much lower fertility level than the French one. Moreover, recent economic growth (on highest GDP per capita levels) has induced a much more significant fertility rebound in France than in Germany.

We conclude from figure 2 that the empirical analysis does not succeed in explaining why in some OECD countries, the inverse J-shaped pattern is situated at quite different fertility levels. Moreover, we do not know why in some countries, economic growth increases fertility more significantly than in other countries. It seems that other factors beyond economic advancement are responsible for the relatively high fertility levels and the significant fertility rebound that occurred already at relatively low GDP per capita levels.

To get a deeper insight in the economic mechanisms behind fertility increase, we decompose *GDP per capita* into its standard components, which are labour productivity, average working hours per worker, employment rates and the ratio of the active population. We take into account the gender disaggregation of the component variables. Because we are now particularly interested in the specific determinants of the fertility *rebound*, and also because of limitation in data availability, we focus on linear impacts of the decomposition variables on fertility and consider the time period 1995 to 2007 by applying the FE model. Table 2 shows the regression results

Table 2: GDP- Decomposition (1995 – 2007)

Type of regression:	Fixed Effects (robust SE)			
Endogenous variable:	**total fertility rate *(TFR)***			
Specification:	linear model			
Regressors:				
lnGDPpc	-9.226***			
	(-6.41)			
lnGDPpc^2	0.456***			
	(6.32)			
ln(labour productivity)		-0.219***	-0.252***	-0.160***
		(-3.48)	(-4.74)	(-3.29)
ln(avrg. hrs. per worker)		-0.380	-0.524	
		(-0.72)	(-1.21)	
ln(avrg. hrs. per worker men)				0.366
				(1.40)
ln(avrg. hrs. per worker women)				-0.951**
				(-2.91)
ln(employment ratio)		0.632***		
		(4.02)		
ln(employment rate 25-54)			1.392***	
			(7.79)	
ln(employment rate 25-54 men)				0.553
				(1.72)
ln(employment rate 25-54 women)				**0.520*** **
				(3.61)
ln(ratio active population)			-1.785***	
			(-7.78)	
ln(ratio active population men)				3.150***
				(2.57)
ln(ratio active population women)				-4.986***
				(-3.79)
constant	48.43***	2.945	7.987**	9.594**
	(6.74)	(0.67)	(1.87)	(2.64)
N	368	356	356	315
nb. of countries:	30	30	30	27*
time period:	1995-2007	1995-2007	1995-2007	1995-2007
R^2 (within):	0.232	0.091	0.327	0.326
R^2 adj.:	0.161	0.001	0.259	0.247

t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001

+ OECD countries without: Japan, Turkey, USA

Column 1 of table 2 shows that economic development measured by GDP per capita continues to have a convex impact on fertility when limiting the observed time period to the years 1995 to 2007. This may be due to the fact that the different components of GDP have ambiguous linear impacts on TFR. In fact, decomposing GDP per capita shows that labour productivity and the ratio of the active population is significantly negatively correlated with fertility, while the employment variables are positively correlated with fertility (columns 2-4). Among the employment variables, it is particularly women's employment (observed for women aged 25 to 54 – column 4) that has a significantly positive impact on TFR, pointing to the fact that female employment is a key factor for the fertility rebound in OECD countries. Countries with increasing female employment rates are thus likely to experience a fertility rebound. However, unobserved factors may play an important role for the positive within-country association between female employment and fertility, as for example increasing investments in policies supporting the compatibility of family and career for women. This consideration is supported by our finding that women's average working hours are negatively associated with fertility: long average working hours negatively affect the aggregated rate of fertility, in spite of a positive association between this latter and female employment rates. This suggests that institutions increasing the compatibility between women's labour market participation and childbearing play an important role for the positive association between female employment and fertility.

To date, high female employment rates (ages 25-54) over 80% along with high fertility rates can especially be observed in Finland, Norway, Sweden, Denmark and Iceland. These are countries with high income levels and high public assistance to working parents with young children at the same time. Parental leave schemes are comparatively generous and child care services are also provided area-wide. English-speaking countries support a combination of work and child rearing mainly by in-work benefits, flexible working hours, and both in-cash and in-kind support which target primarily low-income families and preschool children. In contrast, those countries with low fertility and female employment levels, like Eastern and Southern European countries or Germany, are characterised by a relatively low support for work and family reconciliation. France contrasts with these countries with higher female full-time employment rates and at the same time higher fertility rates than Germany, even though Germany has somewhat higher GDP levels. A key difference stands also in the support granted to households with children under preschool to combine work and family. Thus, our results suggest that changes in the impact of economic development on fertility reflect changes in institutional patterns helping parents to balance work and family life. For this reason, we propose a focus on the impact of family policies on fertility in OECD countries.

3. The impact of family policies on fertility in OECD countries

We now analyse the extent to which the development of government policies towards families with children in the last decades has contributed to the re-increase in fertility trends. The main novelty of our assessment lies in the effort to take into account whole family policy packages, and to identify the respective influence of each item of in-cash and in-kind support. An original dataset has been elaborated for this for a period going from 1980 to 2007 (OECD Family Data Base) for 18 OECD countries (Denmark, Netherlands, Spain, Norway, Sweden, Portugal, France, New Zealand, Belgium, United States, Italy, Japan, Australia, United Kingdom, Ireland, Finland, Germany, Austria). We empirically assess the influence of family policies on fertility trends by considering three main types of policy instruments (cash transfers, parental leave and childcare). Spending in-cash is divided in two sets to identify separately the support granted around childbirth and those which flows to cover the later cost of raising children. Child care is divided in measures for spending and coverage.

We perform a two-way Fixed Effects estimator with country and time fixed effects and country-specific linear time trends, and we integrate female employment rates and women's average working hours as exogenous variables. We control for these variables, as the measured impact of family policies on fertility risks will be biased if policies affect female employment and women's working hours, which are correlated with fertility. We also check whether the effects of policies are the same in all countries, or dependent on their overall "welfare state" context. It might be the case that the effect of policies varies with the broad context of Welfare States which assign different roles to men and women and to public policies in providing welfare to families (Esping-Andersen[4], 1999; Thévenon, 2011[5]). In order to investigate such possible heterogeneity, we run regressions that include interactions with country-clusters taken from the categorization of family policy regimes provided by Thévenon (2011). Country-dummies are thus replaced by dummies for four different patterns identified from the combination of a large range of key dimensions of family policies (English-speaking, Southern European, Nordic and Continental Welfare States), and then interacted with each of the policy variable. Therewith, we take into account multiplicative

[4] Esping-Adersen, G. (1999): "*The Social Foundtions of Postindustrial Economies*". Oxford University Press, 1999.

[5] Thévenon, O. (2011): "*Institutional settings of having children: a comparison of family policy development across Europe*", in Koblas J., Liefbroer A., and D. Philipov (eds), Reproductive Decision-making in a Micro-Macro Context, Springer, forthcoming.

interactions between family policy variables and their context of implementation. The estimated impact of policy variables is thus assumed to be conditional on countries' Welfare State context, whereas Continental Welfare States serve as reference category.

Table 3: The conditional impact of family policies on fertility (1982 – 2007)

Endogenous variable:	total fertility rate (*TFR*)		
Regressors:			
spending on cash benefits per child (%GDPpc) *(ref. cat.: « Continental » Welfare*	0.017*	0.015*	0.008
	(2.47)	(2.53)	(1.43)
Deviation from ref. cat. of « English-speaking » Welfare States	-0.022**	0.0107	0.021*
	(-2.92)	(1.02)	(2.13)
Deviation from ref. cat. of « Southern European » Welfare States	0.094***	0.116***	0.067*
	(8.10)	(4.49)	(2.31)
Deviation from ref. cat. of « Nordic » Welfare States	0.063***	0.058	0.055***
	(4.23)	(4.14)	(4.08)
spending per birth around childbirth (%GDPpc) *(ref. cat.: « Continental »*	0.004***	0.003**	0.002**
	(4.01)	(3.33)	(2.57)
Deviation from ref. cat. of « English-speaking » Welfare States	-0.022*	-0.011*	-0.005
	(-2.48)	(-2.00)	(-1.61)
Deviation from ref. cat. of « Southern European » Welfare States	-0.031***	-0.025***	-0.018***
	(-5.08)	(-5.00)	(-3.84)
Deviation from ref. cat. of « Nordic » Welfare States	-0.003	0.007**	-0.003
	(-1.40)	(-3.23)	(-1.69)
nb. paid leave weeks *(ref. cat.: « Continental » Welfare States)*	-0.000***	-0.000***	-0.000***
	(-3.43)	(-4.03)	(-4.32)
Deviation from ref. cat. of « English-speaking » Welfare States	0.000	-0.000	-0.001
	(0.24)	(-0.39)	(-1.00)
Deviation from ref. cat. of « Southern European » Welfare States	-0.003**	-0.000	0.001
	(-2.88)	(-0.52)	(1.25)
Deviation from ref. cat. of « Nordic » Welfare States	0.001***	0.000	0.003***
	(4.29)	(0.76)	(4.98)
enrolment young children (0-2) in childcare *(ref. cat.: « Continental » Welfare*	0.0142***	0.016***	0.016***
	(9.89)	(15.74)	(15.07)
Deviation from ref. cat. of « English-speaking » Welfare States	-0.015***	-0.013***	-0.007
	(-4.99)	(-4.57)	(-1.28)
Deviation from ref. cat. of « Southern European » Welfare States	-0.015***	-0.015***	-0.016***
	(-7.71)	(-10.08)	(-9.99)
Deviation from ref. cat. of « Nordic » Welfare States	-0.005*	-0.008***	-0.010***
	(-2.47)	(-4.50)	(-6.07)
spending on childcare services per child (0-2) (%GDPpc) *(ref. cat.:*	0.006	0.004**	0.001
	(3.12)	(2.61)	(0.96)
Deviation from ref. cat. of « English-speaking » Welfare States	-0.002	-0.009*	-0.007*
	(-0.57)	(-2.25)	(-2.25)
Deviation from ref. cat. of « Southern European » Welfare States	0.000	-0.001	-0.001
	(-0.16)	(-0.82)	(-0.79)
Deviation from ref. cat. of « Nordic » Welfare States	-0.012**	-0.0131***	-0.003
	(-3.96)	(-4.58)	(-1.30)
female employment rate (25-54) *(ref. cat.: « Continental » Welfare States)*	..	-0.002	0.001
	..	(-1.36)	(0.51)
Deviation from ref. cat. of « English-speaking » Welfare States	..	..	-0.011
	..	..	(-1.35)
Deviation from ref. cat. of « Southern European » Welfare States	..	..	-0.000
	..	..	(-0.12)
Deviation from ref. cat. of « Nordic » Welfare States	..	..	-0.005
	..	..	(0.25)
women's avr. working hours *(ref. cat.: « Continental » Welfare States)*	..	0.0006***	0.0008***
	..	(5.01)	(5.99)
Deviation from ref. cat. of « English-speaking » Welfare States	..	..	0.000
	..	..	(0.25)
Deviation from ref. cat. of « Southern European » Welfare States	..	..	-0.000
	..	..	(-0.11)
Deviation from ref. cat. of « Nordic » Welfare States	..	..	-0.0018***
	..	..	(-6.81)
N	274	228	228
nb. of countries:	18	18	18
time period:	1982-2007	1982-2007	1982-2007

Cash family benefits and childcare enrolment are the main variables positively associated with fertility in Continental Welfare States. A significantly positive (respectively negative) deviation coefficient implies that the effect of a policy instrument on fertility is higher (respectively lower) in a country of a certain Welfare State type in comparison to Continental Welfare States. Most of the estimated deviation coefficients appear to be different from zero, which shows that effects of policy measures are quite heterogeneous across countries with different Welfare State types. For example, spending on cash benefits appears to be more important for fertility in South Europe than in the reference category "Continental". This suggests that the provision of support in-cash is especially effective in countries where the average income level is comparatively quite low and where the support to families is overall more restricted than in the other areas.

The impact of spending per birth around childbirth on *TFR* appears to be positive but quite marginal for Continental countries and lower in the Anglophone and especially the Southern areas. By contrast, the effect is larger in the Nordic block when controlling for female employment. Possibly because female employment rates are relatively high and leave payment is earning-related in Nordic countries, we find that spending per birth around childbirth has a more effective influence on fertility behaviour in this area (as well as the number of paid leave weeks).

The influence of the duration of paid leave on fertility is found to be quite marginal in Continental countries with no important deviations for other country clusters. The effect of the coverage of childcare services for children under age three on fertility rates is found positive and strong in Continental countries (and more important than spending on child care services), but weaker in the Nordic and Southern areas. This finding reveals the role of idiosyncratic characteristics attached to the different Welfare State contexts which seem to affect the effectiveness of policies. Thus, fertility rates are more sensitive in Continental countries than elsewhere to the provision of childcare services for young children. By contrast, fertility seems to respond more to spending in cash benefit than to the provision of paid leave and of childcare services after childbirth in South European countries (a possible explanation being that fertility behaviours may be primarily responsive to in-cash transfers in countries with comparatively low income per inhabitant). Finally, weeks of paid leave appear to play a more significant and positive role in Nordic countries, where both female employment rates and service coverage rates for the young children are higher than in most other countries, and where leave is paid for shorter periods than in many countries of continental Europe.

When combining family policies with female employment and women's working hours, we find that all policy instruments (paid leave, childcare services and financial transfers) have a cumulative positive influence on fertility, suggesting that a continuum of support, especially for working parents, during early childhood is likely to facilitate parents' choice to have children. Nordic European countries and France are examples of this mix. Policy levers do not have similar weight, however. We find that in-cash and in-kind benefits covering the first year after childbirth have a larger potential influence on fertility than leave entitlements and benefits for childbirth. Certain unobserved factors influence fertility behaviour by enhancing the effectiveness and coherence of the family policy mix. Our results suggest that the effect of each policy measure on fertility varies with the Welfare State contexts which provide a more or less comprehensive support to households making the decision to have children and/or to combine work and family life. It also suggests that the relative influence of policy variables will vary all together, with for example, the provision of childcare facilities for children under age three having a larger influence in the continental area where the support in-cash is relatively advanced. Similarly, fertility rates are more sensitive to the duration of paid leave in Nordic countries where female employment rates and the provision of childcare services are higher than in most other countries. Other factors which are not identified may also have a role if they ensure that policy instruments support effectively parents' work-life balance, for example by avoiding a gap in the sequence of support between the expiry of leave entitlements and the provision of childcare services, by providing childcare services that match parents' working hours, or by guaranteeing a stability of policies over time.

Even though all presented results are robust when substituting TFR with tempo-adjusted total fertility rates and when controlling for the mean age of mothers at childbirth, the applied controls for birth postponement are imperfect. The interpretation of the results is thus limited by the fact that variations in TFR are a consequence of both changes in fertility timing and in the total number of children, and tempo-adjusted fertility rates provide debatable estimates of variations in fertility "levels". More accurate controls are necessary to be able to identify the pure quantum effect of economic advancement, female education and labour market participation and family policies on fertility. The use of individual observations facilitates these controls. Micro data can reveal when and why, in a life cycle perspective, parents are encouraged or discouraged to have children in comparison to other parents of different socio-economic backgrounds.

The differentiated effects of family policies on age-specific fertility are left to future exploration. However, the present paper proposes a first descriptive insight in the differentiated birth postponement process of women for two antithetic European countries - France and Germany.

4. Quantum and timing of fertility in France and Germany

Our analysis shows that after a long decline in fertility rates along the process of economic development, fertility starts to re-increase in those countries that succeed combining economic progress with female employment and work-life balance policies. So far, we only considered macro-level factors of the fertility rebound. It is still unclear how the influence of these macro-level factors varies with individual characteristics.

Therefore, we first test how fertility is linked with income and education levels of women being at the end of their childbearing age. Then, we analyze in how far birth postponement varies among women of different education and income groups. We use data from the French 'Budget des Familles' (BdF, 2006) and from the German Socioeconomic Panel (SOEP, 2010).

In the German SOEP survey, women are directly asked how many children they have, when they were born etc. Hence, even if these children are not observed as individuals in the survey, they are counted for. In the French BdF, only those children who still live in the household are observed and counted. The BdF contains information about the link between the household members, which allows distinguishing between biological children and other family/household members (stepchild, siblings, grandchildren, cousins etc.). However, no information is given about children living outside their mother's household (living with the ex-partner, already moved out…).

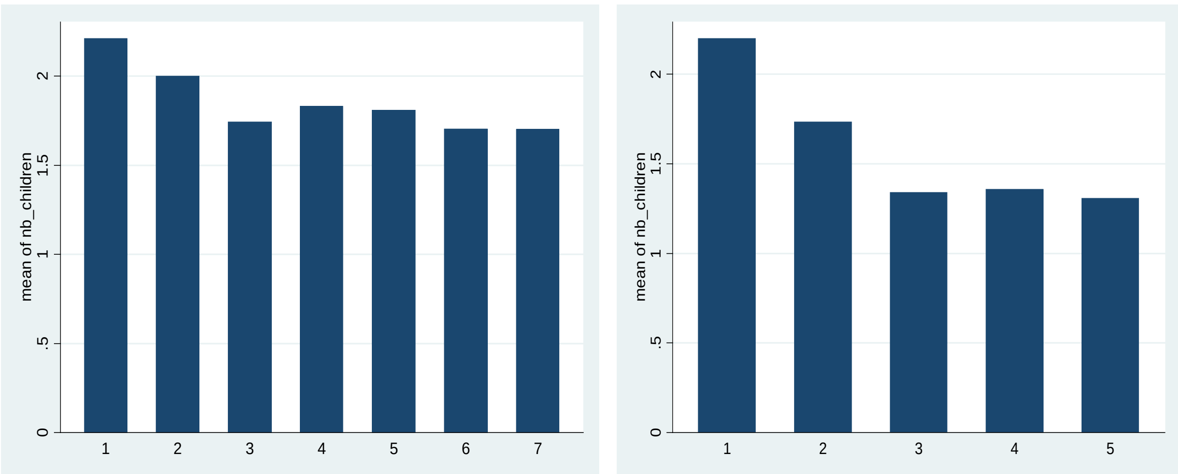
The purpose of this analysis is to focus on completed cohort fertility in order to properly distinguish between tempo- and quantum-effects. However, due to the shortcoming of the French data base, we do not observe women aged 45 or 50 years old, but those who are around their forties. This allows to limit the number of women who are observed 'childless' because their children have already moved out. For the French database, we drop those women for whom we know that children outside the household do exist (even if these children could be only the children of the women's partner). However, fertility rates for French women still risk being somewhat underestimated, as some women might be observed as 'childless' even though they have children living outside their household.

For both countries, we combine three cohorts instead of analyzing only one cohort, i.e. we observe women aged 39, 40, and 41, in order to increase the number of observations (for every cohort, only 200women are observed, for France as well as for Germany). Our final database contains 502 German and 518 French women, aged 39-41.

Figure 3 shows the weighted mean of the number of children per education category.

Figure 3: 'Completed' fertility per education category

France Germany



Budget des Familles 2006 GSOEP 2010

1: no diploma
2: etudes primaries, brevet college
3: CAP, BEP
4: baccalaureat pro
5: baccalaureat general (high school dipl.)
6: BTS, DUT
7: university degree

1: no diploma
2: Hauptschule
3: Realschule
4: Fachhochschule
5: Abitur (high school diploma)

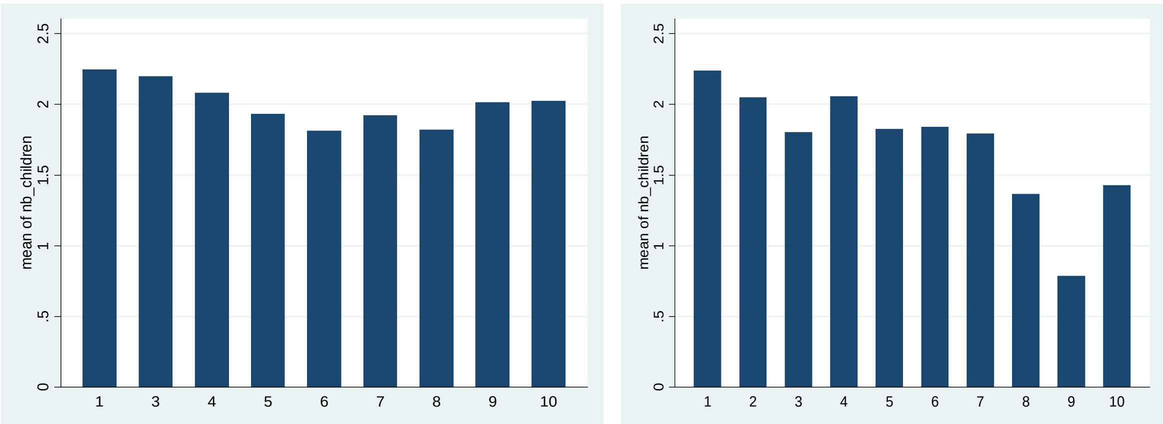
The BdF and the SOEP unfortunately do not use the same education codes, which is why the education categories are slightly different between the two countries.

In France as in Germany, women without any diploma have on average 2.2 children once they have almost completed their childbearing period. For both countries, women have less children the higher they are educated and the number of children is the smallest for the most educated women. However, the fertility difference between high and low educated women is much more striking in Germany than in France. In Germany, women with a high school diploma have on average 1.35 children (category 4 and 5), while in France, women with a high school diploma (category 4-7) have on average 1.75 children.

Table 4 shows the weighted mean of the number of children per income category (deciles based on the 3 cohorts for each country). We observe individual labor earnings of women and limit our analysis to the majority of women who are living with a partner in the same household. This limitation is a first attempt to control for partner income[6].

Figure 4: 'Completed' fertility per income category

France Germany



Budget des Familles 2006 GSOEP 2010

1-10: Income deciles based on women's individual labor earnings (only those living with a partner in the same household)

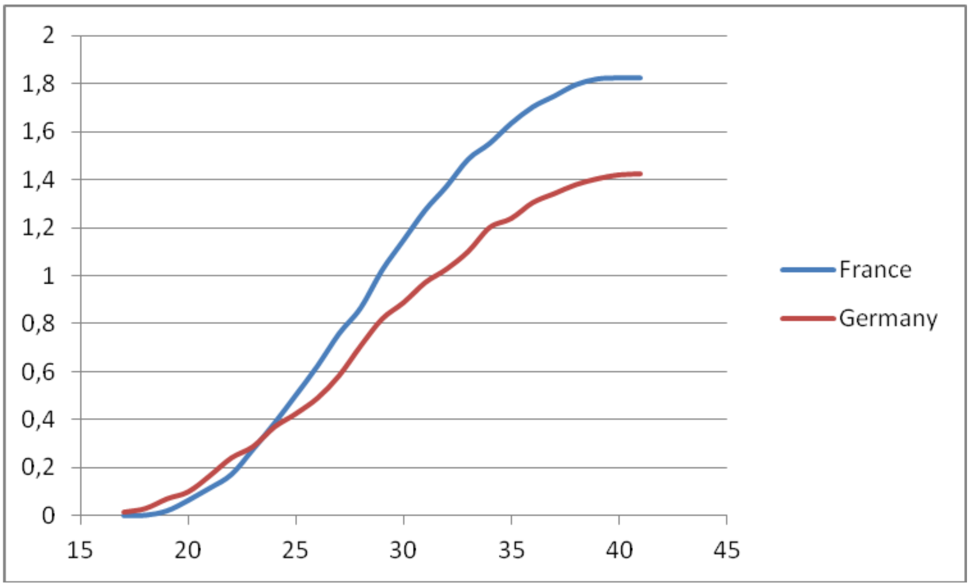
Once again we observe in both countries a similar high average number of children for the lowest category, i.e. women without earnings. At the same time, the fertility decrease that goes hand in hand with increasing income seems less drastic in France than in Germany. In addition, figure 4 suggests that the U-shaped pattern between fertility and income that was found on the macro-level can be confirmed for the micro level, with French women with high wages having significantly more children than German women.

[6] Work in progress: Analysis of the link between fertility and household income (women's and partner's income, wage and capital income, social transfers etc.) with a proper differentiation between lone mothers and mothers living with partners.

Tables 3 and 4 show that the quantum difference in fertility between Germany and France is high for well educated women and those with high wage incomes, whereas there exists in effect no difference in fertility levels for low educated women and those with no income.

We now combine the quantum-analysis with a tempo-analysis by comparing the age-specific in France and Germany for our three cohorts of women aged 39-41.

Figure 5: Age-specific fertility rates



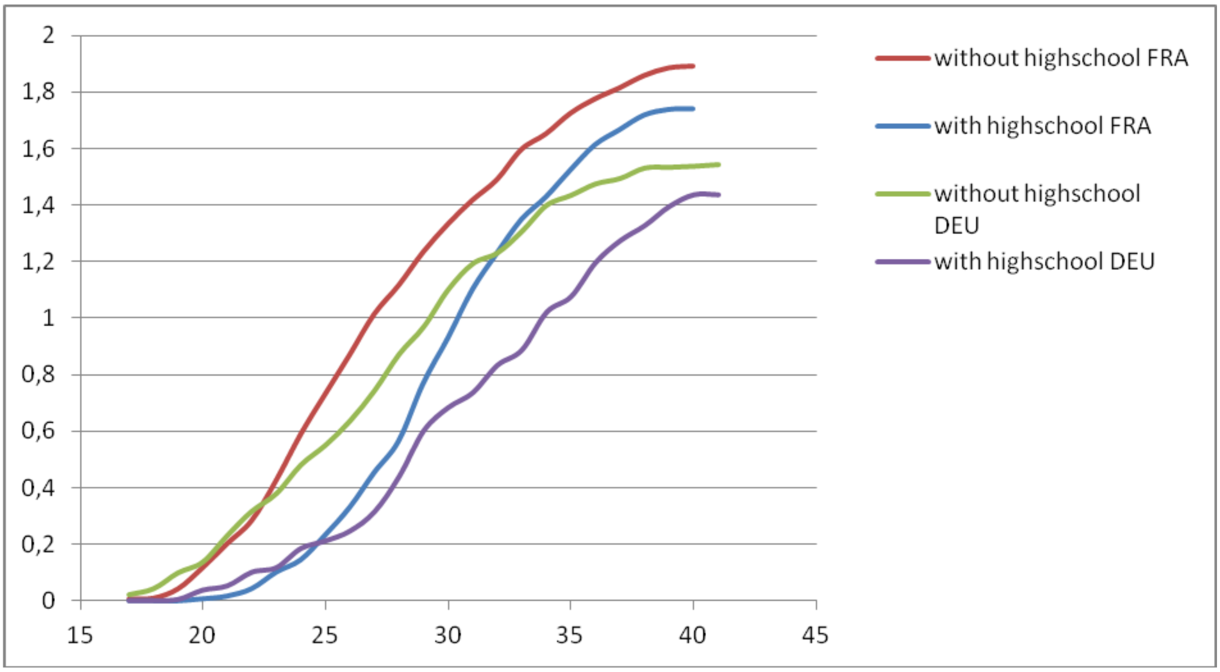
Data: Budget des Familles 2006 & GSOEP 2010

Table 5 shows that women in France and Germany have a similar number of children (weighted means per age) until the age of 24, while German women have even somewhat more children than French women in early ages. From the age of 24 on, the fertility gap between both countries increases with age - with French women having significantly more children then German women[7]. There is no catch-up at later ages.

Figure 6 now compares the timing of births of high and low educated women in France and Germany.

[7] The gap is likely to be even bigger as French fertility rates are likely to be underestimated due to unobserved children out of the household in contrast to German fertility rates.

Figure 6: Age-specific fertility rates by education groups



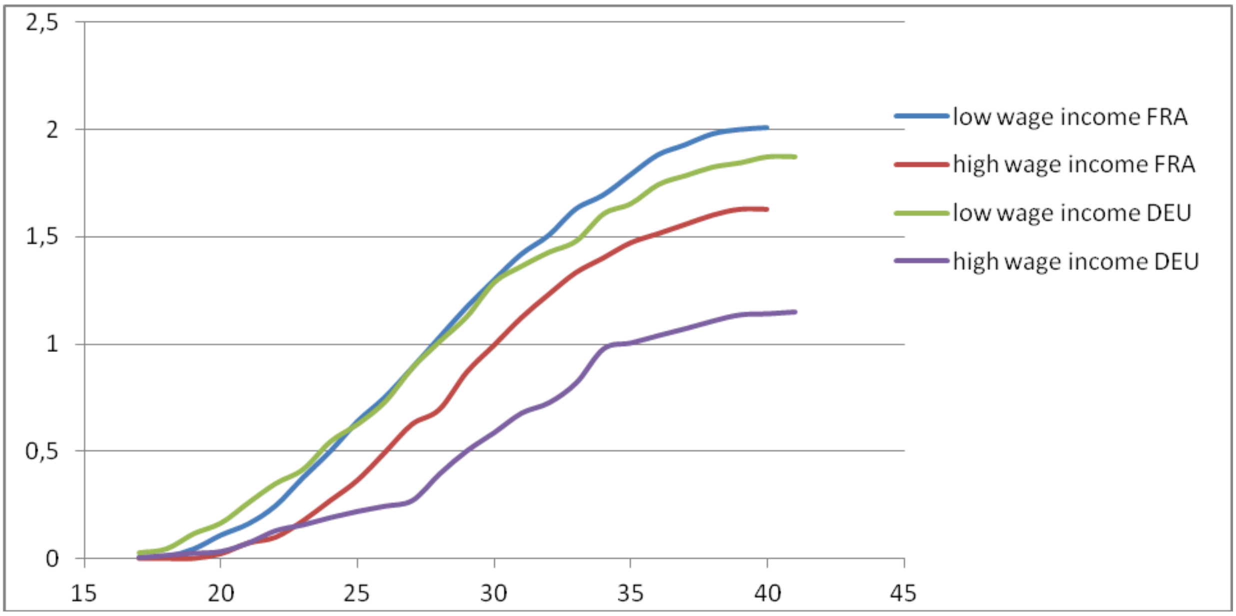
Data: Budget des Familles 2006 & GSOEP 2010

France: 38% with and 62% without highschool diploma (baccalaureat)
Germany: 27% with and 73% without highschool diploma (Abitur)

In France as well as in and Germany, women with a high school diploma have fewer children than women without a high school diploma. At the same time, the quantum difference of fertility between women with and women without a high school diploma at age 40 is quite similar between the two countries. What makes the difference between the countries is the fact that French educated women catch up in terms of fertility much earlier than German educated women. Figure 6 shows that the catch up in France happens between the ages 28 and 32, i.e. after university and during the first years of career development. In Germany, the catch up happens much later, from age 37 on. This suggests that German educated women face more difficulties than French women in combining child care and working in the early years of their professional activity.

Finally, figure 7 compares the timing of births of women with low and high individual labour income in France and Germany.

Figure 7: Age-specific fertility rates by income groups



Data: Budget des Familles 2006 & GSOEP 2010

France & Germany: low wage income: below median individual labor income; high wage income: above median individual labor income

For both countries, the fertility difference at age 40 is higher when comparing income groups then when comparing education groups within each country. In addition, figure 7 reveals that the fertility difference for women aged 40 is much higher in Germany than in France when comparing different income groups. Note that there was no difference between the countries when comparing different education groups. This confirms even more that labour market participation and career development issues play a crucial role for women when it comes to decide at what ages to have children. The fertility rates are particularly low for German women with a relatively high labour income and no catch up can be observed before the age of 41.

5. Conclusion and Outlook

The influence of economic development on fertility trends has changed radically in OECD countries in the last few years, during which a rebound of fertility rates has been observed. In some developed countries, recent economic advancement goes hand in hand with a significant rebound in fertility (France). In other countries, total fertility rates stay below replacement level, even though GDP levels are relatively high (Germany).

Our findings on the macro and micro level suggest that fertility in developed countries differ not only in terms of timing, but also in terms of quantum. Decomposing GDP per capita, focusing on female employment and family policy instruments and analyzing age-specific fertility rates suggests that in those countries with continuous low fertility, women face difficulties when it comes to combine work and family life.

Clearly identifying these difficulties is the next step of this research. Therefore, we intend to link tempo- as well as quantum-aspects of fertility to labour market participation and family policy instruments. Both the French BdF and the German SOEP contain detailed information about the labour market integration and career development of women. In addition, information is available for different income types for women, their partners and the household, including social transfers linked to family policies like child allowances, parental leave payments, child care subsidies etc. Unfortunately, the BdF does not provide a follow up of individuals on a yearly basis, but the cross-section analysis allows observing different cohorts to reveal at what ages women benefit the most from family policy transfers. The available survey data allows analyzing differentiated effects of policies on fertility and women's employment behaviour according to their individual characteristics (number of children, age, education level, individual and household income, occupation, migration background, family status etc.).