FERTILITY IN TURKEY, BULGARIA AND ROMANIA: HOW TO DEAL WITH A POTENTIAL LOW-FERTILITY TRAP?

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"Fertility in Turkey, Bulgaria and Romania – how to deal with a potential low-fertility-trap?"

Research Report for the World Bank's Human Development Department

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- Turkey: Income and Living Conditions Survey (Panel) for 2006-2007, 2006-2008, 2006-2009, 2007-2010, 2008-2011, Income and Living Conditions Survey (Cross-sectional) from 2006 to 2011 and General Population Census (5 Percent Sampling) for 1980, 1985 and 2000 provided by the Turkish Statistical Institute; Census data also provided by i-pums
- Romania: Income and Living Conditions Survey (Panel) for 2007-2008, 2007-2009, 2007-2010, 2008-2011, Income and Living Conditions Survey (Cross-sectional) from 2007 to 2011 provided by Eurostat; Census data (2002) provided by i-pums
- Bulgaria: Income and Living Conditions Survey (Panel) for 2006-2007, 2006-2008, 2006-2009, 2007-2010, 2008-2011, Income and Living Conditions Survey (Cross-sectional) from 2006 to 2011 provided by Eurostat; aggregate measures calculated on census data (2001) provided by Dimiter Philipov and Elena Koytcheva (2008)

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"Fertility in Turkey, Bulgaria and Romania – how to deal with a potential low-fertility-trap?"

Table of Contents

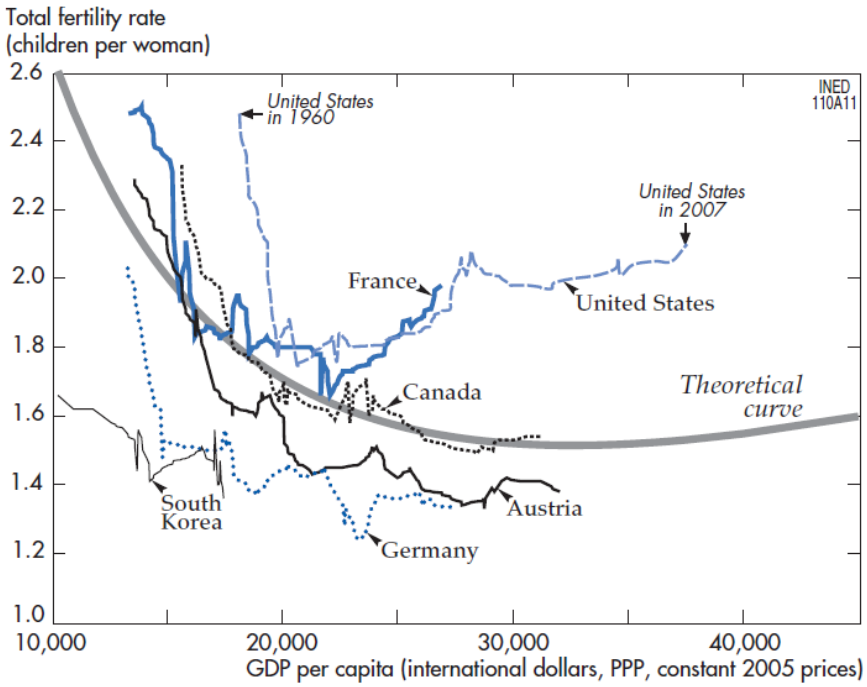
“Fertility in Bulgaria and Romania – how to deal with a potential low-fertility-trap?”

1. Introduction/ Motivation

1.1. What we know so far

Recent macro-economic studies (Myrskilä et al, 2009), Greulich-Luci and Thévenon (2014) have shown that in several highly developed countries, lowest-low fertility has come to an end. For these countries, the pattern between total fertility rates and economic development is actually inverse J-shaped. This means that the correlation between economic development, as measured with GDP per capita and fertility turns from negative to positive from a certain relatively high level of development on. The re-increase of fertility that comes hand in hand with economic development is particularly striking in France and the United States, as illustrated in Figure 1. In other countries like Germany and Austria, this rebound is less developed, and fertility stagnates -despite high levels of economic development-, at relatively low levels below replacement level. In addition, for these countries, the pattern in its entirety is situated on lower levels of fertility (the y-axis).

figure 1.Inverse J-shaped pattern between economic development and fertility in highly developed countries

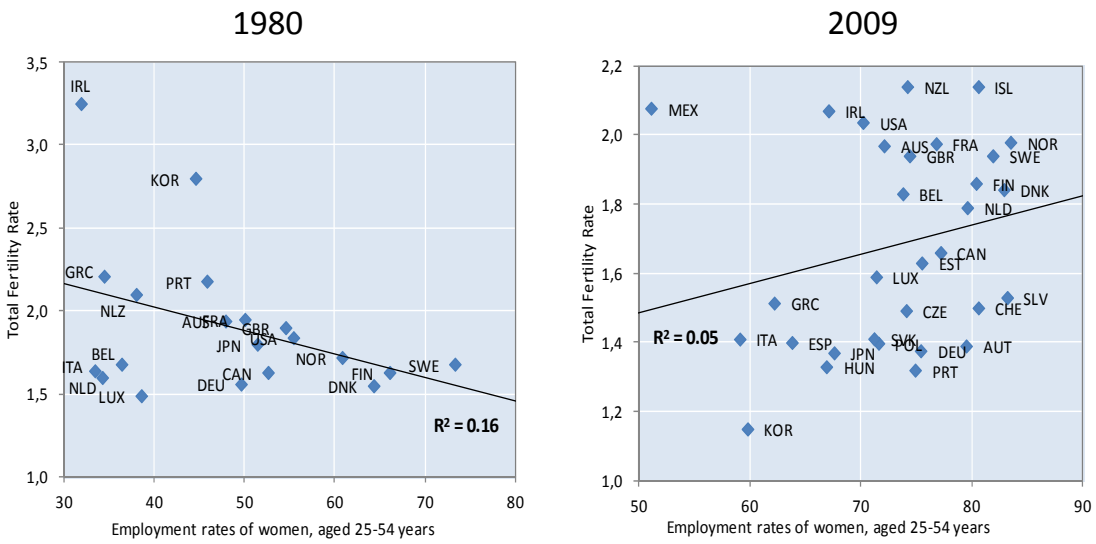


Source: Luci-Greulich and Thévenon (2014) *EJPE*

Luci-Greulich and Thévenon (2014) conclude that economic development is thus not sufficient to explain why the fertility rebound occurs in some developed countries but not in others. A decomposition of GDP per capita allows them identifying female employment as main explanatory variable behind the re-increase in fertility. In other words, the fertility rebound happens only in those countries in which female employment rates are relatively high.

Indeed, several OECD studies show that the correlation between fertility and female employment is not negative any more, as illustrated in Figure 2. Most high fertility countries like the Nordic countries and France show high levels of female employment, and in particular full-time employment of mothers with young children.

figure 2.The correlation between total fertility rates and employment in OECD countries



Source: OECD (2011), *Doing Better for Families*, OECD, Paris.

Luci-Greulich and Thévenon (2013) show furthermore that in these countries, female employment and fertility are not conflictive any more due to the development of family policies, in particular child care services, which encourage parents to combine work and family life. Their study providing a regression analysis based on macro panel data (OECD Family Data Base) covering 30 OECD countries and the years 1960 to today gives further evidence that the positive correlation between fertility and female employment is not only due to *between-country* variation (as illustrated in Figure 2), but is actually dominated by *within-country variation*. That is, countries in which female employment increases significantly *over time* are most likely to experience a re-increase in fertility (in the presence of increasing investments in work-life balance policies).

Based on these macroeconomic findings, a recent paper by Greulich, Thévenon and Guergoat-Larivière (2014), prepared for the World Bank's Human Development Department, investigates in how far the positive pattern between fertility and employment can be confirmed for the micro level. They want to know if, within European countries, employed women have a higher probability of having a child than women being inactive or unemployed.

Theoretically, this could be the case if the substitution effect (qualified women substitute children against working due to high opportunity costs of staying at home) becomes dominated by an income effect: successful integration of the woman in the labour market before child arrival becomes an important pre-condition for childbearing as employment generates family income which is needed to bear the costs of raising a child. Plus, employment before child arrival might also facilitate women's

return to the labour market after child arrival, which again generates family income and could be demanded by women who claim a return on their education investments).

On the empirical side, micro-econometric analysis is needed to see if being employed is a true determinant for child arrival, or if employment just comes in hand with other individual determinants such as age or partnership.

To investigate this issue, Greulich et al. (2014) mobilize European survey data providing information on women's and their partner's labour market status observed before the potential conception of a child. They use the European Survey of Income and Living Conditions (EU SILC) which contains data for 27 European countries (Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Iceland, Italy, Lithuania, Luxembourg, Latvia, the Netherlands, Norway, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia and the United Kingdom). The longitudinal version is a four year rotational panel covering the years 2003 to 2011.

The analysis focusses on women's activity status as potential determinant for the arrival of a second child. The focus on second child arrival is chosen as the authors identify a barrier to 2nd child birth being more important than a barrier for 1st childbirth in most European low -fertility countries.

Especially in Eastern European countries, where total fertility rates are around 1,5 children per women on average, most women (around 90%) have one child at the end of their childbearing age, but the probability of having a second child is relatively low in comparison to high fertility countries in Europe. While in Nordic countries or France, 80% of women having one child decide in favour of a second child, in Eastern Europe only around 60% of women make this choice. Thus, in most low fertility countries (with the exception of Germany), low fertility is mainly the result of existing barriers to second child arrival, while childlessness is not the main component of low fertility rates. In addition, in Eastern European countries, the mean age of mothers at first childbirth is not higher than in high fertility countries, hence postponement of first childbirth (and therewith a barrier to 1st child arrival) does not hinder second child arrival.

Greulich et al. (2014) find out that within European countries, being in employment during the months before potential conception actually significantly increases the probability of having a second child for women aged 15 to 49, in comparison to unemployed and even to inactive women. Table 1 gives an overview of the main regression results. A deeper analysis taking into account interaction effects shows that being in stable employment is positively correlated to child arrival particularly for women who have a partner who is himself in stable employment. Having a partner in stable employment is found to be a crucial determinant for child arrival, but once this condition is fulfilled, being employed for women themselves after the arrival of the first child plays also an important role for the decision to have a second child.

The positive effect of employment is found to be particularly strong in Northern countries as well as Southern European countries. For Continental European countries, only part-time employment can be associated with a higher probability of having a second child, but not full-time employment. The effect is found to be insignificant in Eastern European countries.

A multi-level analysis finally follows up these regional differences and shows that the impact of employment on child arrival is positive particularly in high fertility countries where child care coverage is high. The authors conclude that successful labour market integration after the birth of a first child seems to facilitate women's decision of having a second child. A stable employment

position is most likely to create a secure economic environment, which seems to be a crucial condition for women for deciding in favour of a second child. Family policies enabling mothers to combine work with family life, in particular the provision of childcare for young children, are most likely to encourage women's decision for a second child. Childcare policies can thus be viewed as an important tool to promote simultaneously women's fertility as well as women's employment. Besides, labour market policies are needed to encourage a stable integration of women in the labour market.

table 1. The probability of having a second child within European countries (logit regressions with robust standard errors, with country- and year-fixed effects)

	Model 1	Model 2	Model 3
Woman's activity status			
Stable employment (ft & pt, employed and self-employed)	0.116*	*Ref.*	
Stable full-time employment			*Ref.*
Stable part-time employment			-0.0541
Stable unemployment		-0.228**	-0.241**
Stable inactivity		-0.0792	-0.0937+
Stable student		-0.540***	-0.555***
Stable retirement		-0.273	-0.287
Stable military service		0.0249	0.0136
Partner information			
No partner	-1.035***	-1.023***	-1.024***
Partner but not married	-0.161**	-0.160**	-0.159**
Intercept	-0.928***	-0.845***	-0.827***
Control for women's age, age and sex of first child, year and country fe	yes		
Number of observations	35401		
Number of events	2972		
Pseudo R^2	0.1729	0.1742	0.1742

+ p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Data: EU SILC LT, 2003-2011, 25 European countries
Source: Greulich, Thévenon and Guergoat-Larivière (2014), WB Report

1.2. What we want to know now

The present paper proposes a focus on three European countries that have quite specific contexts among European countries. A first focus will be on Turkey, and a second focus will be on Bulgaria and Romania. For these three countries, two major amendments are proposed to deepen the analysis of socioeconomic determinants of child arrival:

- An analysis of the *evolution* of socioeconomic differentials in fertility within each country *over time* (Census data completed with cross section survey data)
- An analysis of the impact of women's activity status on the probability of child arrival differentiated by *child rank (1st, 2nd and 3rd child arrival).*

The two countries are at the moment undergoing important demographic transitions. Changes in fertility behaviour are characterized by large regional and social differences, which merit a particular focus.

In Bulgaria and Romania, total fertility rates stagnate at very low levels below the replacement rate. For these two countries, employment plays out against child arrival particularly for low qualified women. This may be linked to the reluctance of women in employment (mostly full time) to give birth to a (additional) child when the only way to do so is to give up their employment situation, leading to a significant reduction in family income. Enabling women to keep their job while raising children seems thus to be important especially for low income families.

Bulgaria and Romania can benefit from the experience of other European countries in order to find ways to avoid, or to overcome, the low-fertility trap. It seems that in countries which experience a fertility re-increase, particularly those women who are successfully integrated in the labour market decide in favour of children. Dissolving the negative association between employment and fertility by encouraging parents' work-life balance emerges thus as a major challenge for Turkey, Romania and Bulgaria.

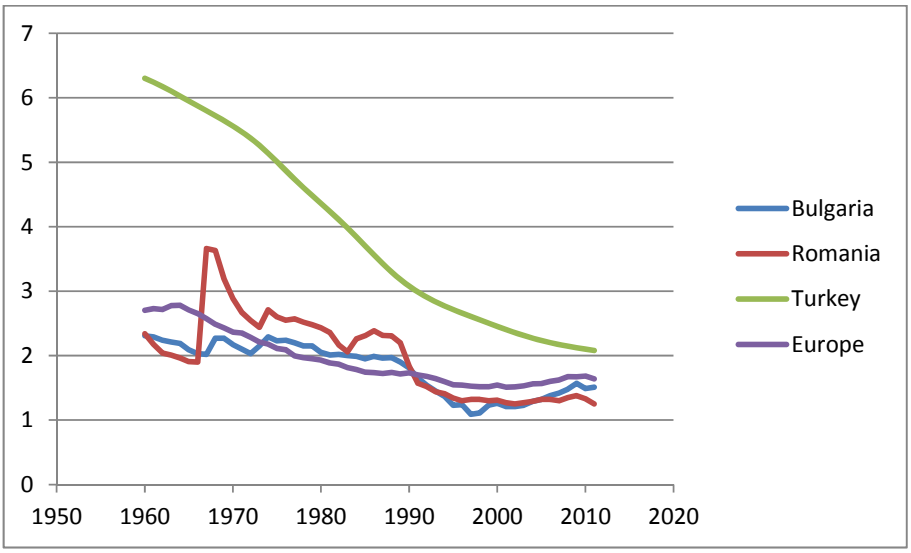
2. General overview – aggregated data in a comparative perspective

2.1. Fertility

As Figure 3 illustrates, Bulgaria and Romania are in a situation called the "low-fertility trap" with low and stagnating fertility rates. In both countries, total fertility rates dropped below EU average[1] in the early 1990s and they still are below replacement level. In Bulgaria, women have on average 1.5 children. Romania is one of the" lowest-low" fertility countries with a total fertility rate of 1.25.

[1] The EU averages presented in section 2 are calculated on the basis of 29 European countries including Bulgaria, Romania and Turkey. The other 26 countries are: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom.

figure 3.Evolution of total fertility rates in Turkey, Romania and Bulgaria in comparison to the European average



Data Source: World Bank World Development Indicators (2014)

The reported total fertility rate is a transversal indicator which provides the sum of all age-specific fertiltiy rates observed in each year. This index allow us getting information on actual fertility behaviour, but this behaviour is strongly influenced by women's age and thus birth timing. In a context of increasing birth postponement, total fertility rates risk to underestimate fertility due to these 'tempo effects'. Completed cohort fertility rates, i.e. the number of children per women of each cohort who have completed their childbearing measure, focus on 'quantum' only and will be presented in the following section (calculations based on census and survey data).

2.2.Female employment

Figure 4 illustrates the employment-to-population ratio for women (aged 15 plus), which excludes -in contrast to labour force rates- the unemployed. The employment-to-population ratio is still low in Turkey (26% in 2012) but we can observe a continuous and considerable re-increase since the early 2000s. The female labour force participation rate of women aged 15 to 64 (including unemployed women) is –with 32% in 2012-somewhat higher, whereas one fourth of working women work part time in Turkey (EU average female labour force participation 67%, with 22,5% of women working part-time, WB WDI, year 2012)[2].

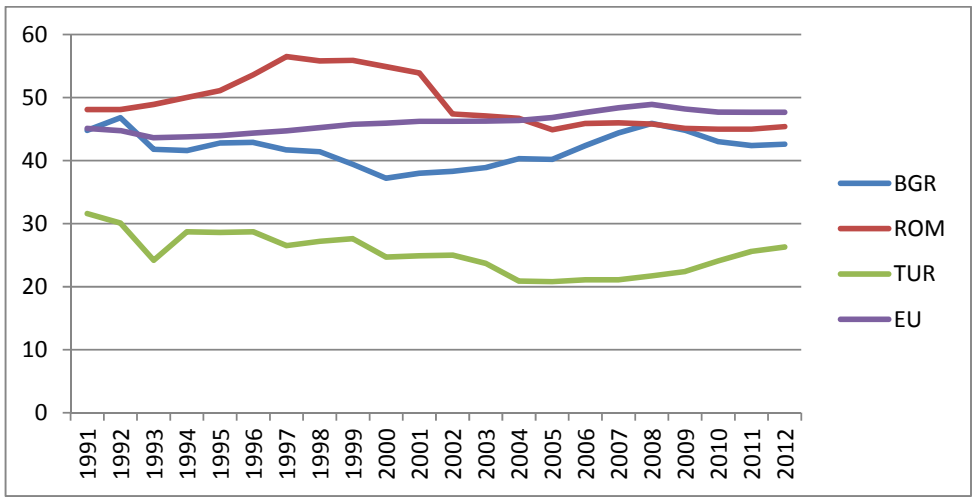
Figure 5 shows actually that this increase in women participating in the labour market is particularly due to younger cohorts of women, with 40% of women aged 25 to 29 being available for work in the year 2012. This strong trend among younger cohorts towards increased participation goes hand in hand with increasing education of girls and young women and gender and family norms that are just starting to change. Even though the majority of jobs for women in Turkey still require only low qualification and do not provide social security, the number of registered and paid female workers is increasing from year to year. This evolution is encouraged by the government which promised employers premiums if they employed women or younger workers – a program intended to ease unemployment, which quickly rose due to the 2008 global economic crisis. The government also

[2] Male labour force participation rate in Turkey 76%, EU average 78% (WB WDI, year 2012)

intends to raise female employment rates in order to reduce the significant gap between the Turkish rates (32%) and the European objective of 60%. Given the general trend and the policy backup, female employment rates are likely to increase in Turkey in the next future, especially for young women who are just finishing education. Turkish women increasingly represent a strong talent pool for the Turkish labour force. Consequently, encouraging women's economic empowerment in terms of education, employment and income does not only reduce gender inequalities, but can also be considered as a fruitful way to stimulate economic growth (c.f. Cagatay and Özler 1995; Klasen 1999, 2002, 2003; Seguino 2000, 2005; Luci 2009; World Bank, 2012).

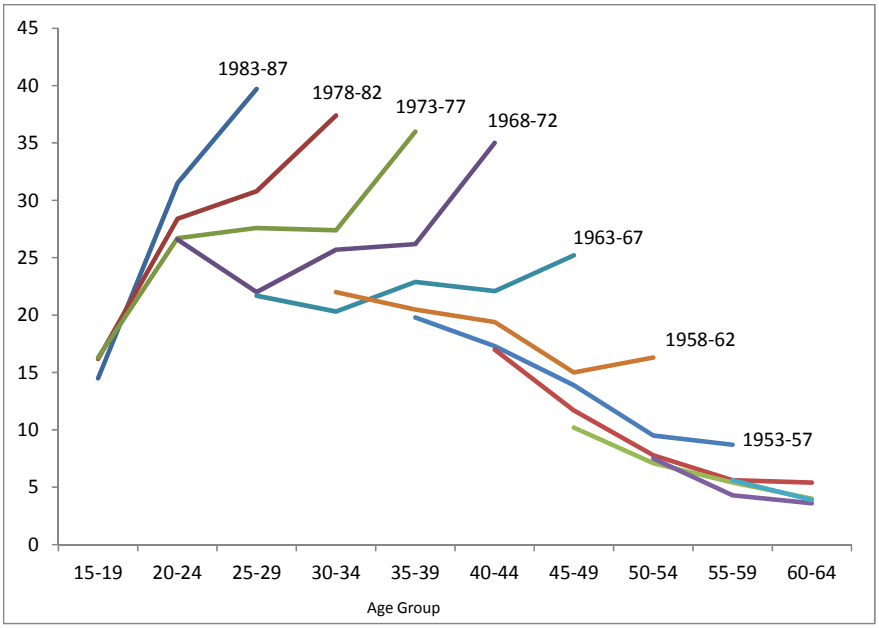
Against that background, increasing female employment and maintaining fertility above replacement level are two major challenges in Turkey. These two objectives must not necessarily be conflictive if Turkey succeeds in adapting its institutional framework to the new setup. Encouraging women to combine work and family life thus emerges as a key factor in Turkey which would allow the country to set the course for meeting its demographic, economic and social objectives.

figure 4.Employment-to-population ratio of women in Bulgaria, Romania and Turkey in comparison to the European average



Data Source: World Bank World Development Indicators (2014)

figure 5. Female labour force participation in Turkey by cohorts



Source: TURKSTAT LFS (1992,97,2002,2007,2012). Data labels represent year of birth.

Figure provided by Ana Maria Munoz Boudet, WB

In Romania and Bulgaria, the employment-to-population ratio is higher as in Turkey (43% in Bulgaria, 45% in Romania in 2012), but they are stagnating somewhat below the EU average of 48%. Female labour force participation rates (including unemployed women) are -with 63% in Bulgaria and 57% in Romania- around the EU target of 60%, but somewhat below the EU average of 67%[3]. Part-time employment is not common for women in both Bulgaria and Romania. Only 3% of employed women work part time in Bulgaria, and only 11% in Romania (EU average 22,5% in 2012).

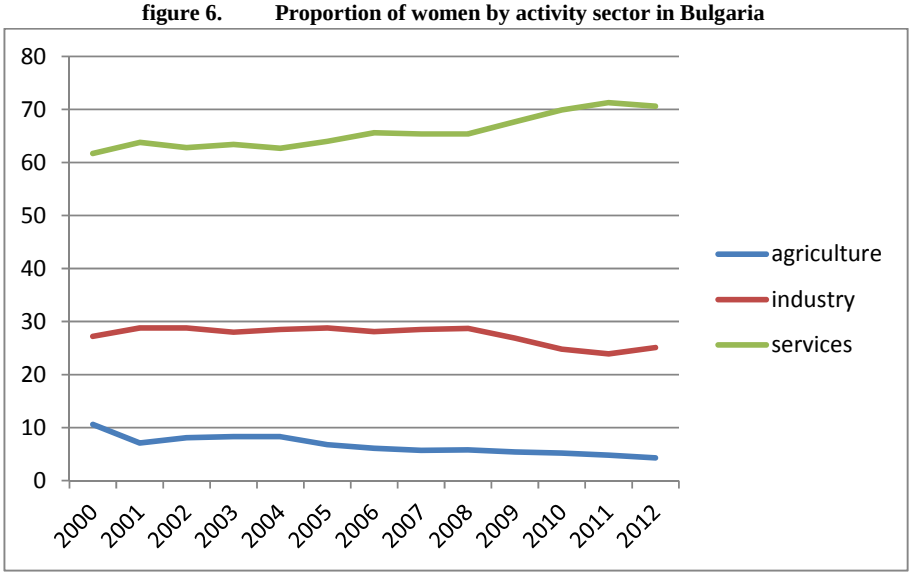
With the majority of women working full-time coming hand in hand with low fertility rates, it seems that in both Romania and Bulgaria, women have difficulties in combining work and family life. Like in Turkey, an institutional support is needed to encourage women to work and have children at the same time.

Consistent with the "feminization U" hypothesis (c.f. Goldin 1994, Cagatay and Özler 1995), women's increase in employment coming hand in hand with economic development in Turkey, Romania and Bulgaria is largely due to an increase in the proportion of women employed in services, while the proportion of women employed in agriculture is decreasing.

As Figures 6 to 8 show, in all three countries, the largest activity sector for women today is services, while the proportion of women working in services is higher in Bulgaria (70%) than in Romania and Turkey (50%). The EU average is at 80% (WB WDI, year 2012). Agricultural work is still quite common for women in Turkey (40%) and Romania (30%), but not in Bulgaria (10%). The EU average is at only 6%.

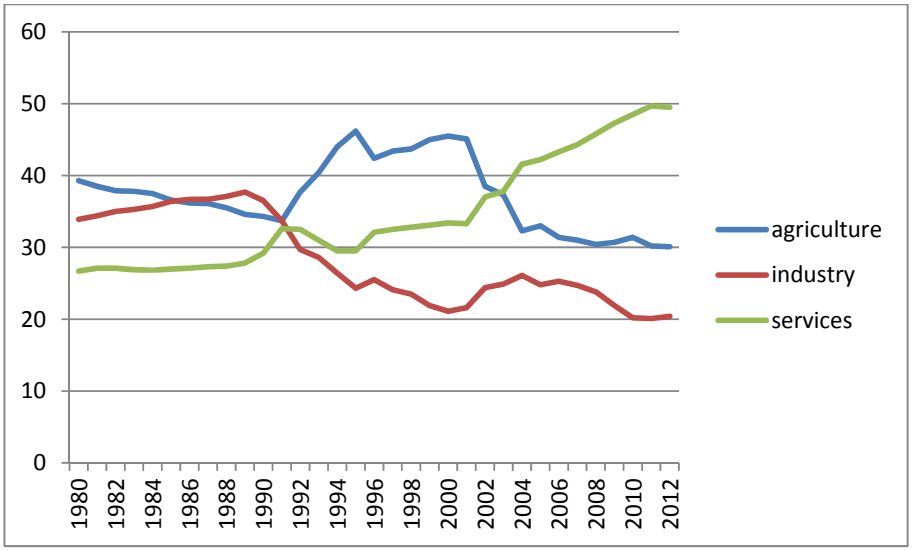
[3] Male labour force participation rate in Bulgaria 71%, in Romania 76%, EU average 78% (WB WDI, year 2012)

figure 6. Proportion of women by activity sector in Bulgaria



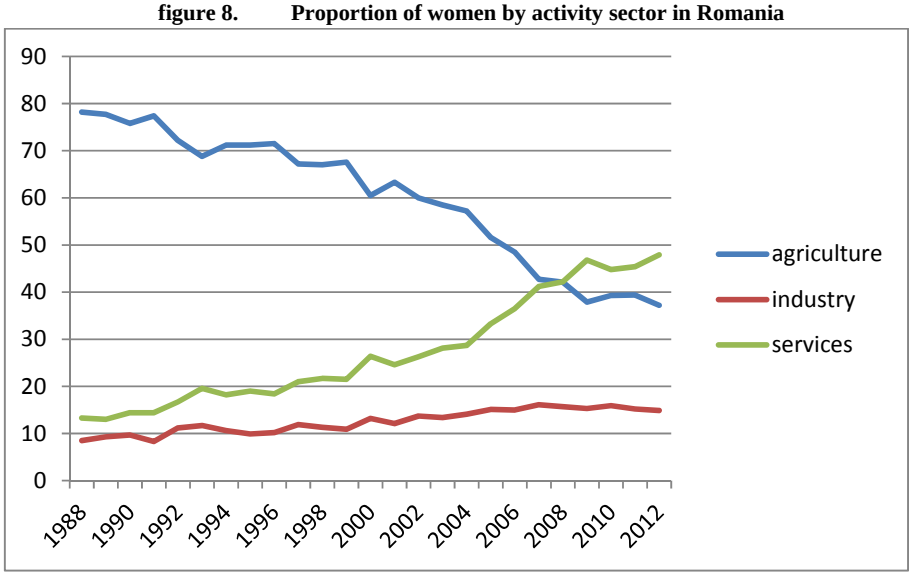
Data Source: World Bank World Development Indicators (2014)

figure 7. Proportion of women by activity sector in Romania



Data Source: World Bank World Development Indicators (2014)

figure 8. Proportion of women by activity sector in Romania



Data Source: World Bank World Development Indicators (2014)

In comparison to Romania and Bulgaria and consistent with the lower stage of economic development (c.f. OECD 2008, Lastarria-Cornhiel 2006, Agarwal 2003), women in Turkey work less as employees in formal jobs and more in non-registered activities such as subsistence activities in agriculture, as contributing family workers or as self-employed. The fact that women are over-represented in informal employment in comparison to men renders them vulnerable to poverty and economic shocks.

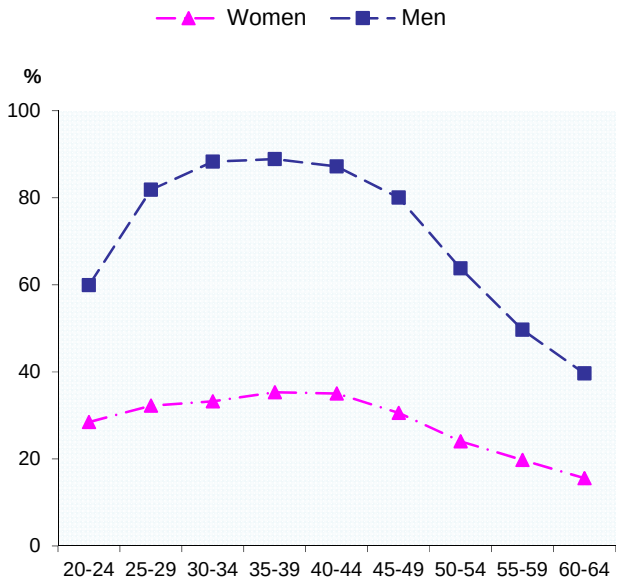
The proportion of women working as contributing family workers is 1% in Bulgaria against 20% in Romania and 34% in Turkey (EU average 4%). The gender difference is particularly striking in Turkey, where only 5% of employed men are working as contributing family workers (Bulgaria 1%, Romania 7%, EU average 1%, WB WDI, year 2012).

8% of women are self-employed in Bulgaria (14% of men), against 33% in Romania (33% of men) and 45% in Turkey (34% of men) (EU average 13% for women, 19% for men).

The gender-specific employment gap is largest in Turkey, followed by Romania and Bulgaria. On average for all ages 15 to 64, the gender gap in terms of labour force participation rates is 43 percentage points in Turkey, 16 percentage points in Romania and 8 percentage points in Bulgaria (EU average 11%, WB WDI year 2012).

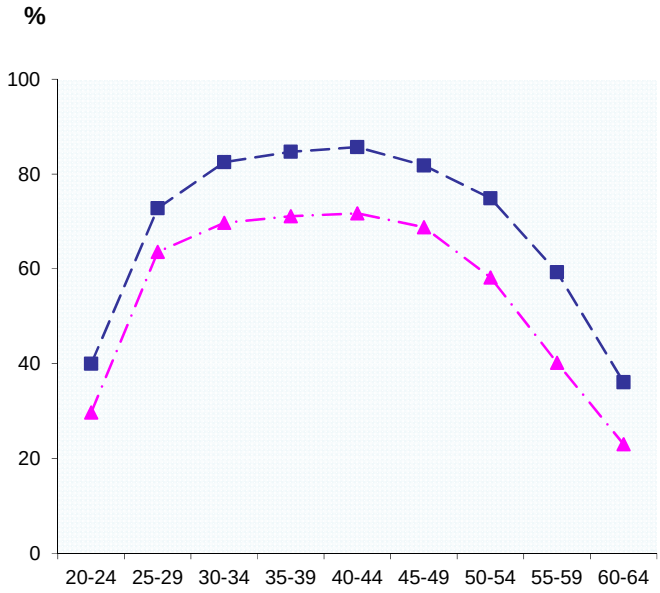
Figures 9 to 11 illustrate the gender gap by age for each country. In Bulgaria, where the gender gap is below EU average, the gap exists actually only for ages 20 to 35, the period of family formation, while in Romania and particularly in Turkey, the gap can be observed for all ages.

figure 9. Age-employment profiles by gender in 2011 in Turkey



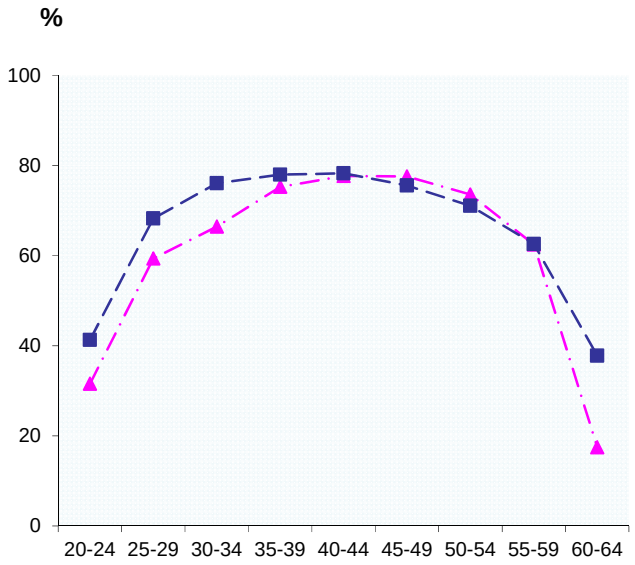
Data Source: OECD Family Data Base (2014)

figure 10. Age-employment profiles by gender in 2011 in Romania



Data Source: OECD Family Data Base (2014)

figure 11. Age-employment profiles by gender in 2011 in Bulgaria



Data Source: OECD Family Data Base (2014)

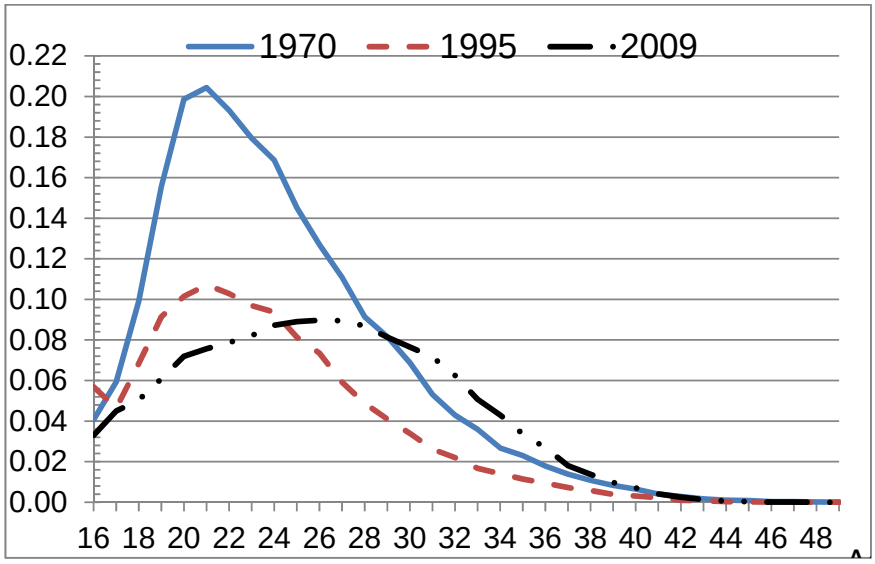
With the majority of women participating in the labour market, birth postponement is a major issue in Bulgaria and Romania. In 2009, the mean age of mothers at *first* childbirth was 25 in Bulgaria and Romania, and 23 in Turkey (EU average 28, OECD FDB).

2.3. The timing of births

As Figure 12 and 13 illustrate, the proportion of women having their children at a certain age (*all ranks combined*) is highest at age 21in 1995 and 1970, but this age shifts to around 27 in 2009 in Bulgaria and Romania. The line is flatter for 1995 and 2009 in comparison to 1970 due to declining fertility levels and the fact that births are less concentrated around a specific age, which suggests that there is more heterogeneity in the timing of births for more recent years.

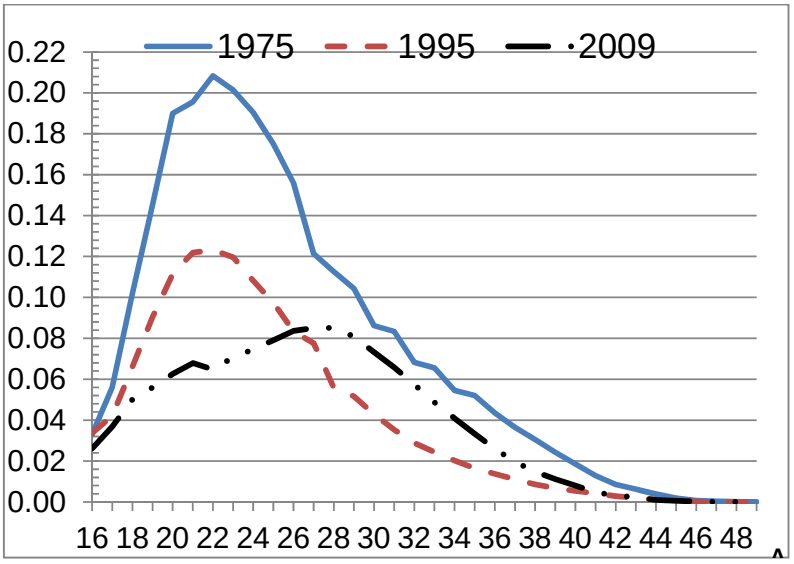
Data for Turkey is not available in this format, which is why we use the Census 2000 data to get information about fertility timing for all three countries.

figure 12. Age specific fertility rates profile in Bulgaria



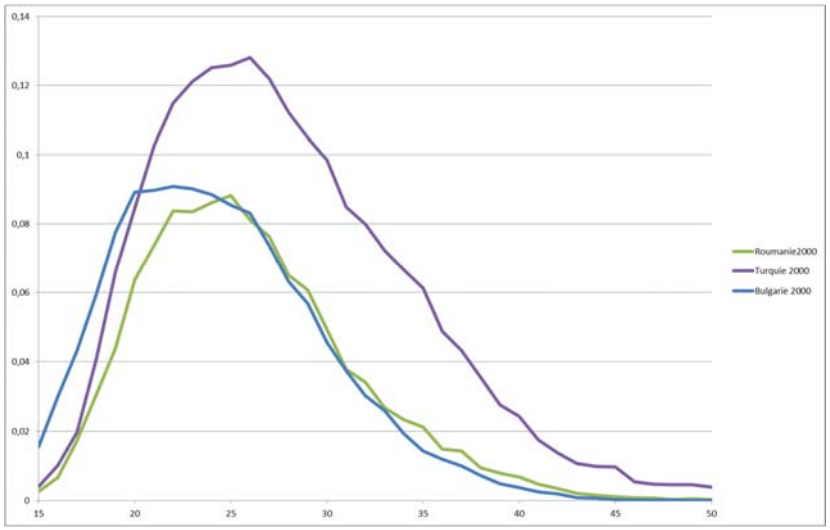
Source: Eurostat (2011) and UN Statistical Division (2012).

figure 13. Age specific fertility rates profile in Romania



Source: Eurostat (2011) and UN Statistical Division (2012).

figure 14. Age specific fertility rates in Turkey, Romania and Bulgaria



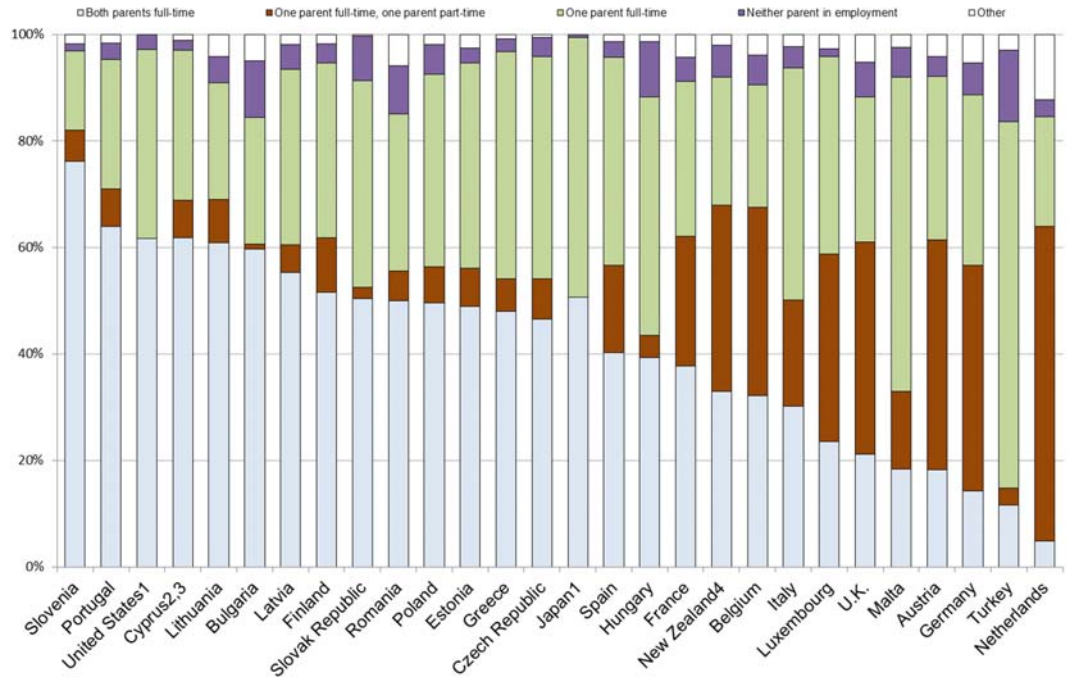
Source: Census 2000 Turkey (i-pums), census 2001 Bulgaria (D. Philipov), census 2002 Romania (i-pums)

Figure 14 shows that for the year 2000, the proportion of women having their children (all ranks combined) is highest at age 27 in Turkey. As fertility levels are higher in Turkey than in Bulgaria and Romania, these proportions cannot be directly compared to each other. What this Figure shows, however, is that the age-specific fertility rates are higher in Turkey for all ages except for ages 15 to 20 in Bulgaria, revealing that teenage pregnancies are more common in Bulgaria in comparison to Romania and Turkey. For example, at age 17, four percent of women have children in Bulgaria, but only one percent in Romania and Turkey.

2.4. Combining work and family life – parental employment, child poverty, family policies

Figure 15 shows that in Turkey, almost 80% of children live in households with a single earner - this is the largest proportion among European countries. The proportion of children living in household with both parents not working is also relatively large compared to other European countries. Much in contrast, the proportion of children having parents who work both full time is quite large in Bulgaria (60%) and Romania (50%), not only in comparison to Turkey but also in comparison to other European countries.

figure 15. Children in couple households by parental employment status, 2010

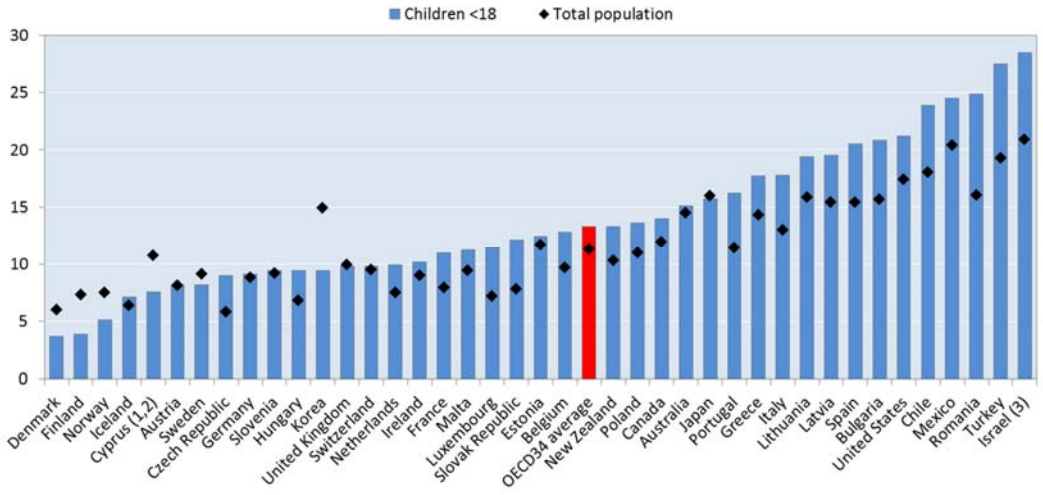


Data Source: OECD Family Data Base (2014)

As a consequence of Turkey's particular parental employment pattern with maternal employment around 22% only, child poverty rates are extremely high in Turkey, as shown in Figure 16. In addition, the OECD FDB reports an increase in 8 percentage points in child poverty rates since the mid-1990s for Turkey.

At the same time, and very strikingly, child poverty rates are also high in Romania and Bulgaria, where maternal employment rates are much higher (60% in Bulgaria, 56% in Romania). This suggests that for most families in Bulgaria and Romania, a dual earner income is not sufficient to adequately support a family. This suggestion is in line with the finding of our micro econometric analysis that will be presented later on. We will see that in Romania and Bulgaria, particularly low educated women who have returned back to the labour market after the birth of a first child are not likely to decide in favour of a second child. Financial constraints (due to potential job loss and additional costs caused by the 2nd child) seem to be a major reason for this finding.

figure 16. Poverty rates for children and the total population, 2010*



Data Source: OECD Family Data Base (2014)

Poverty thresholds are set at 50% of the median income of the entire population.

On a first sight, Bulgaria and Romania seem to be better situated compared to Turkey in terms of family policies. Nevertheless, especially in terms of work-life balance instruments, the two countries lack far behind the European average, and in particular behind France and the Nordic countries which report high fertility rates in combination with high female employment rates. Child care coverage is low, especially for children aged 0 to 2 (table 2, 14% against 28% of EU average) and consequently, women have to choose between children and work. Income options are thus low for women after child arrival, which raises a particular problem of child poverty in Bulgaria and Romania, which has reached an alarming position since the 2000s (Botev, 2012). The same is valid for Turkey, as Figure 16 illustrated.

table 2. Participation rates in formal care and pre-school for children under six, 2008

Participation rates in formal care and pre-school for children under six, 2008

	Enrolment in formal care for the under 3s and pre-school from 3 to 5 years (%)					Expected years in education for 3 to 5 year olds
	Under 3 years	3 years	4 years	5 years	3 to 5 years	3 to 5 years
Bulgaria	14,6	64,3	71,7	76,1	70,7	2,1
Romania	14,3	55,3	75,8	86,4	72,5	2,2
Turkey	..	2,8	13,0	55,4	23,8	0,7
OECD -average	*30,1*	*59,7*	*80,0*	*91,8*	*77,3*	*2,3*
EU 27 -average	*28,2*	*68,8*	*85,6*	*91,1*	*81,8*	*2,5*

Data Source: OECD Family Data Base (2014)

3. Differentials in fertility within each country

Analysis based on Census data (year 2000, cohorts 1910-1960) and cross sectional survey data (SILC year 2011, cohorts 1969-1974):

3.1. Completed fertility by cohort

The following part will mainly focus on fertility trends in Romania and Turkey. The Bulgarian overview will be somewhat shorter because it was not possible to obtain Bulgarian census data. Census data for Romania and Turkey have been obtained thanks to the i-pums database (Integrated Public Use Microdata Series) provided by the Minnesota Population Center (for Turkey for the year 2000, for Romania for the year 2002) and the Turkish Statistical Office. For Bulgaria, aggregate measures based on census data (2001) were provided by Elena Koytcheva and Dimiter Philipov (Demographic Research, 2008).

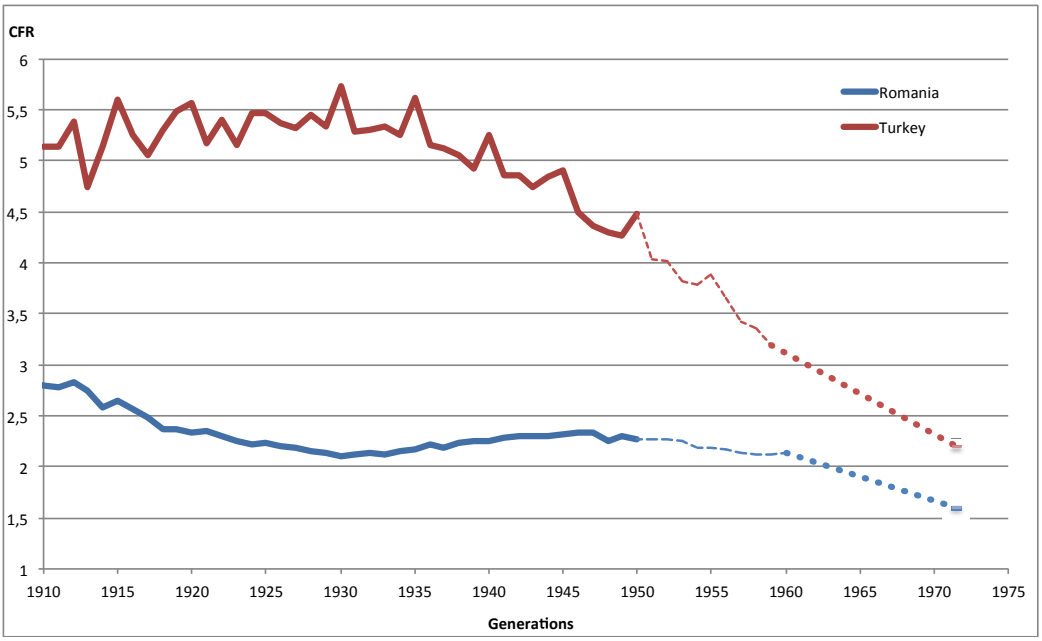
Census data provides unbiased measures of completed fertility for cohorts 1910 to 1950 (women are at least 50 years in the 2000 and have thus completed their childbearing period). We nevertheless report census data until cohort 1960 (women aged 40 observed in 2000), acknowledging that this measure risks to be somewhat downward biased as a minority of Turkish and Romanian women aged 40 have not yet completed their childbearing period.

The latest available wave for Turkey is 2000 and 2002 for Romania. In order to obtain more recent information about completed fertility, we complement the census data with survey data. For this purpose, we use wave 2011 of the cross sectional module of the European Survey of Income and Living Conditions (SILC), which provides not only data for Turkey and Romania, but also for Bulgaria.

The main advantage of this survey is the comparability of countries, as measures of individual characteristics such as education and of individual economic conditions such as labour market status or income are harmonized. This information is rarely available in other, more 'demographic' surveys. Some pitfalls emerge, however, due to the fact that the EU SILC does not report information on the number of children directly. However, children are observed with a proper identification number when living in their parents' households, and households are followed when moving. Nevertheless, we do not know whether the children living at their parents' household are biological or not. We therefore drop households with children whose age difference to their mothers is smaller than 15 years. We also do not observe children when they live with the parent's ex-partner or when they already moved out. Therefore, there is a risk of downward bias of observed fertility for women who are at the end of their childbearing age and who have had their children quite early.

We actually observe that the weighted mean of women's age-specific number of children is decreasing after the age of 42 in the SILC cross section wave of 2011 for all three countries. To limit this downward bias while obtaining a large number of observations at the same time, our approximate weighted completed fertility measures of 2011 are calculated based on women aged 37 to 42 (cohorts 1969-1974).

figure 17. Completed fertility rates in Romania and Turkey



Data Source: Census (i-pums) 2000, 2002 and EU SILC CS 2011, women aged 37 to 42

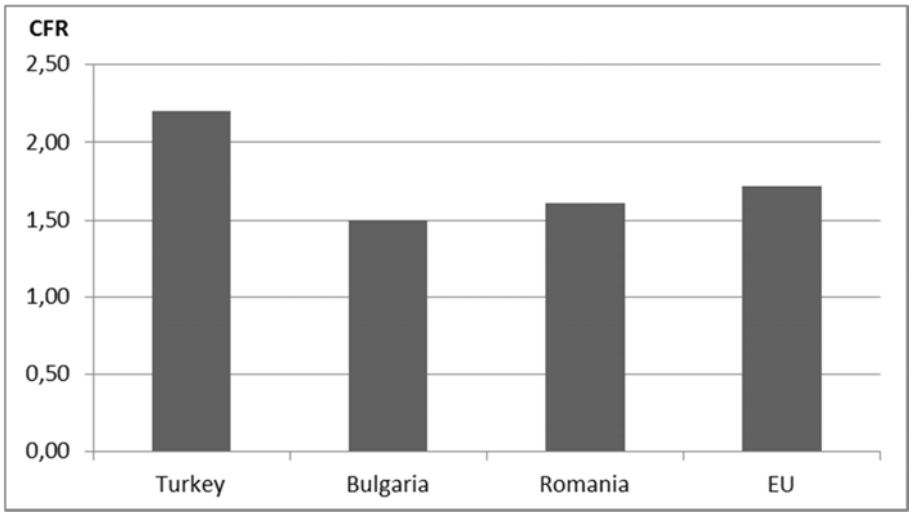
Figure 17 illustrates the evolution of completed fertiity rates by combining census with survey data for Romania and Turkey. Countries line are divided in three parts : The first one (bold line) presents the genereration for which the index is complete (census 2000 respectively 2002) while the second one (dashed line) is for the somewhat biased measure for the 1950 to1960s generations (census 2000 respectively 2002). The endpoint of the third line (dot line) presents the average number of children observed for cohorts 1969 to 1974 (survey 2011). The line for Turkey shows specific peaks for every "round" generation (born in a '00 or '05 year) due to the fact that especially for older cohorts, their exact age is unknown and hence women report "round" birth years as proxies.

As total fertility rates, completed fertility rates are declining in both countries over time. The decline is more drastic in Turkey, but completed fertility is much lower in Romania. Here, the fertilty decline trend is less important but fertility was already much lower for older cohorts. At the same time, we can see that the evolution of the completed fertility rate in Romania can be cut in three periods. Fertity decreased for cohorts 1910 to 1930, re-increased for cohorts 1930 to 1947 and decreased for younger cohorts.

A glance at history suggests that these trend inversals are not only caused by data collection and calculation modalities. The fertility increase for the 1930 to 1947 cohorts corresponds to the sharp increase in total fertility rates from 2 to almost 4 observed for the year 1967 that we have seen in the previous section, the year in which abortion became illegal (n° 770 decret of the Nicolae Ceausescu administration, 1st of october 1966. At this time, abortion was one of the most current contraceptive methods in Romania. It's interdiction caused an important fertility increase during the two first years of it's application. Women borned in 1947 were 20 years old at this time and therefore most impacted by this measure (Berelson, 1979).

For the younger generations, an important part of the fertility decrease is due to an another historical event. In 1989, at the Ceausescu fall, one of the first decision was to legalize abortion. Between 1989 and 1990, the number of abortions increased from 192000 to 992300 (Muresan, 2008).

figure 18. Completed fertility rates in Turkey, Romania and Romania in comparison to the EU average



Data Source: EU SILC CS 2011, women aged 37 to 42

In Turkey, the completed fertility rate of the 1969 to 1974 cohort, observed in 2011, is –with 2.2 children per women- still above replacement level. A comparison of this approximate rate based on the SILC data with the unbiased measure of 2.9 reported by the Human Fertility Data Base (cohort 1970 observed in 2012) suggests however that the SILC measure is downward biased. This is also the case, but to a much lesser extent, for Romania and Bulgaria. Our weighted calculations based on SILC reports a CFR of 1.5 in Bulgaria (against 1.68 in the HFDB) and a CFR of 1.62 in Romania (against 1.67 in the HFDB). The European average is 1.72 for the SILC data and 1.79 for the HFDB[4].

The underestimation in the SILC data is caused by unobserved children who already moved out of their parents' households when their mothers are aged 37 to 42, i.e. we underestimate fertility for those women who started childbearing at very young ages.

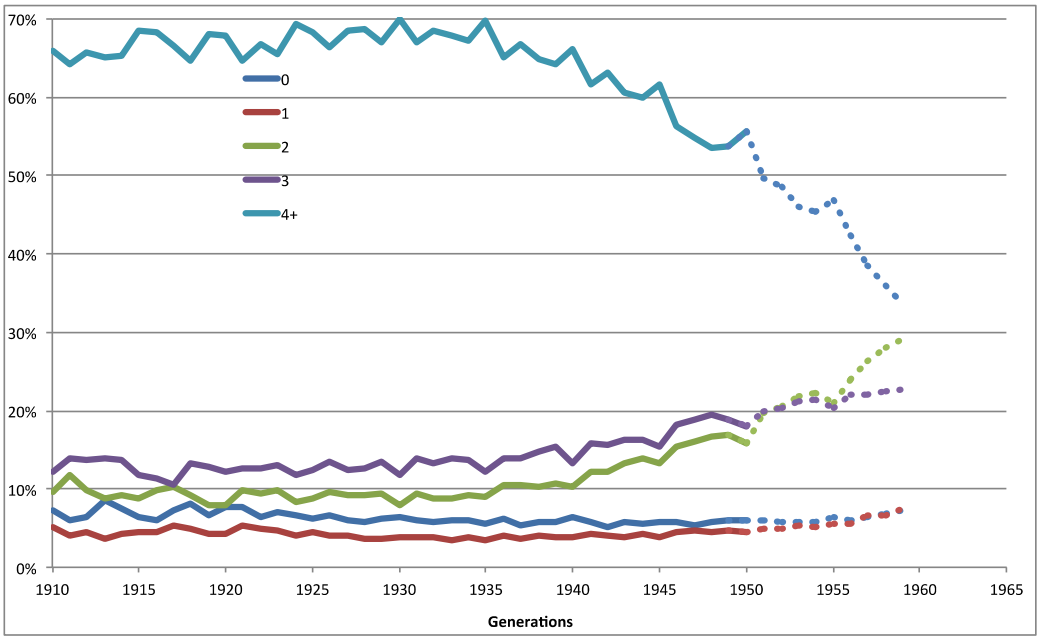
The following analysis of parity fertility and of fertility by education groups helps us identifying more precisely for which specific group fertility is particularly underestimated in each country.

3.2. Parity fertility by cohort

Figures 19 to 21 present the evolution parity fertility by cohort in Turkey, Romania and Bulgaria.

[4] Eu average in EU SILC CS 2011 based on 26 countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain , Sweden, Switzerland, United Kingdom.

figure 19. Evolution of parity fertility by cohort in Turkey

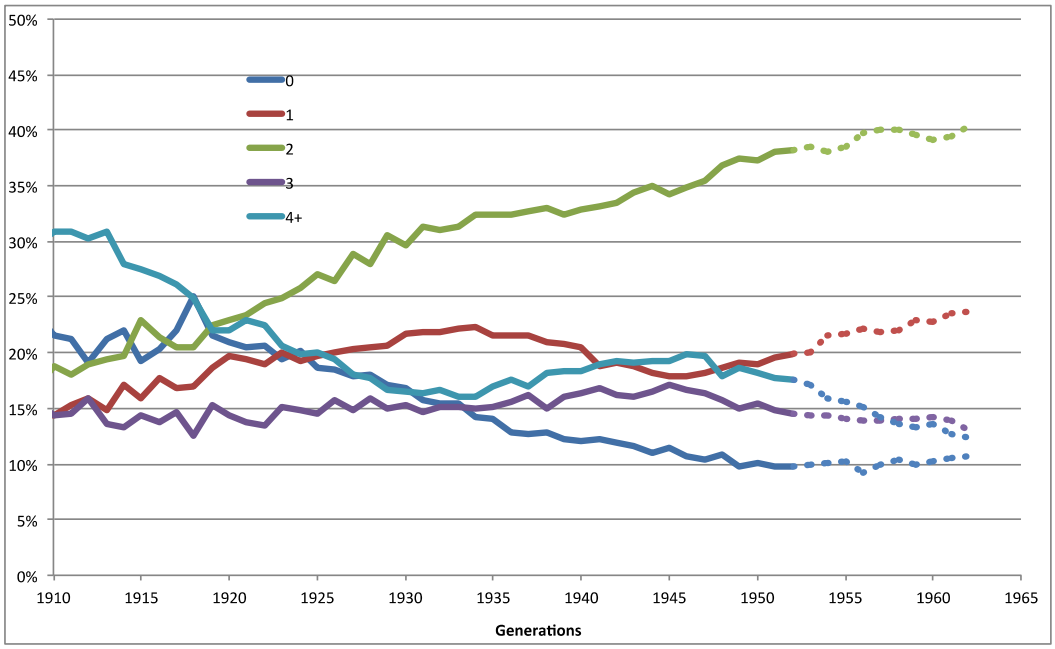


Data Source: Census (i-pums) 2000

In Turkey, until the cohort 1960, the majority of women have four or more children. At the same time, Figure 19 suggests that the fertility decrease observed in Figure 3 is mainly to the important decrease of the proportion of women whith at least four children. Large families are for the most replaced by families with two and three children. In parallel, the proportion of childless women and of those having one child only stays relatively stable in the Turkish population among all generations.

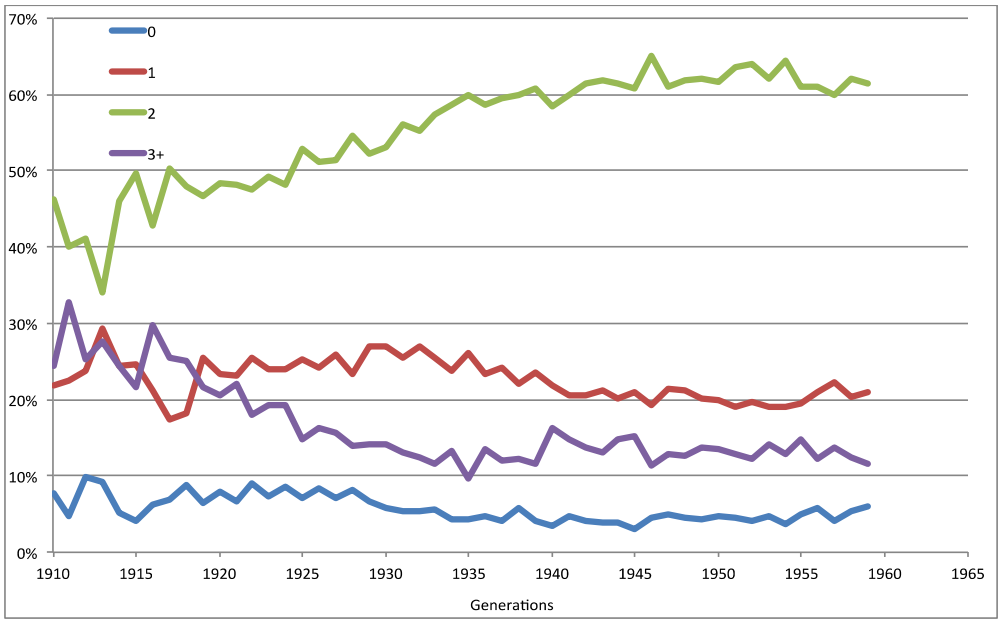
Figure 19 confirms a low and stable proportion of childless women for the 1969 to 1974 cohort (SILC 2011) but suggests an increase in the proportion of women having one child. Women having two or three children now represent the majority of women, while the proportion of women having at least four children has decreased. Even though Figure 19 leads one to suspect a dramatic decline of women having four or more children for younger cohorts, it is likely that the underestimation bias in the SILC data leads to an overemphasis of this decline. We conclude that the downward bias of fertility in EU SILC concerns mainly women with more than three children. These women risk having their first children at relatively early ages, and these children probably already moved out when their mothers are around their forties.

figure 20. Evolution of parity fertility by cohort in Romania



Data Source: Census (i-pums) 2002

figure 21. Evolution of parity fertility by cohort in Bulgaria

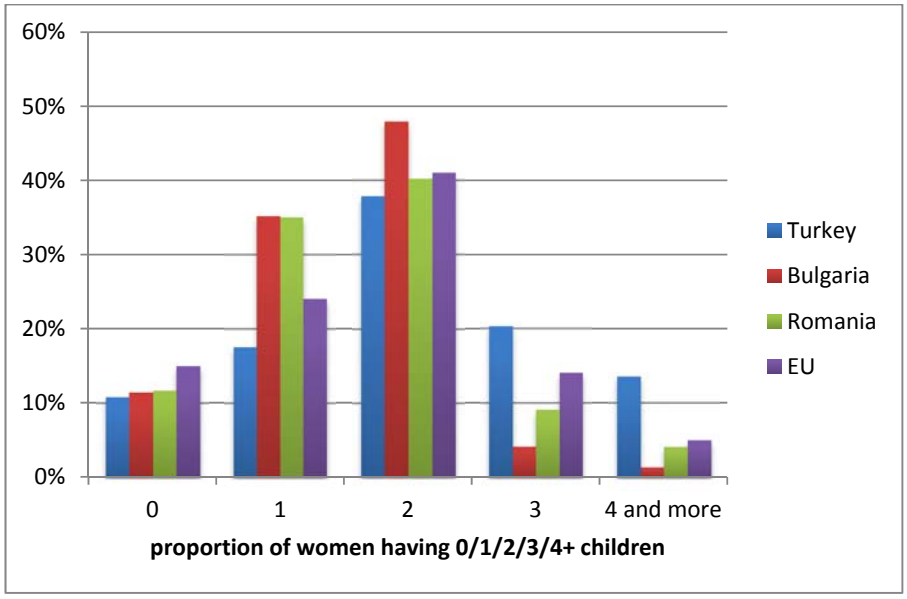


source : Elena Koytcheva and Dimiter Philipov, demographic research, 2008 Data : Bulgarian 2001 census

Figure 20 and 21 show that in Bulgaria and Romania, parity trends are more stable compared to Turkey. Families having three or more children are on the decline, while two-child families are

becoming more and more the norm. Childlessness stagnates around 10%. SILC data confirms these trends for the 1969 to 1974 cohorts.

figure 22. Parity fertility by cohort in Turkey, Romania and Bulgaria in comparison to the EU average



Data Source: EU SILC CS 2011, women aged 37 to 42

Figure 22 shows that in all three countries as well as on average in Europe, most women have two children. With around 10% , the proportion of childless women is actually below EU average in all three countries, while having one child only is very common in Romania and Bulgaria. Only few women have three or more children in Romania and Bulgaria, while this proportion in higher in Turkey and on average in the EU. Consequently, the probabiltiy of transition from having zero to having at least one child is around 90% in all three countries, while the probability of having at least two children is much higher in Turkey in comparision to Bulgaria, Romania and the EU average (table 3). This suggests that in Bulgaria and Romania, there is no important barrier for the arrival of a first child in comparison to other countries, but there seem to be important barriers for the arrival a child of higher rank. Estimations of the determinants of child arrival differentiated by rank presented later on will shed light on these potential barriers.

table 3. Transition probabilities (parity progression ratios)

	weighted proportions of women having					transition probabilities of having at least			
	0 children	1 child	2 children	3 children	4+ children	1 child	2 children	3 children	4+ children
Turkey	0,108	0,175	0,378	0,203	0,135	0,89	0,80	0,47	0,40
Bulgaria	0,114	0,352	0,479	0,041	0,014	0,89	0,60	0,10	0,25
Romania	0,117	0,350	0,402	0,091	0,041	0,88	0,60	0,25	0,31
EU	0,154	0,237	0,415	0,145	0,050	0,85	0,72	0,23	0,06

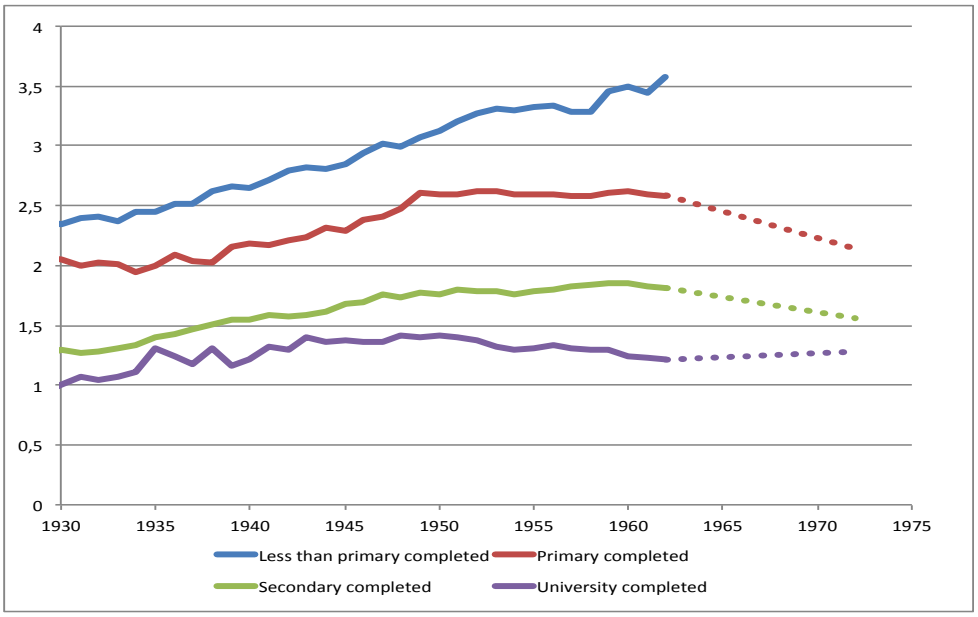
Source: EU SILC CS 2011, women aged 37 to 42

At the same time, it could be that a barrier for having a first child postpones first childbirth rather than impeding it. In this case, children of higher parity would not arrive because of mothers' advanced age. However, first childbirth is not particularly postponed in Bulgaria and Romania in comparison to other countries. For women aged 37 to 42 observed in 2011, we observe a mean age at first childbirth of around 23 in all three countries (EU average 26). The mean age at childbirth for women having only one child at the end of their childbearing period is 25 in Bulgaria and Romania, 27 in Turkey and 28 on average in the EU. This shows that on average, the age at first childbirth for women having only one child is not too high to hinder the arrival of further children, pointing to institutional rather than biological barriers for the arrival of children of higher rank in Bulgaria and Romania.

3.3. Differential fertility: education

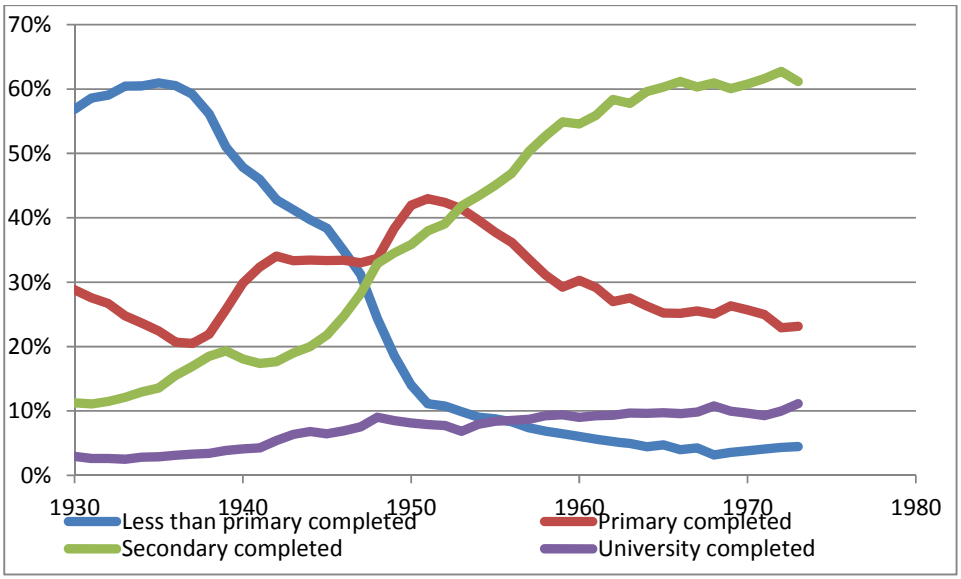
Figure 23 differentiates completed fertility by women's educational achievement in Romania, while Figure 24 sheds light on the evolution of the distribution of Romanian women among education groups.

figure 23. CFR by women's education in Romania



Source: Census (i-pums) 2002 and EU SILC CS 2011, women aged 37 to 42

figure 24. Proportion of women by level of education in Romania



Source: Census (i-pums) 2002

Overall in Romania, the higher the education, the lower women's number of children. The fertility trend by educational achievment in Romania shows that for the 1930 to 1950 cohorts, the fertility increase due to the abolishment of abortion concerned all edcuational groups. For the younger cohorts, fertility stagnates on low levels below replacement level for women with secondary and university education. The blue line giving information about the number of children of women with less than primary completed education stops at cohort 1950 as the SILC survey does not report any women in this lowest-low education group for the 1969 to 1974 cohort.

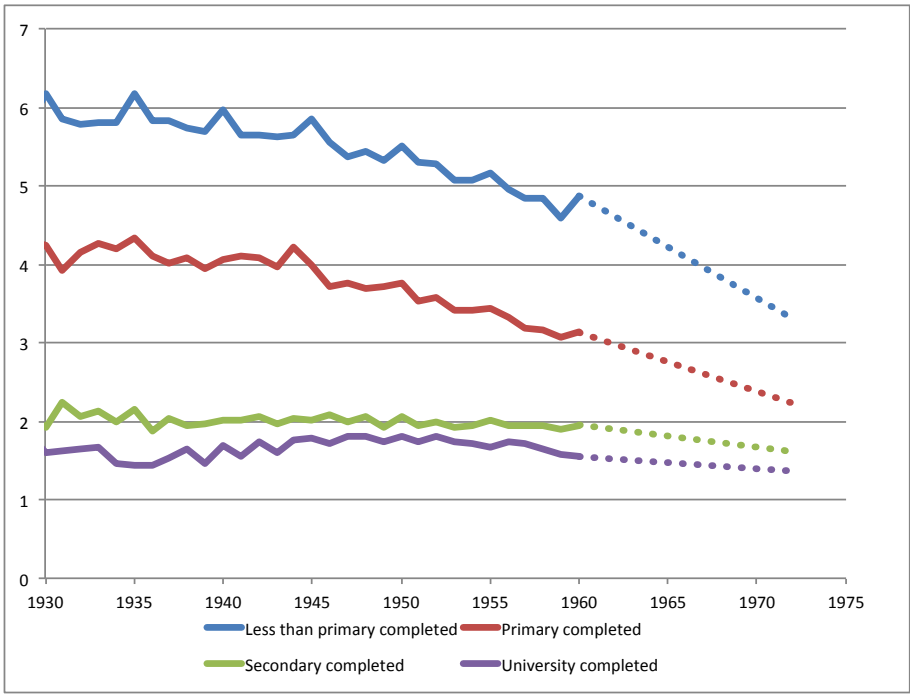
A glance of the distribution of women shows that in Romania, the decline in completed and total fertility rates is mainly due to a structure effect: the proportion of women with secondary education has been dramatically increasing, and fertility is much lower for women with a secondary diploma in comparison to lower educated women. In contrast to survey data, census data still reports a proportion of around 5% of women having less than primary completed education for the 1969 to 1974 cohort. This strongly suggests that fertility measures in the SILC survey data are mainly downward biased due to the underrepresentation of lowest-low educated which have relatively high fertility rates.

(Note: the increase in fertility for higher education groups of the 1930 to 1950 cohort can also be explained by the sociological transformation of education groups coming hand in hand with increasing investments in women's education: Historically, the majority of women of older cohorts having access to higher education have few children. With the democratization of the access to education, a new kind of women coming from families with different fertilty patterns arrives in the high education groups. This can explain a temporary raise of fertility in these groups before an assimilation process sets in.)

In Turkey, the situation is quite different from the situation in Romania as illustrated by Figure 25 and 26. Fertility by education follows two kinds of trends. Less educated women (less than primary education or primary diploma) experienced a fertility decrease while more educated women (secondary and tertiary) show much lower but stable fertility. The decrease in completed and total

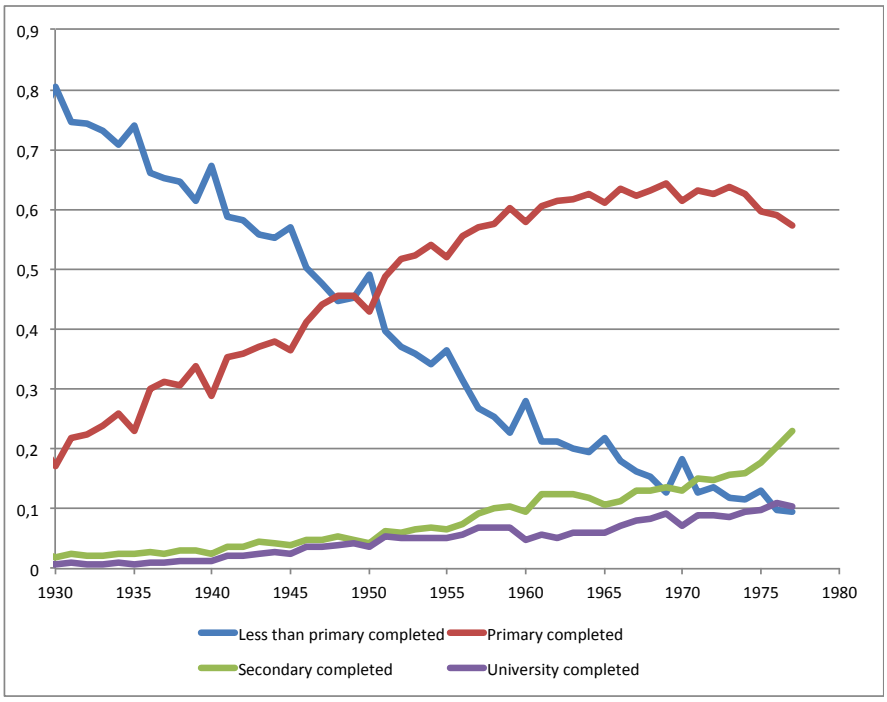
fertility rates in Romania is thus due to a level effect which comes in hand with a structure effect. Fertility decreases for women who have a primary diploma (level effect), and at the same time the proportion of women with this diploma is increasing in Turkey (structure effect). For the youngest observed cohort (1977, aged 23 in 2000), the majority of women (around 60%) have primary completed education. The proportion of women with completed secondary education is sharply rising for the 1960 to 1977 cohorts, and particularly for the latest observed cohorts. Education rates are not presented here for cohorts later than 1977 as our intention is to focus on completed education and completed fertility. We observe actually that the proportion of women with completed secondary and university education is re-decreasing for cohorts younger than 1977 in the Turkish census as these women aged 23 or younger have not yet completed their education. EU SILC data shows, nevertheless, a drastic increase in the proportion of women in secondary and tertiary education for younger cohorts in Turkey. In 2011, 30% of women aged 25 to 30 had secondary education, and 18% university education.

figure 25. CFR by women's education in Turkey



Source: Census (i-pums) 2000 and EU SILC CS 2011, women aged 37 to 42

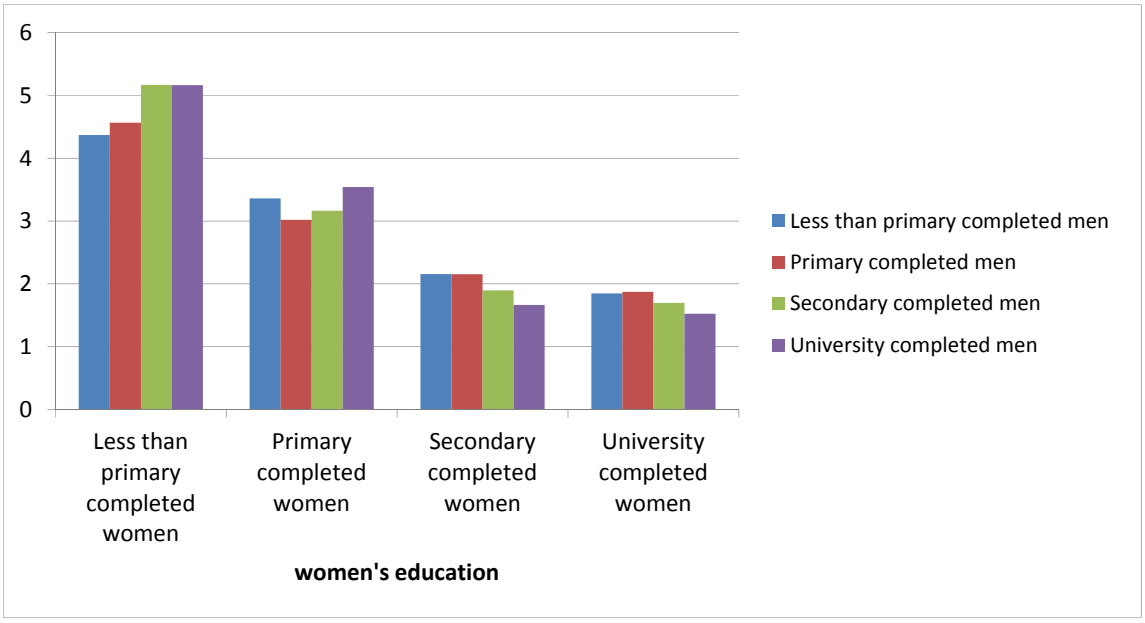
figure 26. Poportion of women by education in Turkey

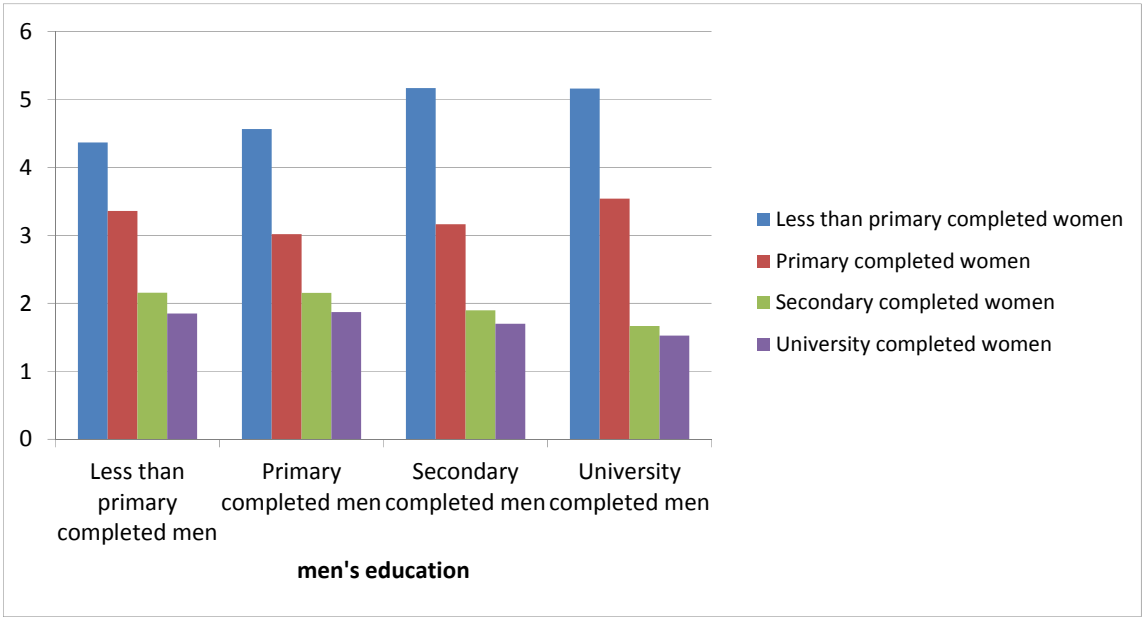


Source: Census (i-pums) 2000

Figures 27 and 28 show completed fertility rates crossing mother's and father's education for the 1950 generation of partnered women in Romania and Turkey (Census 2002, 2000).

figure 27. Completed fertility rates according to women's and their partner's level of education in Romania





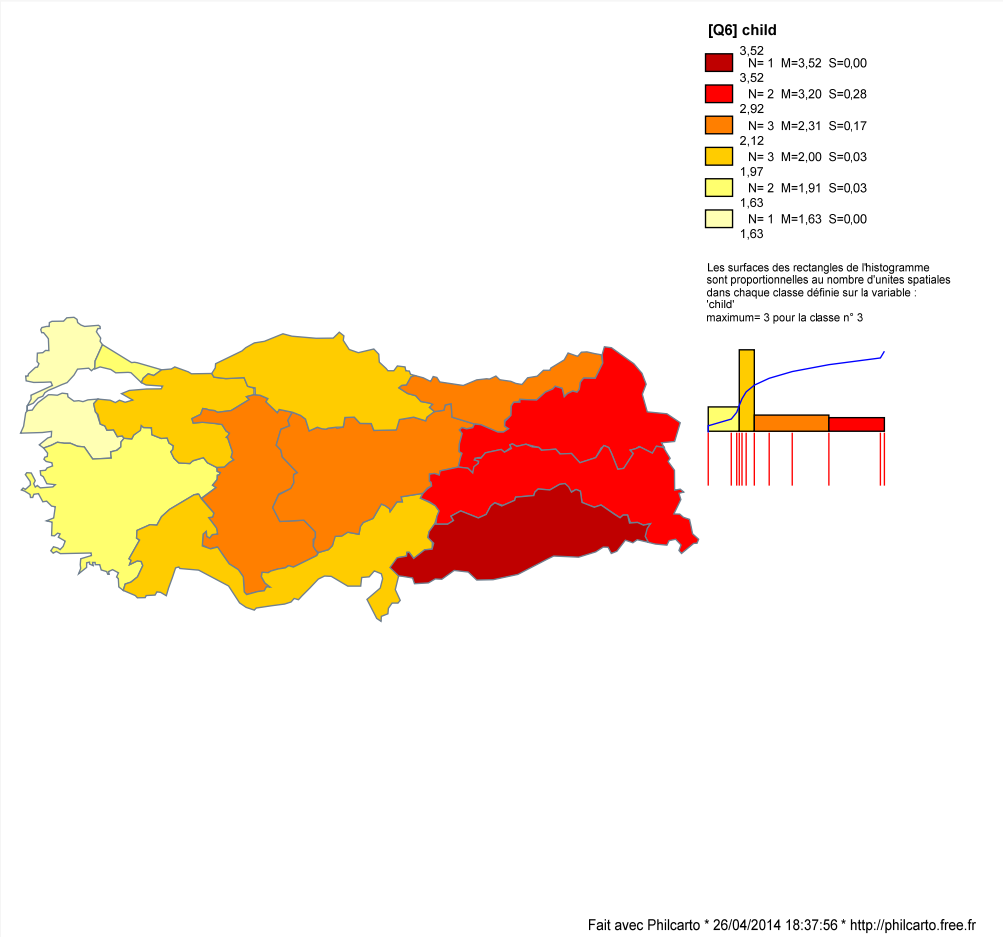
Source: Census (i-pums) 2002, women cohort 1950

In both countries, women's educational level is more determinant for fertility than the education level of their partner. The more the woman is educated, the less will be her completed fertilty rate, relatively independent of the education of her partner. The biggest fertility gap is confirmed between women with primary education or less vs. women with at least secondary education, while the fertility difference between seconday and tertiary educated women is less important. For men, we find important fertility differentials within each education group which are explained by the education level of their female partners.

3.4. Differential fertility: region/ethnicity

An analysis of fertility differentials by region (SILC cohorts 1969 to 1974) shows strikingly higher fertilty levels for South-East Turkey in comparison to the other Turkish regions (map 1). Comparing our completed fertility rates by region with those reported by the Turkish Demographic and Health Survey (2008, women aged 40 to 49) results in the same ranking of regions and suggests that SILC data underestimates fertility rates especially for the South-East region where fertility is highest and mothers have their children relatively early.

map 1. Regional fertility differentials in Turkey

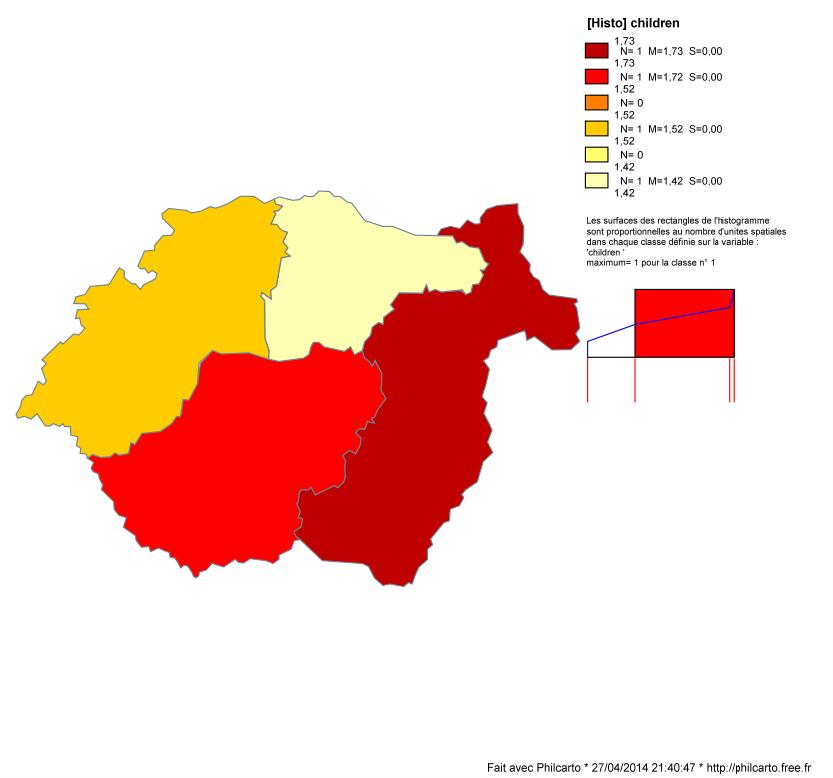


Source: EU SILC CS 2011, women aged 37 to 42

Regional differences can also be confirmed for Romania with higher fertility rates in the South-East (map 2).

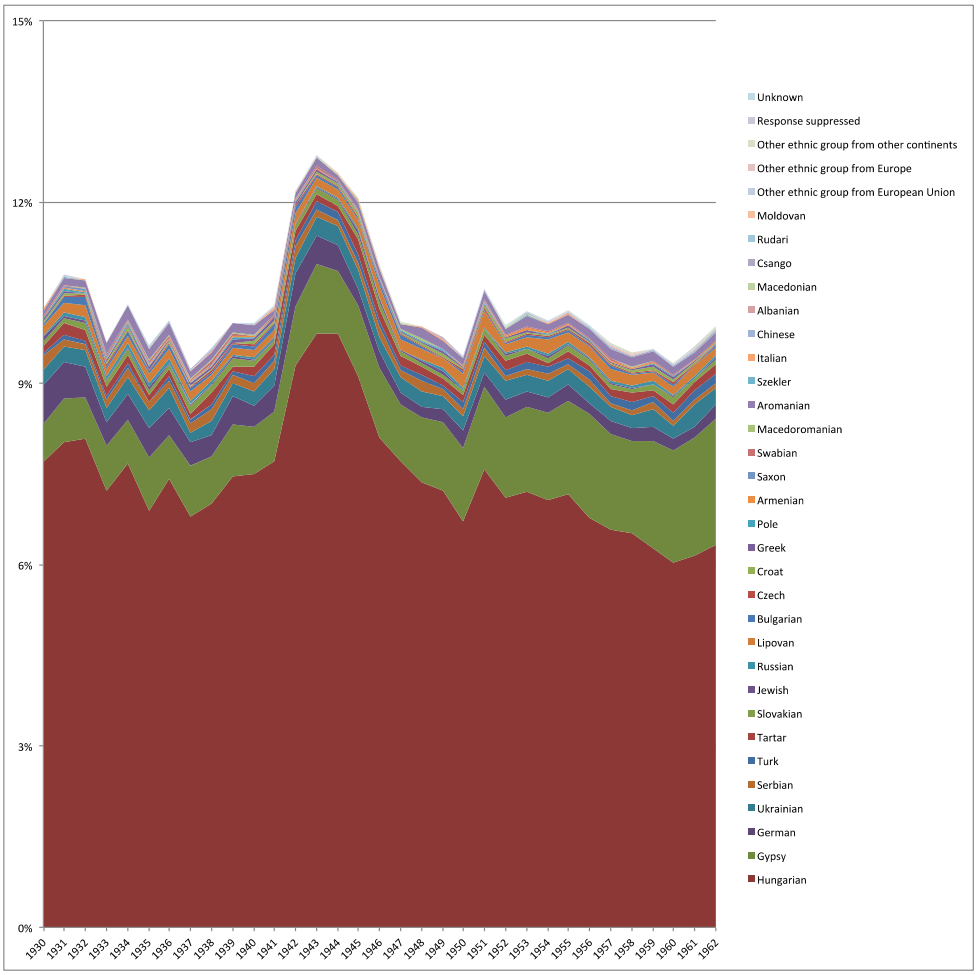
For Bulgaria, SILC allows distinguishing only two regions: In Northern and Eastern Bulgaria, we observe a completed fertility rate of 1,61 while the rate is, with 1,4, much lower in South-Western and South-Central Bulgaria.

map 2. Regional fertility differentials in Romania



Source: EU SILC CS 2011, women aged 37 to 42

figure 28. Proportion of women by ethnic minority in Romania

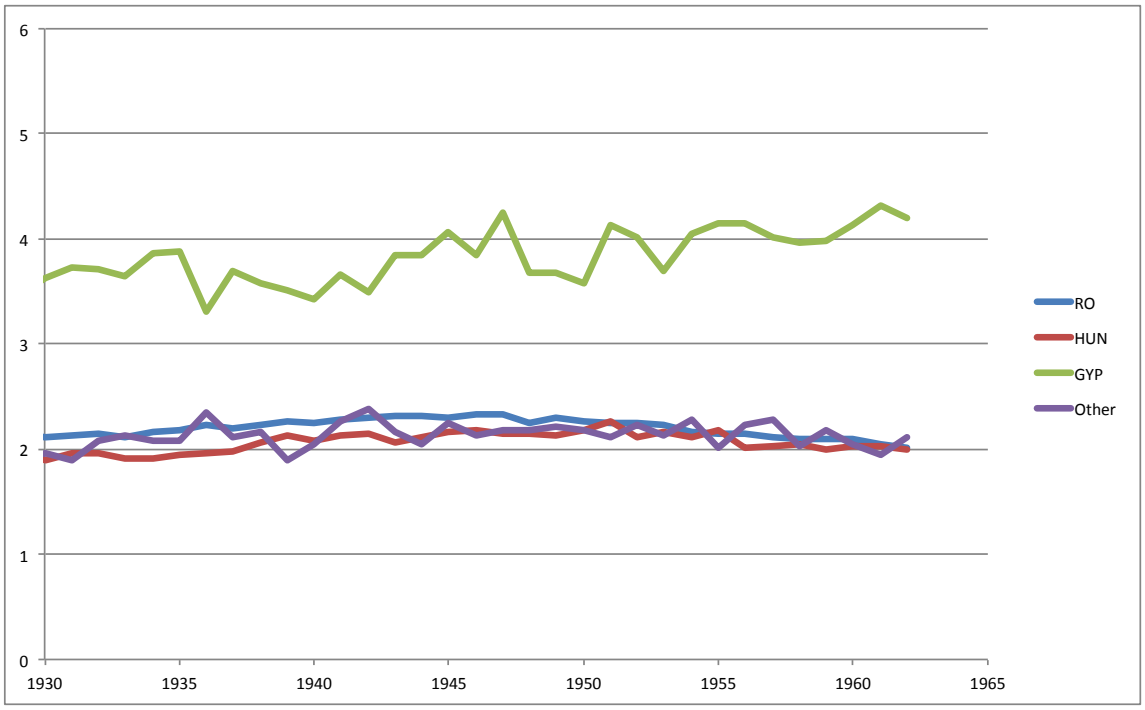


Source: Census (i-pums) 2002

The Romanian census data gives information about the ethnical origin of the mother. This variable is not a strict ethnical variable as it gives not only information about the ethnical background but also about the national groups like Hungarian or Turkish. Nationality does not necessarily correspond to the country of birth but can go back to precedent generations.

Figure 29 show the distribution of ethnical minorities in Romania, representing about 10% of the population. The most important ethnicity is Hungarian followed by Gypsies, in the following called "Roma". The proportion of Roma among women has been increasing for younger cohorts in the census, but is -with around 3% for the 1962 cohort- relatively small. Figure 30 shows that Roma women have a significant higher average number of children than the other ethnicities including Romanian women, which show no differences in fertility. It seems that the fertility gap between Roma women and other women in Romania increases slightly from earlier to younger cohorts due to a small increase in fertility of Roma women.

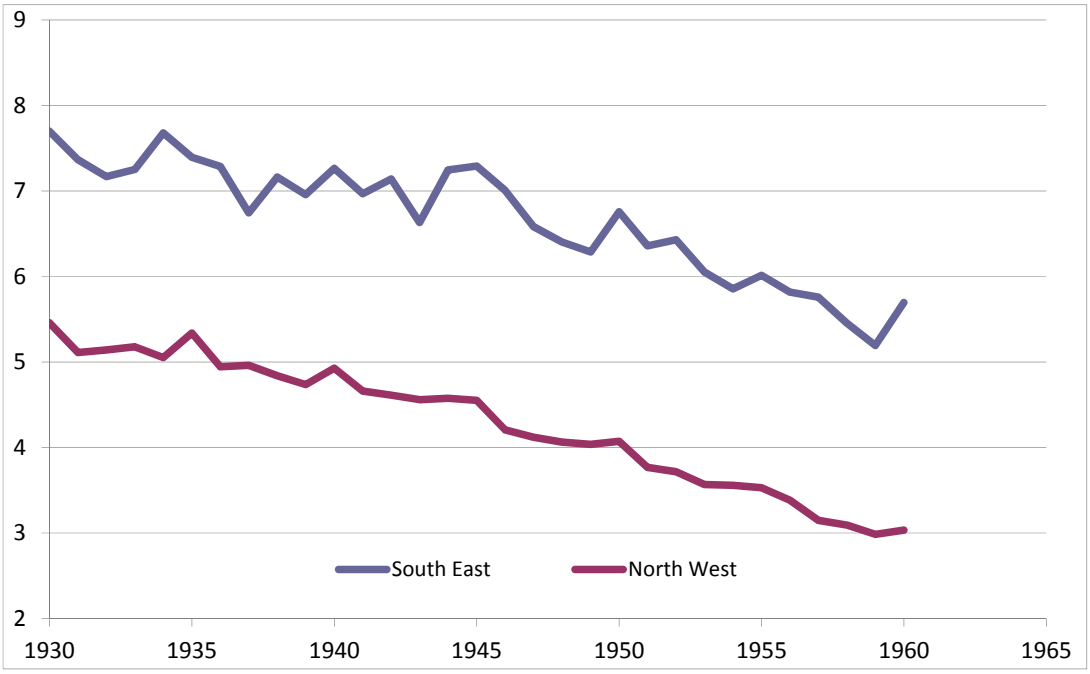
figure 29. CFR by ethnicity in Romania



Source: Census (i-pums) 2002

The Turkish census data does not report the ethnical background of mothers, but the province of birth of the mother. As Figure 31 shows, fertility levels are higher for women of the South-East region of Turkey(provinces in the South-East are: Kars, Ardahan and Igdir, Agri, Van, Mus, Bingöl, Bitlis, Mardin, Hakkari, Siirt, Batman and Sirnak, Diyarbakir, Tunceli, Sanliurfa), while 14% of Turkish women are from this region for the cohort 1960. The fertility decrease over generations can be observed for regions, but there exists an important fertility gap between the two groups which is constant over all generations.

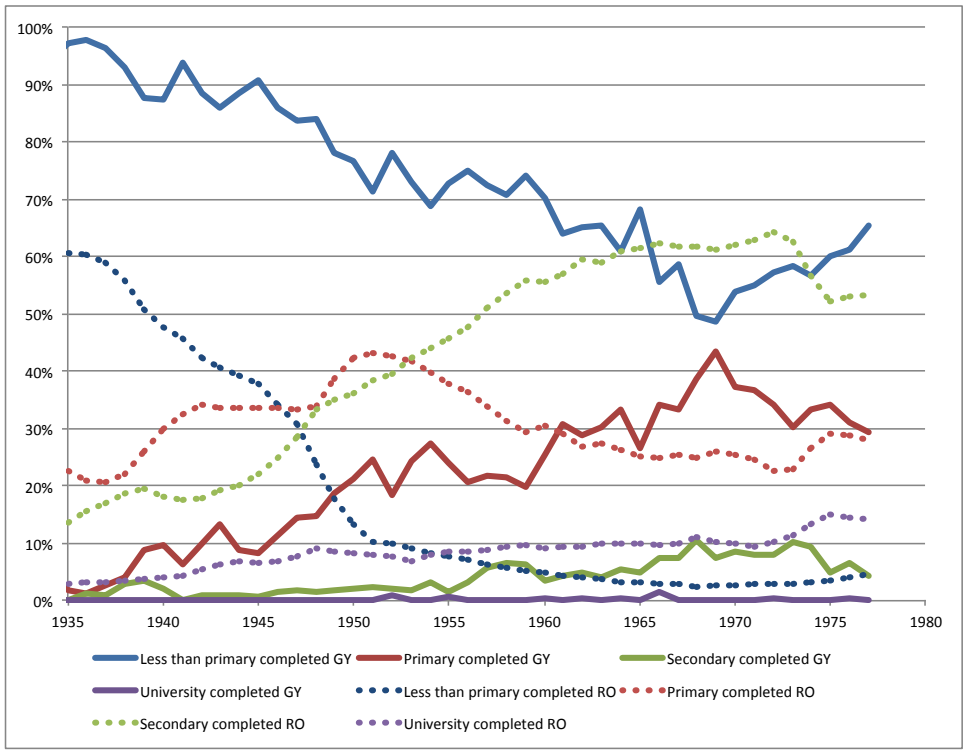
figure 30. CFR by regional background of the mother in Turkey



Source: Census (i-pums) 2000

So far we have identified important fertility differencials inside Turkey and Romania according to education and regional/ethnical background. In order to see if education outweights region/ethnicity (or the other way round) we now cross region/ethnicity and education for our analysis of fertility differentials within countries.

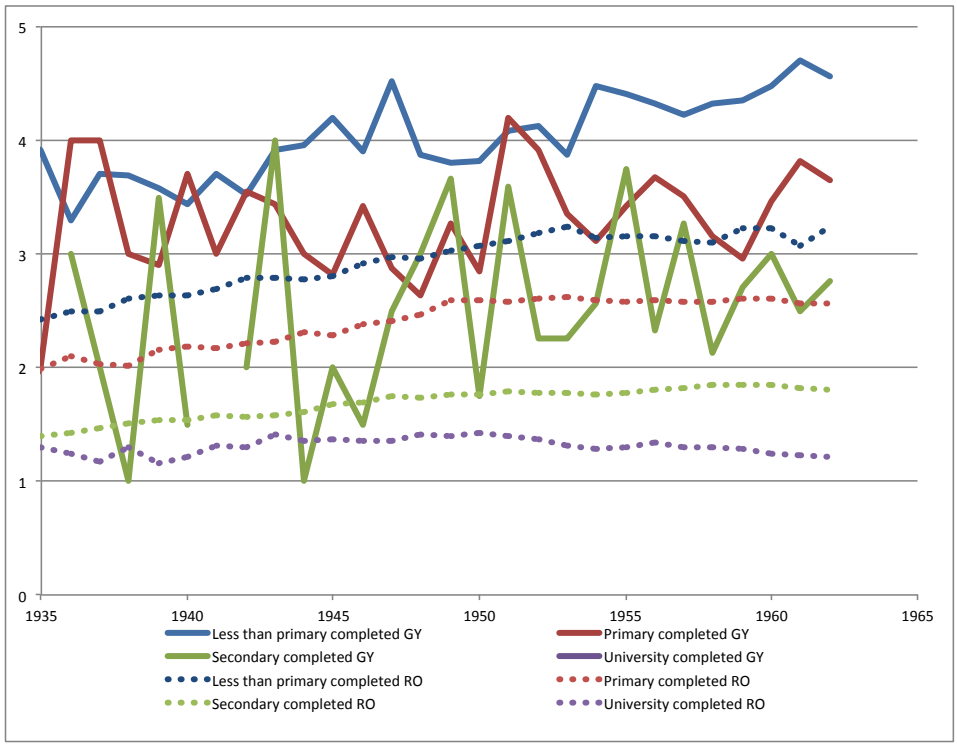
figure 31. Evolution of the distribution of Roma and Romanian women among education groups for Romania (bold line Roma women GY, dot line Romanian women RO)



Source: Census (i-pums) 2002

Figure 32 reveals that over all generations, Roma women experienced an important increase in education, but this increase is limited to completed primary education. In addition, a trend reversal can be seen for the 1965 to 1975 cohorts with more and more Roma women staying illitarate or literate but without a primary diploma. Secondary and university educational achievemnt are almost inexistent in this population (5% for secondary) and there is no observable trend suggesting increases in these categories. For the younger cohorts, still more than 60% of women that didn't finish primary school. Comparing Roma to Romanian women, only completed primary rates are similar for the youngest cohort. The biggest gap exists for completed secondary education, with over 50% for Romanian women against around 5% for Roma women. The percentage of Romanian women with completed university education is, with 12%, still quite low for the 1977 cohort, but trends suggest that more and more women complete secondary education and pass on to university education.

figure 32. CFR of women by ethnicity and education in Romania (bold line Roma women GY, dot line Romanian women RO)



Source: Census (i-pums) 2002

In Figure 33, for Roma women only the lines illustrating fertility for primary and secondary education are interpretable. Fluctuations of the line illustrating Roma fertility for secondary education are huge due to the small number of women in this group. However, Figure 35 suggests fertility for Roma women to be higher for all levels of education. For both Roma and Romanian women, the Figure suggests that women's number of children is decreasing with education.

Regressions based on the 1960 cohort of the 2002 census (women aged 42) confirm that education has a negative impact on the completed number of children controlled for the Roma ethnicity (model 1).

table 4. Regression for Romania with endogenous variable: completed number of children, OLS with robust standard errors

	Model 1	Model 2	Model 3
Less than primary education	1.403***	*Ref.*	1.193***
Primary completed education	0.749***	*Ref.*	Ref.
Secondary education	*Ref.*		*Ref.*
University education	-0.609***		Ref.
Higher than primary		-0.925***	
Roma	1.125***	1.520***	1.340***
Roma*higher than primary		-0.489	
Roma*less than primary			-0.083
Intercept	1.855***	2.694***	2.037***
p (Roma while having higher than primary education)		0.1960	
p (higher than primary while being Roma)		0.0817	
p (Roma while having less than primary education)			0.0000
p (less than primary education while being Roma)			0.0005
N	14184	14184	14184
Adjusted R^2	0.131	0.111	0.060

* p<0.05, ** p<0.01, *** p<0.001

Data : Census (i-pums) 2002, cohort 1960

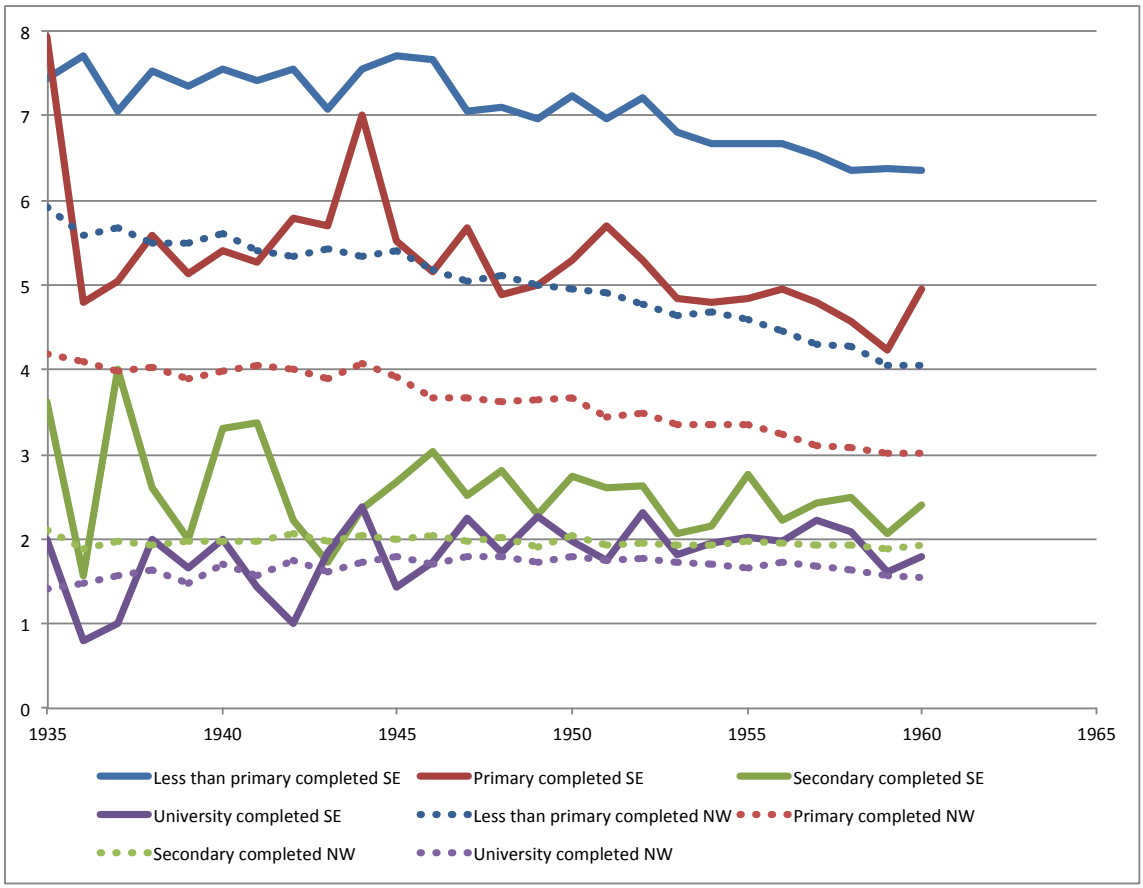
Model 2 shows that the positive impact of Roma on fertility for women who have higher education than completed primary is reduced (1.520-0.489) and even gets insignificant (p value of joint significance 0.196) in comparision to the impact of Roma for those having less than primary and primary education. The negative effect on fertility of having an education higher than primary is even more negative for Roma women in comparision to Romanian women (-0.925-0.489).

(Interpretation of coefficients: Romanian women who have more than primary eduation have 1 child less in comparison to Romanian women with less than primary and primary education. Roma women with more than primary education have 1,5 children less than Roma women with less than primary and primary education).

Finally, model 3 shows that the positive impact of Roma on fertility for women without a primary diploma is somewhat reduced in comparison to the effect of Roma for graduate women, but stays significant (1.3-0,08). The positive impact of having no diploma on fertility is somewhat reduced for Roma women in comparison to Romanian women but also stays significant (1.19-0.08).

These results suggest an assimilation of fertility behaviour of Roma women towards Romanian women once education levels for Roma women converge towards those of Romanian women.

figure 33. CFR of women by regional background and education



Source: Census (i-pums) 2000

Figure 35 shows that there is an important fertility difference of around 2 children between South-Eastern and North-Western women for the less educated women. For more educated women (at least secondary completed), this difference is reduced to 0,5 children only, suggesting that in Turkey, fertility differentials between North-Western and South-Eastern women are likely to dispappear once women of both groups get into secondary education – an education level that is not the norm for cohort 1960, neither for South-Eastern nor for North-Western women.

table 5. Regression for Turkey with endogenous variable: completed number of children, OLS with robust standard errors

	Model 1	Model 2	Model 3
Less than primary education	1.165***	Ref.	1.290***
Primary completed education	*Ref.*	*Ref.*	*Ref.*
Secondary education	-1.105***		*Ref.*
University education	-1.416***		*Ref.*
Higher than primary		-1.438***	
South-East	1.818***	2.450***	1.335***
South-East*university	-1.568***		
South-East*higher than primary		-2.051***	
South-East*less than primary			0.741***
Intercept	2.952***	3.231***	2.737***
p (South-East for higher than primary)	0.0146	0.0001	
p (higher than primary for South-East)		0.0000	
p (South-East for less than primary)			0.0000
p (less than primary for South-East)			0.0000
N	29316	29316	29316
Adjusted R^2	0.2589	0.2175	0.2240

* p<0.05, ** p<0.01, *** p<0.001

Data: Census (i-pums) 2000 , cohort 1960

Model 2 of our regressions based on the 1960 cohort of the 2000 census (women aged 40) shows that the positive impact of the South-Eastern background on fertility for women who have higher education than completed primary is reduced to a large extent (2.45-2.05) but stays significant (p value of joint significance 0.0) in comparision to the impact of the South-Eastern background for those having less than primary and primary education. The negative effect on fertility of having education higher than primary is even more negative for South-Eastern women in comparision to North-Western women (-1.43-2.05).

(Interpretation of coefficients: North-Western women who have more than primary eduation have 1.43 children less in comparison to North-Western women with less than primary and primary education. South-Eastern women with more than primary education have 2,5 children less than South-Eastern women with less than primary and primary education).

These results suggest an assimilation of fertility behaviour of South-Eastern women towards North-Western women once education levels for Sotuth-Easter women converge towards those of North-Western women.

To conclude, we find important fertility differentials in Romania and Turkey according to region, ethnic background and education, while regression results suggest that education is a key variable for fertility which out weights region and ethnicity.

The following micro econometric analysis of determinants of child arrival in Turkey, Bulgaria and Romania is based on the longitudinal data set of SILC (waves 2003 to 2011). For this module, information on region and ethnicity is not available. Our analysis so far suggests, however, that

education, and especially having not completed primary education, is a good proxy for region and ethnicity.

Table 7 illustrates for Turkey that those regions with high completed fertility rates (SILC cohort 1969 to 1974, observed in 2011) are those with low average education levels and high proportions of illiterate women.

table 6. Differential fertility in Turkey – region vs education

region n° (nuts)	region name	cfr	cfr rank (1 low, 12 high)	rank educ(1 hig,h 12 low)	prop illiterate	rank illiterate (1 low, 12 high)	among the 11% illiterate women, ..% live in each region	among the 9% university women, ..% live in each region	among the 20% poorest women, ..% live in each region	% of women living in each region
1	Istanbul	1,94	3	2	0,05	5	0,10	0,30	0,05	0,20
2	West Marmara	1,63	1	4	0,06	6	0,02	0,03	0,05	0,04
3	Aegean	1,88	2	1	0,04	1	0,05	0,21	0,13	0,14
4	East Marmara	2,04	6	6	0,05	3	0,05	0,08	0,08	0,10
5	West Anatolia	2,12	7	3	0,04	2	0,04	0,15	0,07	0,10
6	Mediterranean	2,00	5	5	0,05	4	0,07	0,09	0,15	0,14
7	Central Anatolia	2,53	9	9	0,10	9	0,05	0,03	0,06	0,05
8	West Black Sea	1,97	4	8	0,10	7	0,05	0,04	0,07	0,06
9	East Black Sea	2,29	8	7	0,10	8	0,03	0,03	0,04	0,03
A	Northeast Anatolia	2,92	10	10	0,23	10	0,05	0,01	0,04	0,02
B	Central Deast Anatolia	3,48	11	12	0,48	12	0,15	0,01	0,07	0,03
C	Southeast Anatilia	3,52	12	11	0,45	11	0,33	0,02	0,18	0,08

Source: EU SILC CS 2011, women aged 37 to 42

We conclude thus that for our micro econometric analysis, taking into account the educational level of women captures quite well their regional background. We will not be able to disentangle effects between education, region and ethnicity, but including education in our regression models will reduce a potential omitted variable bias caused by the fact that we cannot control directly for region and ethnicity.

4. Micro econometric analysis: The impact of women's activity status on child arrival

4.1. Construction of the data base and econometric procedure

We estimate women's probability of having a child (differentiated by rank one, two and three) with a logit regression model while taking into account women's, their partner's and household's characteristics observed during a certain period *before* child arrival, by focussing on parents' activity status. With this procedure, we capture determinants of parents' decision to have a child while reducing endogeneity bias, as parents' labour market situation *before* the arrival of a second child is less likely to be influenced by the (future) existence of a second child than if we would observe parents' characteristics at the time of childbirth or after childbirth. However, inverse causality cannot be completely ruled out, as couples (most likely the father) deciding for a child may increase labour market participation before childbirth to prepare for cost increases. At the same time, couples (most likely mothers) may anticipate time needed for the child by reducing or stopping labour market participation, or at least by reducing or stopping efforts to find a job, even before the arrival of the child. We reduce this endogeneity bias by observing parents' labour market status not only before child arrival, but over a certain period *before procreation* of a child. This is possible as EU SILC contains information about labour market status on a monthly basis as well as about the quarter of births.

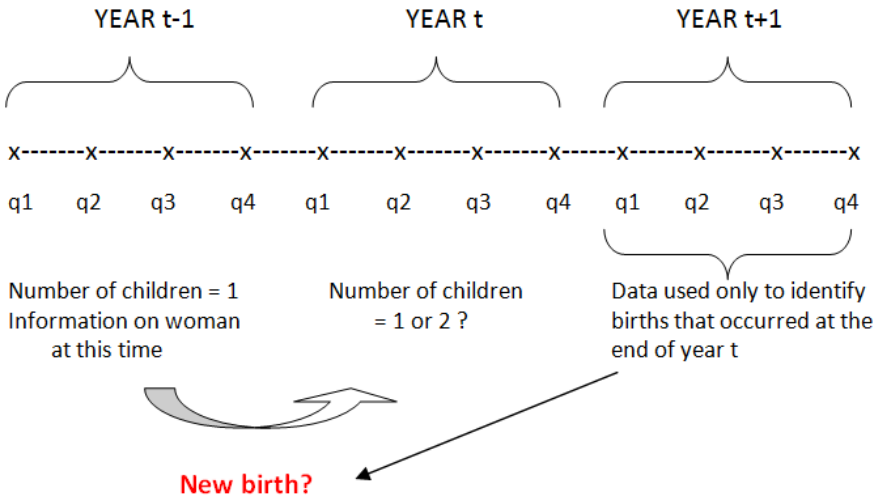
We use the longitudinal data set of the EU-SILC covering the years 2006 to 2011 for Turkey and Bulgaria and 2007 to 2011 for Romania.

We restrict our sample to women aged 15 to 45 years old. For Turkey, we estimate separately the determinants of first, second and third child arrival. For Bulgaria and Romania, we group the two countries as well as all first to third child arrivals together (while controlling for country-fixed effects and rank) because the number of observations and of birth events in Bulgaria and Romania is too low for a separate analysis by rank and country. A large number of observations is necessary not only to obtain consistent estimates but also for being able to cross exogenous variables, as for example activity status and education (analysis of the impact of activity status differentiated by women's education level).

A dummy variable indicating the arrival of a child during the observed period serves as endogenous variable, while we observe the women's and their (if existing) partners' characteristics before potential procreation. This data transformation allows us to apply a simple logit estimation model.

In order to obtain the information needed, individuals have to be observed over a period of at least three years. Children born in the third and the fourth quarters of each year are generally declared at the interview of the year after as interviews usually take place during the first half of each year. Births that occur at the end of the year are thus not detectable immediately. Three consecutive years of interviews are thus needed; year *t* and year *t+1* to identify all births that occur in year *t*, and year *t-1* to observe the mothers' (and their partners') characteristics over a certain period before potential procreation.

The following diagram summarizes how the data is used in order to obtain the required information for analysing the determinants of the arrival of a child, using the example of a child of rank two.



The dependent variable is built as follows:

- Y = 1 if the woman gives birth to a (second) child at year *t* (test group)
- Y = 0 if the woman does not give birth to a (second) child in year *t* (whatever happens in year *t+1*) (control group)

The event "child arrival / no child arrival" is observed in year *t*. Individual characteristics that we consider as possible determinants of the "event" are observed in year *t-1*. Year *t+1* only served to make sure that we observe all child arrivals of year t. We create for each woman a dummy variable *Y=(0/1)* and then keep only year *t-1*. The therewith obtained cross-section structure of the data base allows us estimating the probability of having a child as a function of individual characteristics observed in the year before 'potential' childbirth by using a logit model.

Around 40% of individuals are observed not only for three, but for four consecutive years. Those who are observed during four years (*t-1* to *t+2*) and who haven't had a child in year *t* are observed twice, once in *t* and once in *t+1*. A change in their situation from *t-1* to *t* could explain the arrival of a child in *t+1* rather than in *t*. In addition, allowing for two potential 'events' for individuals observed for four years increases the number of observations. We nevertheless apply robustness checks in order to avoid estimation bias due to unbalanced panel data (we include fixed effects for individuals observed a second time; we drop second-time observations to see if estimation results change).

A woman who is observed during three years and who gives birth to a child in year *t+1* will be in the control group ("no child arrival in year t) because we would need wave *t+2* to observe all childbirths in *t+1*.

Childbirth is taken into account also if an additional child arrives in the following year. The ranks of children are correctly attributed even if a child is observed in the first period but 'disappears' during the observed period (we assume that in this case this child moved out because we observe that these children are usually quite old). In addition, children moving back or into their mother's household during the observed period are not falsely considered as child arrivals as their birth year is observed.

4.2. Descriptive overview of the data

Table 7 presents the covered tme period, the number of observations in the test and control group as well as the proportion of "child arrival" events for each country.

table 7. Descriptive overview of the endogenous dummy variable "child arrival"

1st child arrival				
	time period (year before childbirth)	number of observations	number of events "1st child arrival"	prop. of events "1st child arrival"
Bulgaria	2006-2009	1368	40	0,029
Romania	2007-2009	2087	13	0,006
Turkey	2006-2009	5570	368	0,066
2nd child arrival				
	time period (year before childbirth)	number of observations	number events "2nd child arrival"	prop. of events "2nd child arrival"
Bulgaria	2006-2009	1070	36	0,034
Romania	2007-2009	1445	13	0,009
Turkey	2006-2009	2621	321	0,122
3rd child arrival				
	time period (year before childbirth)	number of observations	number of events "3rd child arrival"	prop. of events "3rd child arrival"
Bulgaria	2006-2009	1166	6	0,005
Romania	2007-2009	943	6	0,006
Turkey	2006-2009	3880	115	0,030
Data Base: EU-SILC LT 2006-2011				

Data Base: EU-SILC LT 2006-2011, women aged 15-45

Overall, child arrival proportions are larger in Turkey in comparison to Bulgaria and Romania for all ranks due to higher fertility rates in Turkey. The proportion of observed second child arrivals is larger for all countries in comparison to first child arrival, as for second child arrival, the group of observed women is much more homogenous: Women in this group (test and control group) are in most cases in a partnership and as they already have one child, they are unlikely to be infertile. The fact that the proportion of observed third child arrivals is smaller in comparison to second child arrival in all countries is in line with the finding presented in the previous section of smaller transition probabilities from second to third child arrival in comparison to those from first to second child arrival.

Ttest in how far women's activity status influences the decision of having a child, we observe women's activity status during a certain period previous to potential conception.

For children born in year *t,* four periods of childbirth are observed in the EU-SILC (1: January-March; 2: April-June; 3: July-September; 4: October to-December). For children born in period 1 in year *t*, we observe their mother's activity status in January, February and March of year *t-1* to capture a period previous to conception. For these women, we cannot observe a period longer than three months before conception, as we do not have information for the year *t-2*.

In order to avoid distortion in the measure of activity status, we also observe only three months for women with childbirth in period 2, 3 or 4 in year *t* and for women without childbirth in year *t*. For children born in period 2, we observe mother's activity status from April to June in the year before childbirth. For children born in period 3, we observe mother's labour market status from July to September in the year before childbirth. For children born in period 4, we observe the labour market status from October to December in the year before childbirth. For women in the control group (no child arrival in year *t*, the three months period of year *t-1* is arbitrarily chosen out of the four options.

We define activity market status as "stable" if it does not change during the observed period of three months. The following categories are created for women's activity status during three months before (potential) conception of a child:

- Stable employment (self-employed, employed, full-time, part time)
- Stable unemployment
- Stable inactivity
- Stable student
- Other:
    - Retirement, military service
    - Change in activity status over the three month period (this change is not reported in further subcategories as only a very small minority of women is represented by this group – see descriptive statistics table 8 to 16)

Besides women's activity status, we include a series of control variables in order to isolate the impact of activity status on women's decision of having a child from other potential determinants.

Most importantly, we include information on women's partners in our models. We control for the presence of a partner (only observed if living in the same household) and observe his activity status, following the same procedure as for women's activity status (status observed for three months before potential conception of a child). We distinguish the partner's activity status in 'stable employment' versus 'not in stable employment', as the large majority of partners are in stable employment (see table 8 to 16).

In Turkey, we control for the presence of a partner only for 1st child arrival as women having already one or two children are all reported with an observed partner. We do not drop women without an observed partner for first child arrival as almost half the Turkish women having a first child in year *t* are observed without a partner in year *t-1*, suggesting that children of rank 1 are likely to arrive in less than 12 months after partners move together in Turkey. The SILC actually reports zero out of wedlock births in Turkey (see tables 8 to 10: proportion of women with child arrival who have an observed partner but are not married). Tables 11 to 16 show that out of wedlock births are also very rare in Romania but quite frequent in Bulgaria. For the analysis with Romania and Bulgaria all birth ranks combined, we include all women with and without partners and control for the presence of a partner.

In addition to the partner, we control for women's age, the age and sex of the first child for second child arrival as well as the age of the second child and the age difference between the first two children and their sex for third child arrival. We furthermore control for women's education (highest ISCED level attained, observed in the year before potential arrival of a child) and labour income. Household wage income contains the woman's plus – if in couple- their partner's gross employee income as well as their benefits from self-employment, observed for the whole year before potential arrival of a child. Four categories are created for household wage income (zero, low, middle, high), while the latter three represent terciles, created separately for each country.

Information about region, religion, ethnicity or migrant background is not available in the EU-SILC longitudinal data. However, the previous section gave evidence that education represents a good proxy for these characteristics. Education will be used in order to identify heterogeneity in the impact of activity status on child arrival.

Information on general health status and chronic diseases of women is not included in the regression, as EU-SILC provides a very low number of observations for these variables. For those observations, the health status generally does not vary much between women with and without child arrival. Regressions for 2nd and 3rd child arrival are implicitly controlled for biological determinants of child birth such as infertility, as these women already have one or two children in *t-1*. The same is valid for the existence of a strong normative attitude against having children.

Tables 8 to 16 provide a descriptive overview of the exogenous variables by country and rank.

table 8. Exogenous variables for 1st child arrival in Turkey

		no 1st child arrival	1st child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,193	0,160	
	Stable part-time employment	0,008	/	
	Stable full-time self employment	0,079	0,052	
	Stable part-time self employment	0,040	0,054	
	Stable unemployment	0,045	0,014	**
	Stable retirement	0,002	/	
	Stable student	0,192	0,008	***
	Stable inactivity	0,385	0,639	***
	Stable military service	0,000	/	
	Change in activity status within the observed three-months period)	0,057	0,073	
Partner information	*Partner in stable employment*	0,085	0,470	***
	Partner not in stable employment	0,017	0,098	***
	No partner	0,898	0,432	***
	Partner and married	0,101	0,568	***
	Partner but not married	0,001	/	
Both in stable employment		0,038	0,152	***
Household wage income	*Zero household wage income*	0,619	0,340	***
	Low household wage income	0,132	0,149	
	Medium household wage income	0,125	0,242	***
	High household wage income	0,123	0,269	***
Educational attainment	*Low education (illiterate, prim.not completed)*	0,330	0,416	***
	Medium education (primary and secondary)	0,567	0,478	***
	High education (tertiary)	0,103	0,106	
Age	*15-24*	0,664	0,660	
	25-34	0,231	0,323	***
	35-45	0,104	0,016	***
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2006-2011, childless w omen aged 15-45				

table 9. Exogenous variables for 2nd child arrival in Turkey

		no 2nd child arrival	2nd child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,160	0,078	***
	Stable part-time employment	0,019	0,012	
	Stable full-time self employment	0,099	0,053	**
	Stable part-time self employment	0,043	0,072	*
	Stable unemployment	0,014	0,003	
	Stable retirement	0,009	/	
	Stable student	0,003	/	
	Stable inactivity	0,610	0,748	***
	Stable military service	0,000	/	
	Change in activity status within the observed three-months period)	0,045	0,034	
Partner information	*Partner in stable employment*	0,745	0,798	*
	Partner not in stable employment	0,146	0,146	
	No partner	0,110	0,056	**
	Partner and married	0,890	0,944	**
	Partner but not married	0,000	/	
Both in stable employment		0,244	0,181	*
Household wage income	*Zero household wage income*	0,126	0,087	*
	Low household wage income	0,309	0,371	*
	Medium household wage income	0,262	0,327	*
	High household wage income	0,303	0,215	**
Educational attainment	*Low education (illiterate, prim.not completed)*	0,537	0,601	*
	Medium education (primary and secondary)	0,360	0,324	
	High education (tertiary)	0,103	0,075	
Age	*15-24*	0,238	0,380	***
	25-34	0,420	0,573	***
	35-45	0,342	0,047	***
Age of first child	*0*	0,149	0,100	*
	1-2	0,237	0,393	***
	3-6	0,213	0,386	***
	7+	0,401	0,121	***
First child is female		0,437	0,483	
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2006-2011, women aged 15-45 with one child				

table 10. Exogenous variables for third child arrival in Turkey

		no 3rd child arrival	3rd child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,110	0,017	**
	Stable part-time employment	0,013	0,017	
	Stable full-time self employment	0,107	0,052	
	Stable part-time self employment	0,052	0,052	
	Stable unemployment	0,006	/	
	Stable retirement	0,005	/	
	Stable student	0,000	/	
	Stable inactivity	0,667	0,835	***
	Stable military service	0,000	/	
	Change in activity status within the observed three-months period)	0,040	0,026	
Partner information	*Partner in stable employment*	0,813	0,791	
	Partner not in stable employment	0,126	0,157	
	No partner	0,061	0,052	
	Partner and married	0,939	0,948	
	Partner but not married	0,000	/	
Both in stable employment		0,227	0,113	
Household wage income	*Zero household wage income*	0,079	0,070	
	Low household wage income	0,304	0,409	*
	Medium household wage income	0,314	0,296	
	High household wage income	0,303	0,226	
Educational attainment	*Low education (illiterate, prim.not completed)*	0,708	0,843	
	Medium education (primary and secondary)	0,239	0,139	
	High education (tertiary)	0,053	0,017	
Age	*15-24*	0,079	0,243	***
	25-34	0,422	0,617	***
	35-45	0,500	0,139	***
Age of second child	*0*	0,090	0,096	
	1-2	0,161	0,278	***
	3-6	0,234	0,409	***
	7+	0,514	0,217	***
Age difference first-second child		4,318	3,087	*
First two children have the same sex		0,458	0,557	*
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2006-2011, women aged 15-45 with 2 children				

Tables 8 to 10 show that in Turkey, the proportion of women in stable full-time employment is low for all women and decreasing with child rank. The proportion of women in stable full-time employment is significantly lower for those women who are going to have a second and third child in comparison to those who stay with one or two children. For example, the first line in table 9 shows that 16% of those women who have one child and who will not have a second child in the following year are in stable full-time employment, whereas among those women who will have a second child, only 8% are in stable full-time employment. Most women are observed inactive, and the proportion is larger for those women who will have a child in the next year. The proportion is largest for women having a third child: 84% of these women are reported inactive during the three months before conception of the third child (line 8 table 10). Part-time work as an employee is not common for Turkish women, but self-employment is quite frequent (either full time or part time). Women are actually reported as self-employed in SILC when working as contributing family workers, in subsistence activities in

agriculture and in informal and non-registered work. The majority of women's partners are in stable employment.

table 11. Exogenous variables for first child arrival in Bulgaria

		no 1st child arrival	1st child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,387	0,450	
	Stable part-time employment	0,016	/	
	Stable full-time self employment	0,008	/	
	Stable part-time self employment	0,006	/	
	Stable unemployment	0,142	0,275	*
	Stable retirement	0,005	/	
	Stable student	0,339	0,050	***
	Stable inactivity	0,074	0,200	**
	Stable military service	/	/	
	Change in activity status within the observed three-months period)	0,025	0,025	
Partner information	*Partner in stable employment*	0,096	0,400	***
	Partner not in stable employment	0,040	0,225	***
	No partner	0,864	0,375	***
	Partner and married	0,084	0,35	***
	Partner but not married	0,051	0,275	***
Both in stable employment		0,069	0,225	***
Household wage income	*Zero household wage income*	0,426	0,184	**
	Low household wage income	0,194	0,237	
	Medium household wage income	0,189	0,237	
	High household wage income	0,191	0,342	*
Educational attainment	*Low education (primary or less)*	0,057	0,105	
	Medium education(secondary)	0,768	0,737	
	High education (tertiary)	0,175	0,158	
Age	*15-24*	0,607	0,625	
	25-34	0,240	0,350	
	35-45	0,153	0,025	*
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2006-2011, childless women aged 15-45				

table 12. Exogenous variables for second child arrival in Bulgaria

		no 2nd child arrival	2nd child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,596	0,424	*
	Stable part-time employment	0,025	0,030	
	Stable full-time self employment	0,047	/	
	Stable part-time self employment	0,001	/	
	Stable unemployment	0,113	0,242	*
	Stable retirement	0,006	/	
	Stable student	0,006	/	
	Stable inactivity	0,180	0,242	
	Stable military service	/	/	
	Change in activity status within the observed three-months period)	0,026	0,061	
Partner information	*Partner in stable employment*	0,685	0,576	*
	Partner not in stable employment	0,110	0,273	***
	No partner	0,205	0,152	
	Partner and married	0,691	0,667	
	Partner but not married	0,104	0,182	*
Both in stable employment		0,487	0,303	*
Household wage income	*Zero household wage income*	0,073	0,091	
	Low household wage income	0,306	0,394	
	Medium household wage income	0,309	0,303	
	High household wage income	0,312	0,212	
Educational attainment	*Low education (primary or less)*	0,055	0,212	***
	Medium education(secondary)	0,704	0,545	*
	High education (tertiary)	0,240	0,242	
Age	*15-24*	0,120	0,273	***
	25-34	0,368	0,667	***
	35-45	0,513	0,061	****
Age of first child	*0*	0,059	0,030	
	1-2	0,125	0,303	***
	3-6	0,185	0,394	**
	7+	0,632	0,273	***
First child is female		0,460	0,364	
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2006-2011, women aged 15-45 with one child				

table 13. Exogenous variables for third child arrival in Bulgaria

		no 3rd child arrival	3rd child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,601	/	
	Stable part-time employment	0,025	/	
	Stable full-time self employment	0,043	/	
	Stable part-time self employment	0,003	/	
	Stable unemployment	0,166	0,833	***
	Stable retirement	0,001	/	
	Stable student	0,003	/	
	Stable inactivity	0,121	0,167	
	Stable military service	/	/	
	Change in activity status within the observed three-months period)	0,036	/	
Partner information	*Partner in stable employment*	0,728	0,667	
	Partner not in stable employment	0,175	0,167	
	No partner	0,097	0,167	
	Partner and married	0,838	0,167	***
	Partner but not married	0,065	0,667	***
Both in stable employment		0,532	/	
Household wage income	*Zero household wage income*	0,060	0,167	
	Low household wage income	0,310	0,667	
	Medium household wage income	0,314	0,167	
	High household wage income	0,316	/	
Educational attainment	*Low education (primary or less)*	0,070	0,333	*
	Medium education(secondary)	0,757	0,667	
	High education (tertiary)	0,174	/	
Age	*15-24*	0,035	0,500	*
	25-34	0,308	0,333	
	35-45	0,657	0,167	*
Age of second child	*0*	0,037	/	
	1-2	0,103	0,500	
	3-6	0,149	0,333	
	7+	0,710	0,167	
Age difference first-second child		4,259	5,167	
First two children have the same sex		0,499	0,667	
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2006-2011, women aged 15-45 with two childen				

table 14. Exogenous variables for first child arrival in Romania

		no 1st child arrival	1st child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,439	0,538	
	Stable part-time employment	0,001	/	
	Stable full-time self employment	0,055	0,077	
	Stable part-time self employment	0,033	/	
	Stable unemployment	0,022	0,231	***
	Stable retirement	0,127	/	
	Stable student	0,235	/	
	Stable inactivity	0,076	0,154	
	Stable military service	0,003	/	
	Change in activity status within the observed three-months period)	0,008	/	
Partner information	*Partner in stable employment*	0,250	0,692	***
	Partner not in stable employment	0,026	0,154	**
	No partner	0,724	0,154	***
	Partner and married	0,247	0,769	***
	Partner but not married	0,029	0,077	
Both in stable employment		0,202	0,538	**
Household wage income	*Zero household wage income*	0,445	0,154	*
	Low household wage income	0,182	0,231	
	Medium household wage income	0,186	0,308	
	High household wage income	0,186	0,308	
Educational attainment	*Low education (primary or less)*	0,017	/	
	Medium education(secondary)	0,819	1,000	
	High education (tertiary)	0,164	0,000	
Age	*15-24*	0,498	0,077	**
	25-34	0,299	0,923	***
	35-45	0,203	0,000	
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2007-2011, childless w omen aged 15-45				

table 15. Exogenous variables for second child arrival in Romania

		no 2nd child arrival	2nd child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,648	0,615	
	Stable part-time employment	0,001	/	
	Stable full-time self employment	0,057	0,077	
	Stable part-time self employment	0,055	0,077	
	Stable unemployment	0,013	/	
	Stable retirement	0,009	/	
	Stable student	0,006	/	
	Stable inactivity	0,192	0,231	
	Stable military service	0,001	/	
	Change in activity status within the observed three-months period)	0,017	/	
Partner information	*Partner in stable employment*	0,815	0,846	
	Partner not in stable employment	0,059	0,154	
	No partner	0,126	/	
	Partner and married	0,825	1,000	
	Partner but not married	0,049	/	
Both in stable employment		0,626	0,692	
Household wage income	*Zero household wage income*	0,049	0,154	
	Low household wage income	0,318	0,154	
	Medium household wage income	0,316	0,308	
	High household wage income	0,316	0,385	
Educational attainment	*Low education (primary or less)*	0,013	/	
	Medium education(secondary)	0,857	0,923	
	High education (tertiary)	0,130	0,077	
Age	*15-24*	0,065	0,154	
	25-34	0,345	0,769	**
	35-45	0,590	0,077	***
Age of first child	*0*	0,031	/	
	1-2	0,090	0,308	**
	3-6	0,169	0,462	**
	7+	0,710	0,231	***
First child is female		0,453	0,308	
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2007-2011, women aged 15-45 with one child				

table 16. Exogenous variables for third child arrival in Romania

		no 3rd child arrival	3rd child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,554	0,667	
	Stable part-time employment	0,003	/	
	Stable full-time self employment	0,110	0,167	
	Stable part-time self employment	0,072	/	
	Stable unemployment	0,014	/	
	Stable retirement	0,010	/	
	Stable student	0,004	/	
	Stable inactivity	0,223	0,167	
	Stable military service	0,001	/	
	Change in activity status within the observed three-months period)	0,009	/	
Partner information	*Partner in stable employment*	0,857	0,667	
	Partner not in stable employment	0,085	/	
	No partner	0,058	0,333	**
	Partner and married	0,920	0,667	*
	Partner but not married	0,023	/	
Both in stable employment		0,638	0,667	
Household wage income	*Zero household wage income*	0,047	0,167	
	Low household wage income	0,315	0,333	
	Medium household wage income	0,318	0,333	
	High household wage income	0,319	0,167	
Educational attainment	*Low education (primary or less)*	0,031	/	
	Medium education(secondary)	0,894	1,000	
	High education (tertiary)	0,075	/	
Age	*15-24*	0,016	0,167	**
	25-34	0,328	0,667	
	35-45	0,656	0,167	*
Age of second child	*0*	0,029	/	
	1-2	0,091	0,167	
	3-6	0,207	0,500	
	7+	0,673	0,333	
Age difference first-second child		4,360	4,500	
First two children have the same sex		0,496	0,667	
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2007-2011, women aged 15-45 with two children				

Tables 11 to 16 show that in Bulgaria and Romania, the proportion of women in stable full-time employment is quite high for all women, not decreasing with child rank and not lower for women with child arrival in the following year. Like in Turkey, part-time employment is not common for women in both Bulgaria and Romania, but self-employment is a bit less frequent in Romania and much less frequent in Bulgaria in comparison to Turkey.

At the same time, for both Bulgaria and Romania, there are no observations in several activity categories due to the low number of women with observed child arrival. In others categories, the numbers of observations is mostly too low to obtain significance in the difference between the proportions of women with and without child arrival.

This confirms our choice of grouping both countries and all ranks of child arrival together for the estimations.

4.3. Estimation results

table 17. First child arrival in Turkey

Table: Probability of 1st child arrival in Turkey (logit regressions with robust standard errors)

childless women aged 16-45

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Woman's activity status								
Stable employment	-0.342*	*Ref.*	-0.273	-0.315*	-0.439*	-0.364*	-0.409*	-0.284+
(ft & pt, employed and self-employed)	(-2.38)		(-1.38)	(-2.03)	(-2.31)	(-2.04)	(-2.45)	(-1.48)
Stable unemployment		-0.516						
		(-1.04)						
Stable inactivity		0.543***						
		(3.85)						
Stable student		-2.407***						
		(-4.04)						
Other (unstable, retirement...)		0.698**						
		(2.91)						
Partner information								
Partner in stable employment			-0.0215					
			(-0.09)					
Partner not in stable employment			*Ref.*					
No partner	-3.022***	-2.738***	-3.072***	-3.019***	-3.010***	-3.019***	-3.020***	-3.019***
	(-21.66)	(-19.95)	(-12.91)	(-21.66)	(-16.97)	(-21.66)	(-21.68)	(-21.63)
Women's education								
no graduate (less than primary completed)				0.319				
				(1.88)				
Household labour income								
zero and lowest tercile					-0.0574			
					(-0.29)			
Women's type of employment								
family worker						-0.142		
						(-0.65)		
agricultural work							-0.192	
							(-0.86)	
not registered in social security								-0.292+
								(-1.46)
Interaction terms								
stable employment and stable employed partner			-0.131					
			(-0.47)					
stable employment and no graduation				0.0500				
				(0.12)				
stable employment and low household income					0.269			
					(0.88)			
Woman's age								
16-24	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
25-34	-0.426**	-0.507***	-0.422**	-0.396*	-0.411**	-0.416**	-0.407**	-0.438**
	(-2.73)	(-3.44)	(-2.69)	(-2.55)	(-2.60)	(-2.64)	(-2.60)	(-2.76)
35-45	-3.077***	-3.160***	-3.079***	-3.067***	-3.063***	-3.088***	-3.081***	-3.082***
	(-7.15)	(-7.37)	(-7.15)	(-7.12)	(-7.12)	(-7.15)	(-7.14)	(-7.16)
"Second event" fixed effects	0.252*	0.226+	0.251*	0.254*	0.256*	0.248+	0.254*	0.246
	(1.98)	(1.77)	(1.97)	(1.99)	(2.01)	(1.95)	(1.99)	(1.93)
Intercept	-0.331*	-0.747***	-0.297	-0.414**	-0.306*	-0.360**	-0.337*	-0.353**
	(-2.52)	(-4.45)	(-1.29)	(-3.02)	(-2.07)	(-2.78)	(-2.57)	(-2.72)
Number of observations	5494							
Number of events	347							
Pseudo R^2	0.2289	0.2577	0.2290	0.2306	0.2292	0.2284	0.2292	0.2281
Test of joint significance:								
p (employed if partner employed)[1]			0.0436					
p (partner employed if employed)			0.6327					
p (employed if no graduate)				0.4978				
p (no graduate if employed)				0.3364				
p (employed if low household labour income)					0.4730			

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

"stable employment": employed and self-employed (ft & pt) during 3 months before procreation

[1] test H_0: ($\beta_{\text{stable employment}} + \beta_{\text{interaction: stable employment and stable employed partner}}$)=0

Table 17 shows regression results for the determinants of first child arrival in Turkey. Model 1 shows that being in stable employment is significantly negatively correlated with the probability of having a first child one year later in comparison to all other activity categories. Model 2 distinguishes the other activity categories and shows that women who are in inactivity have a higher probability of having a first child in comparison to women being in stable employment (the estimation coefficient of the category 'other' is also significantly positive, but only very few women are in this category).

The following three models include categorical variables for partner status, education and income as well as their interactions with the categorical variable 'stable employment'. This procedure allows differentiating the effect of women's stable employment on first child arrival by partner status, education and income.

Model 3 suggests that the negative effect of employment is significant for those women who are with a partner who is himself in stable employment (-0.27-0.13, joint p-value 0.0456), meaning that once women have an employed partner, the probability of having a first child is higher for those women who are not employed. Employment is significantly negatively correlated with first child arrival only for graduate women (model 4; effect of employment for non-graduate women representing 18¨% of observed women: -0,31+0,05, p-value 0.4978) and only for households with medium and high income levels (model 5; effect for zero and low income households representing 73% (60% zero and 13,3% low) of households: -0,3+0,27; p-value 0.475).

For models 6 to 8, the categorical variable 'stable employment' represents only a certain type of employment, while the other types are included separately. Model 6 shows that employment is significantly negatively correlated with first child arrival in contrast to other activity categories only for employees and employers, but not for family workers (representing 29% of observed active women). The same is valid only for women active in non-agricultural activities, but not for those in agricultural activities, representing 30% of active women (model 7). Model 8 shows finally that for women both registered and non-registered in social security, employment is significantly negatively correlated with first child arrival in comparison to all other activity categories (42% of women's employment activity is non-registered in this sample).

table 18. Probability of stable employment in Turkey for childless women (logit regressions with robust standard errors)

	Model 1	Model 2	Model 3
Partner			
In stable employment		1.227***	
		(4.68)	
Not in stable employment		*Ref.*	
No partner		1.113***	
		(4.45)	
Woman's education			
no graduate (less than primary completed)			-0.428***
			(-4.83)
Primary and secondary			*Ref.*
University education			1.377***
			(13.77)
Woman's age			
16-24	*Ref.*	*Ref.*	*Ref.*
25-34	1.036***	1.027***	0.764***
	(15.35)	(14.82)	(10.69)
35-45	0.645***	0.676***	0.544***
	(6.70)	(6.84)	(5.57)
Intercept	-1.110***	-2.218***	-1.116***
	(-28.98)	(-8.86)	(-27.04)
Number of observations	5494		
Number of events	1739		
Pseudo R^2	0.0360	0.0398	0.0731

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

Table 18 shows that there is a significantly positive impact of women's age and education on the probability of being in stable employment for childless women. The more childless women are educated , the higher their probability of being in stable employment, even when controlling for age. Women with university education have a significantly higher probability of being stable employed in comparison to women with primary and secondary education, and women with less than completed primary education have a lower probability of being employed in comparison to women with primary and secondary education. When referring this finding to the results of table 17, we conclude that for those educated women who are employed in formal working activities outside the agricultural sector, employment has a significantly negative impact on 1st child arrival. For low educated women who are mainly working as contributing family workers in agriculture, being active does not influence their probability of having a first child.

table 19. Probability of 2nd child arrival in Turkey (logit regressions with robust standard errors)

Table: Probability of 2nd child arrival in Turkey (logit regressions with robust standard errors)

married women aged 16-45 having one child, with observed partner

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Woman's activity status								
Stable employment	-0.285+	*Ref.*	-0.783+	-0.306+	-0.279+	-0.498*	-0.525**	-0.539*
(ft & pt, employed and self-employed)	(-1.82)		(-1.49)	(-1.81)	(-1.44)	(-2.39)	(-2.64)	(-2.35)
Stable unemployment		-0.889						
		(-0.88)						
Stable inactivity		0.328*						
		(2.08)						
Other (unstable, retirement, student…)		-0.220						
		(-0.61)						
Partner information								
Partner in stable employment			-0.374+					
			(-1.90)					
Partner not in stable employment			*Ref.*					
Women's education								
no graduate (less than primary completed)				0.518*				
				(2.43)				
Couple's joint labour income								
zero and lowest tercile					0.234+			
					(1.60)			
Women's type of employment								
family worker						0.0944		
						(0.40)		
agricultural work							0.113	
							(-0.50)	
not registered in social security								-0.138
								(-0.64)
Interaction terms								
stable employment and stable employed partner			0.576					
			(1.04)					
stable employment and no graduation				0.116				
				(0.27)				
stable employment and low household income					0.0719			
					(0.22)			
Woman's age								
16-24	0.252 +	0.247+	0.257+	0.178	0.200	0.224+	0.218+	0.223+
	(1.71)	(1.66)	(1.73)	(1.17)	(1.33)	(1.50)	(1.47)	(1.49)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
35-45	-1.959***	-1.961***	-1.999***	-2.015***	-1.995***	-1.963***	-1.996***	-1.961***
	(-5.77)	(-5.77)	(-5.78)	(-5.85)	(-5.81)	(-5.73)	(-5.78)	(-5.71)
Age of first child								
0	-1.060***	-1.064***	-1.071***	-1.082***	-1.073***	-1.063***	-1.068***	-1.062***
	(-4.64)	(-4.65)	(-4.68)	(-4.78)	(-4.72)	(-4.65)	(-4.68)	(-4.65)
1-2	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
3-6	0.322*	0.334*	0.339*	0.346*	0.335*	0.327*	0.330*	0.320*
	(2.11)	(2.19)	(2.21)	(2.26)	(2.20)	(2.14)	(2.16)	(2.09)
7+	-0.423 +	-0.393	-0.431+	-0.403	-0.422+	-0.416+	-0.418+	-0.425+
	(-1.67)	(-1.55)	(-1.70)	(-1.59)	(-1.66)	(-1.64)	(-1.64)	(-1.67)
First child is female	0.154	0.155	0.149	0.144	0.150	0.154	0.165	0.153
	(1.20)	(1.21)	(1.16)	(1.12)	(1.17)	(1.20)	(1.29)	(1.19)
"Second event" fixed effects	0.115	0.121	0.117	0.109	0.117	0.117	0.117	0.116
	(0.89)	(0.93)	(0.90)	(0.84)	(0.90)	(0.90)	(0.90)	(0.90)
Intercept	-1.608***	-1.905***	-1.294***	-1.645***	-1.688***	-1.595***	-1.602***	-1.591***
	(-10.28)	(-9.64)	(-5.65)	(-10.47)	(-10.17)	(-10.17)	(-10.24)	(-10.11)
Number of observations	2351							
Number of events	303							
Pseudo R^2	0.1064	0.1089	0.1084	0.1107	0.1083	0.1079	0.1091	0.1080
Test of joint significance:								
p (employed if partner employed)[1]			0.2091					
p (partner employed if employed)			0.6961					
p (employed if no graduate)				0.6385				
p (no graduate if employed)				0.1007				
p (employed if low household labour income)					0.4394			

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

"stable employment": employed and self-employed (ft & pt) during 3 months before procreation

[1] test H_0: ($\beta_{\text{stable employment}} + \beta_{\text{interaction: stable employment and stable employed partner}}$)=0

Table 19 shows regression results for the determinants of second child arrival in Turkey, confirming the results found for first child arrival. Being in stable employment is significantly negatively correlated with the probability of having a second child, while women who are in inactivity have a higher probability of having a second child (model 1 and 2).

Stable employment is significantly negatively correlated with second child arrival only for graduate women, but is insignificant for non-graduate women who represent 11,5% of observed women already having a first child (model 4). Employed women also have a significantly lower probability of having a second child in comparison to women with other activity categories (inactive, unemployed…) when being in a household with middle or high income, but there is no significant difference in the probability of second child arrival between activity categories for women with zero and poor household labour income, representing 40% of the sample (10% zero and 30% low) (model 5). The effect of employment is significantly negative for women working as employees and employers, but insignificant for contributing family workers, representing 33% of active women in the sample (model 6). We find a significantly negative coefficient for women engaged in non-agricultural activities, but not for those active in agriculture (representing 35% of active women in the sample) (model 7). Finally, only for women in registered activities, employment significantly decreases their probability of having a second child, while there is no significant difference in the impact of employment vs. non-employment for women in informal activities (43%) (model 8).

Table 20 confirms that for women with one child, the probability of being in stable employment increases with age. Women with university education have a significantly higher probability of being in stable employment in comparison to those with primary and secondary education, but women with less than primary education also have a higher probability of being employed. Low educated women might be active in the presence of a first child because the family needs the additional income of the mother and because mothers' working activity is probably informal work, as contributing family worker, in the agricultural sector, and thus easier to combine with childrearing than work as a formal employee. Referring to table 19, a similar explanation might serve to understand why women active in these sectors do not have a lower probability of second (and first as table 18 has shown) child arrival in comparison to inactive or unemployed women, but women active in formal jobs outside agriculture do have a lower probability of second (and first) child arrival in comparison to inactive women, unemployed women (and students): For low educated women working in subsistence activities, child arrival might not necessarily imply job loss. For educated women in formal activities, child arrival is likely to come in hand with a work and income cessation for a considerable period in Turkey. This is why women who are already inactive or unemployed have a higher probability of deciding in favour of a child in comparison to educated women working in formal jobs outside agriculture. Besides this explanation, we acknowledge that education and type of employment can also capture non-observed characteristics like norms, values, access to family planning etc.

table 20. Probability of stable employment in Turkey for women with one child (logit regressions with robust standard errors)

Table: Probability of stable employment in Turkey (logit regressions with robust standard errors)

married women aged 16-45 having one child, with observed partner

	Model 1	Model 2	Model 3
Partner			
In stable employment		0.867***	
		(5.81)	
Not in stable employment		*Ref.*	
Woman's education			
No graduate			0.245+
			(1.59)
Primary and secondary			*Ref.*
University education			1.751***
			(11.64)
Woman's age			
16-24	-0.402**	-0.394**	-0.0413
	(-2.98)	(-2.89)	(-0.28)
25-34			
35-45	0.474***	0.563***	0.397**
	(3.51)	(4.14)	(2.85)
Age of first child			
0	-0.278+	-0.261+	-0.294+
	(-1.58)	(-1.47)	(-1.59)
1-2			
3-6	0.223+	0.202+	0.366*
	(1.64)	(1.47)	(2.56)
7+	0.389*	0.428**	0.757***
	(2.48)	(2.72)	(4.49)
Intercept	-1.108***	-1.893***	-1.579***
	(-10.09)	(-10.76)	(-12.58)
Number of observations	2351		
Number of events	695		
Pseudo R^2	0.0411	0.0553	0.0887

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

table 21. Probability of 3rd child arrival in Turkey (logit regressions with robust standard errors)

Table: Probability of 3nd child arrival in Turkey (logit regressions with robust standard errors)

married women aged 18-45 having two children, with observed partner

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Woman's activity status								
Stable employment	-0.849**		-1.601+	-1.020**	-1.017*	-1.178*	-1.328*	-1.399+
(ft & pt, employed and self-employed)	(-2.94)		(-1.60)	(-2.85)	(-2.50)	(-2.28)	(-2.57)	(-1.93)
Stable unemployment		/						
Stable inactivity		0.908**						
		(3.15)						
Other (unstable, retirement, student…)		-0.0346						
		(-0.05)						
Partner information								
Partner in stable employment			-0.296					
			(-1.06)					
Partner not in stable employment			*Ref.*					
Women's education								
no graduate				0.843***				
				(3.30)				
Couple's joint labour income								
zero and lowest tercile					0.0932			
					(0.43)			
Women's type of employment								
employed as family worker						-0.620+		
						(-1.72)		
employed in agriculture							-0.562	
							(-1.64)	
not registered in social security								-0.676*
								(-2.08)
Interaction terms								
stable employment and stable employed partner			0.850					
			(0.81)					
stable employment and no graduation				0.572				
				(0.92)				
stable employment and low household income					0.382			
					(0.66)			
Woman's age								
18-24	0.756**	0.755**	0.748**	0.586*	0.719**	0.734**	0.717**	0.727**
	(2.82)	(2.81)	(2.77)	(2.17)	(2.61)	(2.64)	(2.62)	(2.69)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	
35-45	-1.189***	-1.182***	-1.197***	-1.225***	-1.185***	-1.186***	-1.181***	-1.180***
	(-3.60)	(-3.58)	(-3.61)	(-3.65)	(-3.58)	(-3.56)	(-3.56)	(-3.55)
Age of second child								
0	-0.812*	-0.801*	-0.807*	-0.793*	-0.805*	-0.804*	-0.804*	-0.806*
	(-2.09)	(-2.06)	(-2.08)	(-2.07)	(-2.08)	(-2.07)	(-2.07)	(-2.08)
1-2	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
3-6	0.397+	0.404+	0.407+	0.455+	0.407+	0.396+	0.396+	0.394+
	(1.52)	(1.54)	(1.55)	(1.77)	(1.58)	(1.52)	(1.52)	(1.51)
7+	-0.273	-0.255	-0.269	-0.223	-0.265	-0.279	-0.278	-0.290
	(-0.78)	(-0.73)	(-0.77)	(-0.64)	(-0.76)	(-0.79)	(-0.79)	(-0.82)
Age difference between first and second child	-0.165**	-0.166**	-0.163**	-0.144**	-0.162**	-0.164**	-0.165**	-0.164**
	(-3.07)	(-3.11)	(-3.05)	(-2.73)	(-2.99)	(-3.05)	(-3.06)	(-3.05)
First two children have same sex	0.412*	0.416*	0.411*	0.435*	0.405*	0.415*	0.409*	0.416*
	(2.06)	(2.08)	(2.05)	(2.15)	(2.02)	(2.07)	(2.04)	(2.08)
Intercept	-2.631***	-3.509***	-2.390***	-2.849***	-2.675***	-2.644***	-2.623***	-2.642***
	(-8.60)	(-9.23)	(-6.11)	(-9.29)	(-8.36)	(-8.65)	(-8.57)	(-8.65)
Number of observations	3644							
Number of events	109							
Pseudo R^2	0.1061	0.1091	0.1075	0.1198	0.1070	0.1059	0.1079	0.1060
Test of joint significance:								
p (employed if partner employed)[1]			0.0138					
p (partner employed if employed)			0.5867					
p (employed if no graduate)				0.3701				
p (no graduate if employed)				0.0111				
p (employed if low household labour income)					0.1249			

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

"stable employment": employed and self-employed (ft & pt) during 3 months before procreation

[1] test H_0: ($\beta_{\text{stable employment}} + \beta_{\text{interaction: stable employment and stable employed partner}}$)=0

table 22. Probability of stable employment in Turkey for women with two children (logit regressions with robust standard errors)

Table: Probability of stable employment in Turkey (logit regressions with robust standard errors)

married women aged 18-45 having two children, with observed partner

	Model 1	Model 2	Model 3
Partner			
In stable employment		0.242*	
		(2.11)	
Not in stable employment		*Ref.*	
Women's education			
No graduate			0.0978
			(0.76)
Primary and secondary			*Ref.*
University education			2.088***
			(12.23)
Woman's age			
18-24	0.119	0.136	0.319
	(0.72)	(0.82)	(1.89)
25-34			
35-45	0.300**	0.310**	0.130
	(3.04)	(3.15)	(1.31)
Age of second child			
0	-0.132	-0.130	-0.229
	(-0.73)	(-0.72)	(-1.23)
1-2	*Ref.*	*Ref.*	*Ref.*
3-6	0.491***	0.485***	0.514***
	(3.76)	(3.71)	(3.77)
7+	0.478***	0.478***	0.738***
	(3.49)	(3.49)	(5.22)
Intercept	-1.520***	-1.737***	-1.729***
	(-13.74)	(-11.34)	(-14.54)
Number of observations	3633		
Number of events	983		
Pseudo R^2	0.0153	0.0164	0.0555

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

Table 21 shows regression results for the determinants of third child arrival in Turkey, confirming and reinforcing the results found for first and third child arrival.

Being in stable employment is significantly negatively correlated with the probability of having a third child, while women who are in inactivity have a significantly higher probability of having a third child (model 1 and 2).

Stable employment is significantly negatively correlated with third child arrival only for graduate women, but is insignificant for non-graduate women who represent 10% of observed women already having a two children (model 4). Employed women also have a significantly lower probability of having a third child in comparison to women with other activity categories (inactive, unemployed…) when being in a household with middle or high income, but the difference in the probability of third child arrival between activity categories for women with zero and poor household labour income, representing 40% of the sample (4% zero and 32% low), is significant only on the 13% level and the coefficient is less negative (-1.02+0.4) (model 5). The effect of employment is significantly negative for women working as employees and employers, and still significantly negative, but with a smaller coefficient (-0.62 instead of -1.18) for contributing family workers, representing 43% of active women in the sample (model 6). We find a significantly negative coefficient for women engaged in non-

agricultural activities, but the coefficient is less negative and insignificant for those active in agriculture (representing 46% of active women in the sample) (model 7). Finally, for both women in registered and in non-registered activities, employment significantly decreases their probability of having a third child, but the estimated coefficient for non-registered activities, representing 60% of active women, is less negative (-0.7 instead of -1.4) (model 8).

Table 22 confirms that education and age increase the probability of being in stable employment for women having two children.

The fact that being in stable employment is negatively correlated with the probability of child arrival for all three ranks suggests the existence of a negative correlation between fertility and female employment on the macro level. Comparing the size of the coefficients, we conclude that the negative effect of employment is stronger negative for third than for second and first child arrival. Especially women having already two children and returning back to the labour market after the arrival of a second child are likely to decide against having a third child, even those working in non-registered activities as contributing family workers. This might be due to the fact that women's income is needed to guarantee a sufficient income for a family with two children, and a third child would cause too high indirect costs due to job loss, but also too high direct costs even for those who would continue working after the arrival of a third child.

table 23. Probability of child arrival (rank 1 to 3) in Bulgaria and Romania (logit regressions with robust standard errors)

Table: Probability of child arrival in Bulgaria and Romania (logit regressions with robust standard errors)

women aged 17-45

	Model 1	Model 2	Model 3	Model 4	Model 5
Woman's activity status					
Stable employment	-0.191	*Ref.*	0.0959	-0.976+	
(ft & pt, employed and self-employed)	(-0.86)		(0.29)	(-1.95)	
Stable unemployment		0.767**			
		(2.90)			
Stable inactivity		0.205			
		(0.73)			
Stable student		-2.010**			
		(-2.66)			
Other (unstable, retirement, military)		-0.310			
		(-0.49)			
Partner information					
Partner in stable employment			-0.546		
			(-1.60)		
Partner not in stable employment			*Ref.*		
No partner	-2.298***	-1.815***	-2.759***	-2.272***	-2.165***
	(-6.33)	(-5.11)	(-6.88)	(-6.06)	(-5.78)
Women's education					
Primary				*Ref.*	*Ref.*
Secondary				-0.274+	-0.693*
				(-0.97)	(-2.15)
Tertiary				-0.930+	-1.012*
				(-1.27)	(-2.49)
Interaction terms					
Stable employment and stable employed partner			-0.312		
			(-0.76)		
Stable employment and secondary				1.040	
				(1.84)	
Stable employment and tertiary				1.341	
				(1.48)	
Woman's age					
17-24	0.0356	0.177	-0.00480	-0.0652	-0.0651
	(0.13)	(0.71)	(-0.02)	(-0.23)	(-0.24)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
35-45	-2.645***	-2.616***	-2.690***	-2.679***	-2.669***
	(-6.14)	(-6.03)	(-6.17)	(-6.21)	(-6.18)
First child	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Second child	-0.621*	-0.618*	-0.593*	-0.644*	-0.610*
	(-2.24)	(-2.27)	(-2.14)	(-2.32)	(-2.23)
Third child	-1.891***	-1.908***	-1.914***	-1.948***	-1.940***
	(-4.63)	(-4.70)	(-4.65)	(-4.72)	(-4.79)
Bulgaria	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Romania	-1.342***	-1.214***	-1.268***	-1.338***	-1.337***
	(-5.98)	(-5.05)	(-5.66)	(-6.04)	(-6.05)
"Second event" fixed effects	-0.736**	-0.761**	-0.741**	-0.747**	-0.755**
	(-2.92)	(-3.01)	(-2.95)	(-2.94)	(-2.96)
Intercept	-1.643***	-1.981***	-1.234***	-1.400***	-1.043**
	(-5.28)	(-7.17)	(-3.33)	(-4.06)	(-2.84)
Number of observations	7910				
Number of events	108				
Pseudo R^2	0.1744	0.1956	0.1798	0.1794	0.1786
Test of joint significance:					
p (employed if partner employed)[1]			0.4215		
p (employed if no secondary)				0.8305	
p (employed if tertiary)				0.6368	

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

"stable employment": employed and self-employed (ft & pt) during 3 months before procreation

[1] test H_0: ($\beta_{\text{stable employment}} + \beta_{\text{interaction: stable employment and stable employed partner}}$)=0

table 24. Probability of stable employment in Bulgaria and Romania (logit regressions with robust standard errors)

Table: Probability of stable employment in Bulgaria and Romania (logit regressions with robust standard errors)

women aged 17-45 , with observed partner

	Model 1	Model 2	Model 3
Partner information			
Partner in stable employment		1.126***	
		(11.72)	
Partner not in stable employment		*Ref.*	
No partner		1.060***	
		(10.06)	
Woman's education			
Primary			*Ref.*
Secondary			1.155***
			(19.36)
Tertiary			2.238***
			(21.64)
Woman's age			
17-24	-2.041***	-2.069***	-1.781***
	(-30.22)	(-26.63)	(-24.90)
25-34	*Ref.*	*Ref.*	*Ref.*
35-45	0.429***	0.470***	0.491***
	(7.00)	(7.49)	(7.58)
Bulgaria	*Ref.*	*Ref.*	*Ref.*
Romania	0.332***	0.266***	0.412***
	(6.29)	(4.97)	(7.46)
Intercept	0.699***	-0.275**	-0.371***
	(13.12)	(-2.80)	(-5.41)
Number of observations	7910		
Number of events	4873		
Pseudo R^2	0.1721	0.1854	0.2359

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

Table 23 shows regression results for the determinants of child arrival (ranks one to three combined in one sample) Bulgaria and Romania. Regression results are controlled for country- and rank-fixed effects (as well as second-event fixed-effects for those women who are observed twice in the sample).

Model 1 shows that being in stable employment is insignificant for the probability of child arrival in comparison to all other activity categories for women. Model 2 distinguishes the other activity categories and shows that women who are in unemployment have a significantly higher probability of having a child in comparison to women being in stable employment, but women who are inactive have no significantly higher probability of having a child in comparison to employed women.

The following two models include categorical variables for partner status and education as well as their interactions with the categorical variable 'stable employment'. This procedure allows differentiating the effect of women's stable employment on child arrival by partner status and education.

Model 3 suggests that the effect of employment stays insignificant for those women who are with a partner who is himself not in stable employment (0.0959), but the effect is also insignificant, even if it becomes negative, for those women having a partner in stable employment (0.0959-0.3, joint p-value 0.04). Employment is significantly negatively correlated with child arrival only for women with

primary and lower secondary education, but becomes positive (even though insignificant) for those with secondary education (55% of women in the sample) (-0.9+1; joint p-value 0.8) as well as for those with tertiary education (18% of women) (-0.9+1.3; joint p-value 0.6) (model 4). Secondary and tertiary education itself decrease the probability of child arrival in comparison to primary and lower secondary education (model 5).

Finally, table 24 shows that the probability of being in stable employment increases for women with age and education. However, our descriptive statistics have shown that the majority of women in Bulgaria and Romania work full-time in formal[5] jobs, independent of their education level or their number of children. Being in stable employment hinders particularly low-educated women to decide in favour of a child, most likely because especially for these women (who are often with low educated and low income partners), their own wage income represents an important part of the family income. The arrival of a child would cause too high direct for these low income families, but also too high indirect costs, as child arrival most often goes hand in hand with the cessation of working activities for mothers (given the fact that public and subsidized child care coverage is very low for children aged 0 to 2 in Bulgaria and Romania and low income families cannot afford nannies or child minders). For higher educated women, being in employment does not play against their decision of having a child in comparison to inactive or unemployed women. This could be to the fact that they can bear the direct cost of children more easily in comparison to low educated women, and they can either afford a reduction of family income for a certain period or they can afford to externalize childcare to the private market.

5. Summary of main findings

5.1. Bulgaria and Romania

- *Impact of women's activity status on child arrival*
  Women in employment have not significantly different probability of child arrival in comparison to women who are inactive in Bulgaria and Romania. Employed women are thus not less likely to decide in favour of children in comparison to inactive ones, in contrast to findings for Turkey. Nevertheless, they are also not more likely to have children, in contrast to several high fertility countries in Europe like France or the Nordic countries, in which women's work life balance is encouraged by institutional support such as child care for young children, for example.

[5] Differentiation by employment in agriculture and/or as contributing family worker is not made for the regressions for Bulgaria and Romania, as only a very small minority of women work in these types of jobs, and thus the number of observations in these groups would be too small in order to obtain reliable results. Differentiation by registered vs. non-registered activities is not made as for these two countries information is not available in SILC.

- *Differentiated impact of employment on child arrival*
  For a particular group of women, employment reduces significantly the probability of child arrival, even though for all women combined, we find a non-significant impact. This group consists of low educated women (with only completed primary or completed lower secondary education, most likely because especially for these women (who are often with low educated and low income partners), their own wage income represents an important part of the family income. The arrival of a child would cause too high direct costs for these low income families, but also too high indirect costs, as child arrival most often goes hand in hand with the cessation of working activities for mothers in the absence of adequate institutional support for combining work and family life. For higher educated women, being in employment does not play against their decision of having a child in comparison to inactive or unemployed women, but as work-life balance possibilities are insufficient in Bulgaria and Romania, employed women do not have a significantly higher probability of child arrival in contrast to other European countries.

- *Conclusion*
  For a particular (shrinking) group of women, however, employment activities are not negatively correlated with child arrival. Being active does not significantly reduce the probability of child arrival for non-educated women as well as for women working in agriculture, as family workers and in non-registered activities. It seems that for these women, child arrival goes less hand in hand with a job loss than for women working in formal employment.

- *Conclusion*
  Enabling women of all education levels to continue working while having children would significantly increase family income and thus enable families to overcome economic obstacles that, for the moment, play against their decision to have (additional) children.

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