D6.18 Report on analysis of ESS data on cross-national differences in the timing and quantum of fertility

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Cross-National Differences in the Effect of Educational Attainment on Fertility Quantum: A Study Based on ESS Data

0. Preamble

This report is the final deliverable of Work Package 6 of the REPRO project, a project funded within the EU's seventh framework programme to better understand reproductive decision-making in a macro-micro perspective. All three tasks in this Work Package focus on cross-national variation in fertility-related outcomes. The first two tasks focussed on fertility norms and fertility intentions. The last task within Work Package 6 focussed on cross-national variations in fertility behaviours. In the course of analysing the ESS data, it became apparent that a focus on fertility quantum held more promise than a focus on fertility timing. The size of the samples made it hard to perform analyses on fertility timing that allowed for the inclusion of time- and country-varying period indicators. Therefore, it was decided to focus on fertility quantum. In addition, a focus on fertility quantum was also felt to be useful, given that one could argue that it is more important to understand the factors influencing the final level of fertility rather than the factors that influence its timing. As a result, this report will focus on understanding cross-national differences in fertility quantum.

1. Introduction

During the last decades, European countries have witnessed an enormous change in fertility patterns. The timing of entry into parenthood has been postponed, the prevalence of childlessness has increased, and the total number of children that people have has decreased (Freijka, 2008; Freijka & Sobotka, 2008; Kreyenfeld, 2010). Although many different theories have been put forward to explain these changes (Blossfeld et al., 2003; De Bruijn, 1999; Esping-Andersen, 2009; Liefbroer, 2005; Van de Kaa, 1996), two theories have been most influential. The first of these theories is the New Home Economics, introduced by Becker (1981), whereas the second is the Second Demographic Transition theory, developed by Lesthaeghe and Van de Kaa (Lesthaeghe, 1995; Lesthaeghe & Van de Kaa, 1986; Van de Kaa, 1987). According to the economic perspective, young adults' educational ambitions and career aspirations increase the opportunity costs to become a parent, and have been shown to influence fertility behavior (Becker, 1981; Liefbroer, 2005; Rondinelli, Aassve, & Billari, 2010). The Second Demographic Transition highlights changing attitudes and values for explaining fertility dynamics and patterns (Kreyenfeld, 2010). According to this perspective,

processes of emancipation in Western Europe are reflected in considerable societal changes with respect to attitudes and demographic behaviour, emphasizing individualism, personal autonomy, gender equality, and detachment from traditional family roles (Lesthaeghe & Surkijn 1988; Merz, Özeke-Kocabas, Oort, & Schuengel, 2009; Mills, 2007; Sobotka, 2004; Van de Kaa, 1987).

In both theoretical frameworks, education and changes in education play an important role. According to Becker (1981), the rising level of female educational attainment has reduced the gains from marriage for women. According to the SDT, the emphasis on self-reliance and autonomy is stronger among the higher educated. Based on these ideas, a large number of studies have focused on the role of education in fertility decision-making. However, this literature suffers from several limitations. First, almost all studies focus on how educational attainment influences the timing of fertility (Kreyenfeld, 2010; Liefbroer & Corijn, 1999). But if educational attainment 'only' leads to postponement of childbearing, its impact on the total number of children that a woman or a couple has might be limited. Second, most studies focus on one country (e.g., Ekert-Jaffe & Stier, 2009; Koytcheva & Philipov, 2008; Kravdal & Rindfuss, 2008; Kreyenfeld, 2010; Rondinelli et al., 2010), and those studies that include more countries usually include only a limited set, both in terms of the number of countries included and in terms of the geographical dispersion of the countries included (Kalwij, 2010; Liefbroer & Corijn, 1999 Hilgeman & Butts, 2009). Third, most studies focus on fertility behaviour of women and do not include men.

This study wants to contribute to the literature on the relationship between educational attainment and fertility behaviour in three ways. First, it examines the influence of educational attainment on fertility quantum, i.e. the total number of children a person has over his or her lifetime. Second, it examines whether the influence of educational attainment differs across Europe. Particularly, we consider differences across welfare systems across Europe. Welfare systems refer to "the combined, interdependent way in which welfare is produced and allocated between state, market, and family" (Esping-Andersen, 1999, p. 34f). Third, it examines whether the influence of educational attainment differs for women and men. Thus, this study aims to provide answers to three research questions:

1. Has educational attainment a negative effect on the total number of children a person has over his or her life time?
2. Is this negative educational gradient stronger for women than for men?
3. Does this negative educational gradient vary across Europe?

To answer these research questions, we apply multi-level modelling to data from the European Social Survey (a more detailed description will be given in the Method section), that include information on quantum fertility for 25 European countries.

2. Background and hypotheses

2.1. Educational attainment and fertility quantum

Mainly inspired by the theoretical approaches like the New Home Economics and the Second Demographic Transition theory, a number of mechanisms or arguments linking educational attainment and the total number of children that people have over their reproductive career can be put forward.

A first argument, that particularly fits the SDT framework, is that higher educated men and women value autonomy more strongly than men and women with a low level of education. One reason for this is that self-reliance and autonomy are skills and values that are promoted in the curricula of institutions of higher education (Meyer,1986). Another reason is that the highly educated have learned not to take existing lifestyles for granted but to critically reflect on such lifestyles (Giddens, 1991). A third reason is that the higher educated often spent time away from the parental home that may strengthen their 'appetite' for autonomy (Waite, Goldscheider & Witsberger, 1986). Taken together, this *autonomy* argument would lead one to expect that in an increase in educational attainment, leads men and women to put less value on traditional family values and to less commitment to family life, resulting in an increased likelihood to opt for no or relatively few children.

A second argument, that is related to the one above, is that higher educated men and women spend more time on childrearing than lower educated men and women.[1] This line of reasoning fits into the classical literature on the quality/quantity trade-off, that suggests that one can either invest in the number of children that one has, or in their quality (Hanushek, 1992). Higher educated people are more likely to opt for the second alternative, whereas lower educated people are more likely to opt for the first. This *quality* argument suggest that, given their focus on quality rather than on quality, higher educated men and women will be more likely to opt for fewer children than women and men with a relatively low level of education.

A third argument is based on the seminal work of Becker and the discussions that his New Home Economics approach has sparked (Becker, 1981). This *incompatibility* argument

[1] We are grateful to Anne Gauthier for suggesting this argument.

suggests that having a family and pursuing a job career can be incompatible because they compete for one's valuable time. Nowadays, more people, especially women, admit that parenthood restricts their educational ambitions and employment opportunities (Koropeckyj-Cox & Pendell, 2007). As a result of perceived conflicting roles of motherhood and professional life, higher educated women with good career opportunities may be more reluctant to opt for (more) children. A less clear picture emerges for men as their opportunity costs associated with parenthood are often lower and educational and career ambitions may not be threatened by fatherhood, especially in countries that support the more traditional male breadwinner model (Kalmijn & Saraceno, 2008). But, overall, the *incompatibility* argument suggests that the higher educated are more likely to feel that having children and a career are difficult to reconcile than the lower educated, leading the former to be more likely to have fewer children than the latter.

The fourth and final argument to be discussed is also based on insights from economics (Becker, 1981). This *affordability* argument starts from the fact that having and raising children is a costly affair and that people or couples with a relatively high income are better able to afford having children than people or couples with a relatively low income. As income is strongly linked to educational attainment, this leads to the conclusion that an increase in level of education leads to an increase in the number of children that an individual or couple has.

Taken together, three out of these four arguments suggest that the higher educated will have fewer children than those with a low level of education. This does not necessarily imply a negative educational gradient, but – in general – we expect that the affordability argument will be weaker than the joint impact of the other three arguments, Thus, we hypothesize a general negative effect of education on the average number of children. However, we expect this effect to operate differently for men and women. It is expected that the incompatibility argument is more relevant for women than for men, as women are often expected to take prime responsibility for household labour. Thus, the negative effect of education on the number of children is hypothesized to be stronger for women than for men (Hilgeman & Butts, 2009; McDonald, 2000). In summary, our first two hypotheses are:

H1: The ultimate number of children that men and women have in Europe is negatively related to their level of educational attainment.

H2: This negative relationship is stronger for women than for men.

2.2. Cross-national differences in the educational gradient of fertility quantum

In recent years, a lot of research has been conducted on the issue whether there are differences across welfare states in the extent to which they facilitate the combination of parenthood and paid employment. Most of that research – but not all (cf. Kalwij, 2010) has been conducted at the macro-level and suggests that fertility may be higher in countries where it this combination is facilitate by institutional arrangements. Differences between welfare regimes have direct implications for the educational gradient in completed fertility as well. The incompatibility argument discussed in the previous section implies that the negative educational gradient may be weaker in contexts that facilitate the combination of parenthood and paid employment (Liefbroer & Corijn, 1999). Given that data on specific arrangements to combine parenthood and employment are not available for all countries in our dataset and for the period under observation, we focus on general characteristics of welfare regimes as an – necessarily crude – indicator of their ability to combine labour force participation and parenthood. Below, we discuss the concept of welfare regimes and discuss some of the main approaches of the issue.

In the literature, (European) countries often are clustered in three types of common welfare regimes (Esping-Andersen, 1990), describing the interplay between income transfers and social services within a country. However, welfare regime cannot only be understood in terms of rights it grants, but also takes into account how state activities are interlocked with the role of the family and the market in social provision (Esping-Andersen, 1990; 1996). Esping-Andersen differentiated the Anglo-Saxon liberal regime, the social-democratic and the conservative-corporatist regime. An expansion of Esping-Andersen's original classification by new types including Mediterranean and Eastern European former communist countries after the fall of the iron curtain in 1989 was suggested by several authors (Bonoli, 1997; Fenger, 2007; Ferrera, 1996). The different welfare regimes refer to how welfare in a country is obtained, maintained and distributed. The liberal Anglo-Saxon tradition endorses the assumption that a majority of citizens can obtain adequate welfare from the market and emphasizes a minor role of the government in welfare redistribution. Markets therefore are not regulated with the idea of stimulating employment growth. A second regime type clusters countries such as Austria, France, and Germany into the conservative-corporatist welfare states characterized by a moderate level of decommodification where the preservation of status differentials is predominant and rights were attached to class and status (Esping-Andersen, 1990). Direct influence of the state is limited to providing income maintenance benefits related to occupational status (Fenger, 2007). Typically, these corporatist regimes are

also shaped by the church (Esping-Andersen, 1996). The typical conservative-corporatist countries such as Germany, Italy and France have been dominated by Christian traditions with their endorsement of traditional family values and family benefits encourage parenthood within a traditional male breadwinner model. The third cluster, the social-democratic regime, is mainly characterized by its emphasis on equalizing living conditions among the citizens of a country, independent of any individual contributions. This system focuses on synchronized social and labour market policies to achieve equality among citizens with respect to income, health care and social entitlements.

In addition to these three welfare state regimes, coined and described by Esping-Andersen in the early 1990s, it seems likely that given the historical developments of Europe since that time other types of welfare state regimes need to be added to the classical types including the former Soviet countries and post communist central Europe. Although Esping-Andersen (1996) has criticized an expansion of his typology suggesting that differences between the former regimes and the "new" Eastern European countries are temporary and transitional only, many differences still have not vanished and it seems useful to add new welfare regime categories. The Eastern European former communist countries were clustered into one category former-USSR and one category post communist European, based on an empirically grounded suggestion by Fenger (2007). Apart from their earlier communist history, Eastern European countries also differ in their recent historical development. Whereas certain countries such as Poland and Slovenia have become part of the European Union after extensive negotiation and reforms, countries such as the Ukraine until recently stood under the influence of the Russian federation. Both the post-communist Eastern European and the former USSR welfare regime seem to partly be similar to the conservative-corporatist regime with some characteristics of the social-democratic countries, however with lower levels of governmental programs and social services. These two types differ in the more relaxed development of economic growth and inflation, reflected by a slightly higher social wellbeing (Fenger, 2007).

Furthermore, as suggested by several authors (e.g. Bonoli, 1997; Ferrera, 1996) we added a Mediterranean welfare regime type. Southern European countries have not been part of Esping-Andersen's original tripartite classification, but given that they form an important part of Europe and are distinct from the Esping-Andersen categories with respect to rules and conditions under which benefits are granted they are clustered into the Mediterranean welfare regime. A Mediterranean welfare regime may show the following characteristics: a

fragmented income maintenance system, accompanied by a low degree of state penetration of the welfare sphere and a rather selective distribution of social benefits (Ferrera, 1996).

Based on the characteristics of the different welfare regimes, i.e. the interplay between state responsibility, income distribution and social benefits, we expect that in Northern and Western European countries family services are more extensively funded and provided to parents, whereas in other welfare regimes educational and occupational opportunities (for women) have not been paralleled by the provision of social services with respect to parental leave and childcare (Hilgeman & Buts, 2009). Therefore, we expect the effects of education to be qualified by welfare regime. In countries where the growing educational and employment opportunities are not paralleled by social services and transfers, the negative effect of education on quantum fertility will be stronger. We expect this scenario especially for countries from the Mediterranean and post-communist European welfare regimes. This we formulate the following hypothesis:

H3: The negative relationship between the ultimate number of children people have and educational attainment is stronger in countries with poor arrangements to combine parenthood and employment than in countries with good arrangements to combine parenthood and employment.

3. Method

3.1. Procedure and Participants

The data used in the present study stem from the third round of the European Social Survey (ESS). The ESS is a repeated cross-sectional survey conducted in many European countries, focussing on understanding cross-national differences in social attitudes and values. Data are collected through face-to-face interviews. Data for the third round were collected during 2005 and 2006 in the following countries: Austria (AT), Belgium (BE), Bulgaria (BG), Switzerland (CH), Cyprus (CY), Germany (DE), Denmark (DK), Estonia (EE), Spain (ES), Finland (FI), France (FR), Great Britain (GB), Hungary (HU), Ireland (IE), Latvia (LV), the Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Russia (RU), Sweden (SE), Slovenia (SI), Slovakia (SK), and Ukraine (UA). The ESS intends to be representative of the residential population of each participating nation aged 15 years and older, regardless of nationality, citizenship or legal status. Anyone who had been living in the country for at least one year could be selected as respondent. Strict guidelines were used to obtain a dataset of high methodological and quality. An effective sample size of at least 1,500 respondents in

each round (800 for countries with less than 2 million inhabitants) was intended. Additionally, the ESS aimed at a minimum response rate of 70 %. This was not achieved in all countries and the response rates varied between 46.0 % and 73.2 %, with an average of 63.4 %. The sample sizes varied between 995 (Cyprus) and 2,916 (Germany).

In the current study, information on a total of 29,035 respondents from 25 countries was included. Given our focus on the total number of children that a person has during his or her lifetime, we exclude respondents of whom it can be expected that they have a fair chance of increasing their number of children in the future. Therefore, only respondents aged 40 years or older were included in the current study, because only between 1.5% and 3.0% of births occur to women after age 40 (Sobotka, Billari, & Kohler, 2010). Although the percentage of birth to men after age 40 probably is higher, it is expected to be relatively small as well. The mean age of the respondents was 58.35 years (*SD* = 12.17, range 40 to 101 years) and 55.01 % were female. Characteristics of the entire sample and the key variables stratified by welfare regime are presented in Table 2 and discussed below.

3.2. Measures

Number of children. Respondents of the ESS have been asked how many children they have ever given birth to/fathered. This variable is used as the dependent variable 'total number of children'.

Independent individual-level variables. The following characteristics were used as individual level predictors; gender, age, partner status, education. Education was measured as completed years of education. With respect to partner status we used a measure that indicated if respondents have ever lived with a partner for three months or longer or not. Age was used as our indicator of birth cohort, and was measured as years lived since birth. To allow for possible non-linear cohort effects, both age and age squared were included in the analyses.

Welfare state regime. Based on the discussion in section 2.2, countries were classified into seven different categories. Table 1 displays an overview on the classification of the ESS countries into the different welfare regime types.

[Table 1 about here]

3.3. Statistical Analyses

Descriptive analyses of quantum fertility were performed for the whole sample and broken down by welfare regime. Negative binomial multilevel analysis was used to investigate the

statistical effects of individual and country characteristics and their interactions (both within-level and cross-level interactions) on the average number of children individuals have in European countries. Analyses were conducted for the entire sample and for subsamples including men and women only. Furthermore, effects were calculated for two different cohorts; respondents born before 1945 and respondents born from 1945 onwards in order to examine whether the effect of educational attainment has decreased or increased for more recent birth cohorts. By using multilevel modelling, units from the first level of analysis (i.e. individual respondents) were treated as nested within units at the next (second) level of analysis (i.e. countries). The aim of multilevel models was to estimate variance at the two levels of interest (i.e. individuals and countries). The estimation of variance at level 1 is an indicator of how much individuals differ in quantum fertility. At level 2, variance estimation indicates variation in number of children across countries. Analyses were conducted by using the negative binomial multi-level regression procedure of MLwin with the maximum likelihood method to estimate the variance components. The negative binomial distribution is used as it is more flexible than the Poisson distribution.

4. Results

4.1. Descriptive Results

Table 2 presents the means and standard deviations of the core variables broken down by welfare regime. Overall, across all countries and cohorts and for both sexes, the average number of children was 2.07. However, as expected, the total number of children is higher for women than for men (m=2.11 versus m=2.02) (results not shown in Table 2). In addition, the total number of children is higher for persons born before 1945 (m=2.23) than for persons born from 1945 onwards (m=1.96) (results not shown in Table 2). This reduction in the total number of children was mainly due changes in behaviour of respondents with a low level of education. For instance, among women with 13 years of completed education or more, the mean family size was relatively stable (m=1.91 for women born before 1945 and m=1.90 for women born from 1945 onwards). However, for women with 12 years of completed education or less, the mean total number of children dropped from 2.34 among women born before 1945 to 2.13 among women born from 1945 onwards (results not shown in Tables). As can be seen from Table 2, there also existed considerable variation across welfare regimes. Whereas former-USSR countries had an average of 1.82 children per respondent, the liberal welfare regimes, including Great Britain and Ireland in the current study showed an average of 2.40

children.[2] Overall, the mean total number of children was clearly lowest in the countries that used to make up the USSR and in German-speaking conservative-corporatist countries. Mean total number of children was clearly highest in liberal countries and in Mediterranean countries. The other three types (social-democratic, conservative-corporatist, and post-communist) had a very similar mean number of children.

On average, respondents had attained about 11.6 years of education. On average, men had completed more years of education than women (*m*=12.0 versus *m*=11.2) (results not shown in Table 2). Educational attainment was clearly lowest in the Mediterranean countries with an average of eight years per respondent while in all other countries the average number of years of education was eleven or higher.

Average age of the respondents was just over 58 years, and 55% of the respondents was female. Over 90% had ever been partnered during their life.

[Table 2 about here]

4.2. Multilevel Results

To test our hypotheses, a number of multilevel models were estimated, presented in Table 3. The first model is usually called the *intercept only* model (cf. Model 1 in Table 3), as it only includes the intercept. It allows one to examine whether there is a statistically significant amount of variation in completed fertility at the country level. This estimate is presented in the results on the random part of the model. Indeed, the variation of the constant is clearly statistically significant, indicating that completed fertility varies across countries.

[Table 3 about here]

In the second model, individual characteristics are added to the model. Overall, women have higher completed fertility than men. Fertility also increases with age, implying that older birth cohorts had higher completed fertility than younger cohorts. The fact that the effect for age square is non-significant means that the cohort-drop in fertility occurs in a linear fashion. The strongly positive effect of the variable 'ever lived with a partner' implies that respondents

[2] Given the nature of our data, it is hard to validate the information on the total number of children. We extracted information on completed fertility for birth cohorts and countries in our classification from the Human Fertility Database (www.humanfertililty.org), and tried to compare the ranking of the welfare states with those in our data. There were no large discrepancies in ranking. In both instances, highest completed fertility was recorded in liberal and Southern European countries and lowest completed fertility was recorded in the former USSR and German-speaking countries (data available on request from the authors).

who have never lived together with a partner have a far lower level of completed fertility than respondents who have lived together with a partner during at least part of their reproductive life-span.

The most important finding in Model 2 is the negative and statistically significant effect of completed years of education (*b*=-.016). This effect implies that the total number of children that respondents across Europe have decreases with increasing level of educational attainment. This finding supports our first hypothesis.

After inclusion of the individual-level variables, the variance at the country-level drops by almost 10% (from 0.037 to 0.034), suggesting that a small part of the country-differences in total number of children result from differences in the composition of the population in terms of level of education and partner status.

In Model 3 of Table 3, the hypothesis that the negative educational gradient is stronger for women than for men is tested. This is done by including an interaction term between gender and educational attainment. This interaction term is statistically significant. The educational gradient in completed fertility is stronger for women (*b*=-.012+-.009=-.021) than for men (*b*=-.012). This confirms our second hypothesis. At the same time, this finding shows that, across Europe as a whole, educational attainment also leads to lower completed family size among men.

In Model 4, the welfare regime typology of countries is added to the model. The countries classified as belonging to the conservative-corporatist welfare regime type constitute the reference category. Compared to these countries, the total number of children is clearly lower in countries that formerly made up the USSR (*b*=-.297) and German-speaking conservative-corporatist countries (*b*=-.215). The total number of children is also significantly lower in other post-Communist countries (*b*=-.096). Completed fertility is higher in liberal countries (*b*=.121), also confirming the descriptive results presented in Table 2. What is most surprising in Model 4, is that the total number of children in Mediterranean countries does not differ from those in countries classified as either ‘conservative-corporatist’ or ‘social-democratic’. This suggests that the relatively high total number of children for Mediterranean countries in Table 2 mainly results from the relatively low level of educational attainment in these countries. Once educational attainment is controlled for, differences between Mediterranean countries and others in terms of total number of children become smaller.

Including the welfare regime typology in Model 4 decreases the country-level variance by almost 45% (from 0.034 to 0.019). Although this decrease is substantial and statistically

significant, it also indicates that there is a large variation in completed fertility within countries that are classified within the same category of the typology.

To test whether the effect of educational attainment on total number of children varied across welfare state regimes, a cross-level interaction between educational attainment and welfare regime is added to the model (see Model 5 in Table 3). It turns out that the effect of educational attainment clearly differs by welfare state regime. To concentrate on women, the negative educational gradient is strongest in Mediterranean and post-communist European countries (*b*=-.011+-.008+-.011=-.030). The effect is weakest in countries classified as belonging to the social-democratic welfare regime type and in countries that were part of the USSR (*b*=-.009 and *b*=-.008, respectively). The conservative-corporatist countries (both German-speaking and non-German speaking) and liberal countries, hold a middle position (*b*=-.019). For men, the negative educational gradient is weaker, and even is absent in social-democratic countries and countries formerly belonging to the USSR. Overall, this pattern is largely in line with expectations, with one big exception. The negatively educational gradient is much weaker in former-USSR countries than expected.

So far, analyses have been performed for men and women jointly and for all cohorts. In order to get a more nuanced view on the relationship between educational attainment and total number of children, we also performed analyses for men and women separately, and for cohorts born before 1945 and from 1945 onwards separately. The results of these analyses are presented in Table 4.

[Table 4 about here]

The first two columns of Table 4 present results for cohorts born before 1945 and for cohorts born from 1945 onwards. The oldest cohort has finalized their reproductive career before 1990. This implies that Eastern European countries were still under Communist-led governments. In many Western European countries – with the main exceptions being the Nordic countries – facilities to combine motherhood and labour-force participation were relatively poor for most of this cohort. For the youngest cohort, part or most of their reproductive careers took place after 1990. For Eastern European countries, this implied a strongly changed social structure, with increased uncertainty. Many Western European countries saw a gradually increase in child-care facilities that allow the combination of motherhood and labour force participation. Based on these two column, the educational

gradient for women in different welfare state regimes in both cohorts are calculated. The results are presented in Figure 1.

[Figure 1 about here]

Among women born before 1945, a clear negative educational gradient was found within all welfare regime types. However, the negative gradient was strongest in post-communist European countries, Mediterranean countries and conservative-corporatist countries (both German and non-German speaking). The negative gradient was somewhat smaller in countries that made up the USSR, and in liberal and social-democratic countries. Among women born from 1945 onwards, little change is observed in countries that had Communist governments before 1990, suggesting that relatively little has changed in the educational gradient over time. In all other welfare regime types, the negative educational gradient for women is clearly weaker among women born from 1945 onwards than among women born before 1945. This weakening of the educational gradient is probably related to a decline in completed fertility across cohorts among women with a low level of education. Descriptive findings show that the average number of children dropped from 2.48 to 2.35 among women with less than nine years of completed education, it dropped from 2.16 to 2.05 among women with between 9 and 12 years of education, and it remained more or less constant (from 1.91 to 1.90) among women with 13 years of education or more.

In columns 3 and 4 of Table 4, results of separate analyses of men and women are presented. Across all cohorts, the negative educational gradient is clearly weaker among women in social-democratic welfare states and in the former USSR than in the other welfare regimes. Among men, the strongest negative educational gradients are observed in post-communist Europe (with the exception of the former USSR) and in Mediterranean countries. In most other welfare regime types, no educational differences between men with different levels of education are observed.

5. Discussion

The aim of this report is to examine how the total number of children that men and women have at the end of their reproductive careers differs by educational attainment. A lot of research has shown that increased educational attainment of women – and men – leads to postponement of entry into parenthood. Little is known whether increased educational

attainment also leads to a lower average level of completed fertility. In this report, we used data from the 2006 wave of the European Social Survey to shed light on this issue. The strength of the ESS is that it has information on a large number of European countries. In our analysis, we only use data from women and men aged 40 and over, because it can be assumed that the large majority of them have completed their fertility career.

Our first hypothesis stated that the ultimate number of children that men and women have across Europe is negatively related to their level of educational attainment. Several reasons to expect such a negative educational gradient in completed fertility were put forward. First, the higher educated are expected to value autonomy and independence more strongly than the lower educated leading the former to prefer fewer children than the latter (the *autonomy* argument). Second, the higher educated are expected to spend more time with their children than the lower educated leading the former to prefer a smaller number of children than the latter (the *quality* argument). Third, the higher educated have a stronger preference than the lower educated to pursue a career, and to the extent that career and parenthood are difficult to reconcile, this will lead the former to decide for a smaller number of children than the latter (the *incompatibility* argument). One argument favours the expectation that the higher educated will have more children; the higher educated usually have a higher income than the lower educated and thus the former are better able to afford more children than the latter (the *affordability* argument). However, overall we expect the first three arguments to overrule the last one. In line with these expectations, we find that there is a negative educational gradient among Europeans. Thus, our first hypothesis is confirmed.

The second hypothesis stated that the negative educational gradient is stronger for women than for men. The main reasoning behind this hypothesis is that the *incompatibility* argument is expected to be more relevant for women than for men, whereas the *affordability* argument is expected to be more relevant for men than for women. Together, these two processes lead one to at least expect a weaker negative gradient for men, but if the affordability argument is much more important for men than for women, it could even lead to a positive educational gradient for men. Hypothesis 2 was confirmed by our data. Across Europe, the negative educational gradient was stronger for women than for men. Still, it was negative even for men. This could be imply a number of things. First, it could imply that the *value* and *quality* arguments are of overriding importance even to men, leading higher educated men to have fewer children than lower educated men. However, it could also be that our findings result from educational assortative mating. If higher educated men have a higher educated partner and lower educated men have a lower educated partner, the negative gradient

for men could result from the fact that the educational effect of their partner is not controlled for. In the current design, we could not investigate this issue. One would need data on the educational attainment of both partners in order to disentangle the effect of male and female educational attainment. This is a promising avenue for future research.

The third hypothesis stated that the negative relationship between the ultimate number of children people have and educational attainment is stronger in countries with poor arrangements to combine parenthood and employment than in countries with good arrangements to combine parenthood and employment. Given that respondents in the survey had ended their reproductive careers at very different points in historical time and given that exact data on institutional arrangements to combine parenthood and employment were not available for many of the countries in the survey, we opted for a relatively crude typology to classify countries. For Western European countries, we used a slightly adapted version of Esping-Andersen's (1990) welfare regime typology. For Eastern European countries, we made a distinction between countries that formerly were part of the USSR and other post-Communist countries. Overall, we found limited support for our hypothesis. The negative educational gradient was weakest in countries classified as 'social-democratic' and in countries that were part of the USSR. The negative educational gradient was strongest in Mediterranean countries and in post-Communist countries. The results on Western European countries fit pretty well with expectations. In countries that fit into the social-democratic welfare regime, it will be relatively easy for women – and men – to reconcile parenthood and labour force participation, whereas this is relatively difficult in countries classified as belonging to the Mediterranean welfare regime type. The relative position of former USSR states is less clear. However, the fact that a weak educational gradient coincides with a low level of completed fertility for all educational groups, suggests that reconciliation in these societies is a difficult thing to achieve for women and men of all educational levels.

In additional analyses, we further explored differences across welfare regimes in the educational gradient. The most noticeable finding in this respect is that it seems that the negative gradient is much weaker among younger cohorts in Western Europe than among older cohorts. Furthermore, the differences across Western welfare regimes in the educational gradient among women and men born from 1945 onwards were much smaller than among women and men born before 1945. In addition, the reduction in the educational gradient across cohorts seem to be mainly caused by a drop in total number of children among women and men with low levels of educational attainment, whereas the total number of children born to women and men with tertiary education has remained more or less constant across cohorts.

These additional findings give food for thought on a number of issues. First, the relatively small difference in total number of children across educational levels among women and men born after 1945, suggests that the effect of educational attainment on the timing of childbearing could be substantially stronger than its effect on fertility quantum. The higher educated clearly postpone entry into parenthood, but – nowadays – get almost as many children as the lower educated. Second, one potential explanation that hardly any reduction in completed fertility is observed for the higher educated whereas a clear reduction is observed for those with a low level of education, is that a diffusion process is operating. Women and men with a high level of education may have reduced their number of children relatively early, and might have finalized this process among the oldest cohort in our sample. If this process of limiting one's family size diffuses to the lower educated with some time-lag, this could lead to a kind of 'catching-up' effect among the low educated born from 1945 onwards. Such an interpretation would fit the pattern that we observe in Table 4 and Figure 1. However, another interpretation is possible as well. The fact that the total number of children stays more or less the same for both cohorts of higher educated women, could signal that they have been relatively successful in striking a balance between parenthood and labour force participation. The reduction of the total number of children among low educated women across cohorts, on the other hand, could signal that striking this balance has not yet been accomplished for this group of women. This could be for cultural reasons, e.g. low educated women being reluctant to outsource childcare, or for more structural ones, e.g. low educated women lacking the resources to outsource childcare. More detailed data and more detailed analyses would be necessary to put these types of explanations to the test. A final interesting finding from the additional analyses is that the negative educational gradient in Eastern European countries has not changed much across cohorts. It remains particularly strong in those countries that were not part of the former USSR, but it also remains negative in post-USSR countries. Given that the cohorts born before 1945 had completed their reproductive career by 1990, whereas younger cohorts experienced at least part of this career after the fall of the Communist regimes, this suggests that this change has affected the 'childbearing context' of all educational groups in similar ways, leading to little change in the educational gradient. However, it has to be acknowledged that most of our post-1944 cohort was already relatively old at the time of the transformative events of 1990. Given the relatively early childbearing in many Eastern European countries, they may have been too old to really register the consequences of the collapse of Communism on completed fertility.

Our results have shed light on an issue that has received only limited attention thus far: the extent to which there exists a negative educational gradient in completed fertility across European societies. An important reason why this topic has received little attention is that one needs micro-level data on cohorts that have completed their reproductive careers for a large number of European countries. In that respect, the European Social Survey offers opportunities that are absent from many other surveys. Still, our data and analyses suffer from a number of limitations that could and should be addressed in future research. First, the ESS is a survey with a relatively small sample size. As a result, the number of respondents per country becomes too small to analyze data on separate countries in a meaningful way. If one wants to 'zoom in' on specific interesting countries, larger datasets that include information on both educational attainment and total number of children are needed. Second, we used a relatively crude – but theoretically grounded – typology to classify European countries according to how compatible parenthood and labour force participation was. Ideally, one would want to include much more specific macro-level indicators of such issues, like those available in Gauthier's Comparative Family Policy Database (http://www.demogr.mpg.de/cgi-bin/databases/FamPolDB/index.plx) or in the OECD Family Database (http://www.oecd.org/document/4/0,3746,en_2649_34819_37836996_1_1_1_1,00.html). In the current case, this is hard to realize because many countries that participate in the ESS are not covered in these databases. But for the analysis of completed fertility, there is the added challenge of deciding on the period a policy indicator should refer to in order to grasp the policy situation during an individual's reproductive career. One way to get around this problem would be to focus on the impact of educational attainment for different parities and to try and come up with a kind of 'aggregated' conclusion. However, the data requirements for such an approach are high and this may only be possible for specific countries (e.g. Kravdal & Rindfuss, 2008). Third, our indicator of educational attainment was based on the level of education as completed at the time of the survey. This can lead to a bias in the estimates of the educational gradient (Kravdal 2007, Hoem & Kreyenfeld, 2006). In particular, in countries with an early pattern of childbearing and in countries where people's educational career continues into the late twenties or early thirties, some overestimation of the educational effect is likely. Having data on the actual educational careers might be useful here, but such information could only be used in an approach that analyses the effect of education on one parity at a time. A final limitation that we want to mention is that we analyzed the influence of the educational attainment of men and women separately. Given

that the level of educational homogamy within couples is relatively high, it is hard to disentangle the influence of 'his' and 'her' educational level (Corijn, Liefbroer & De Jong Gierveld, 1996). Couple data would be needed to do so.

Given the caveats mentioned above, it is too early to try to draw firm policy-implications from these findings. Still, a number of tentative implications can be outlined. First, overall, the negative educational gradient is weakest in social-democratic welfare regime countries and in countries belonging to the former USSR, but probably for quite different reasons. In countries that were formerly part of the USSR, a weak educational gradient is combined with low fertility, suggesting that all educational groups find it hard to combine parenthood and employment. In social-democratic welfare regime countries, a weak educational gradient is combined with relatively high fertility, suggesting that the 'policy package' that is available in these countries seems to facilitate all educational groups in striking a balance between work and family life. Second, the weakening of the educational gradient among women born after 1944 compared to women born before 1945 all across Western Europe seem to result for a large part from a stabilization of fertility among the higher educated and a reduction of fertility among the lower educated. Although multiple interpretations of this finding are possible, one interpretation could be that the 'policy package' to facilitate combining parenthood and employment is less effective for women – and men – with a low level of education than for those with a high level of education. If this partially results from an inability – or a perceived inability – of some lower educated groups to afford public childcare arrangements, policy makers might have a reason to reflect on this.

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Figure 1

Educational gradient in total number of children for women born before 1945 ('old') and women born from 1945 onwards ('young')

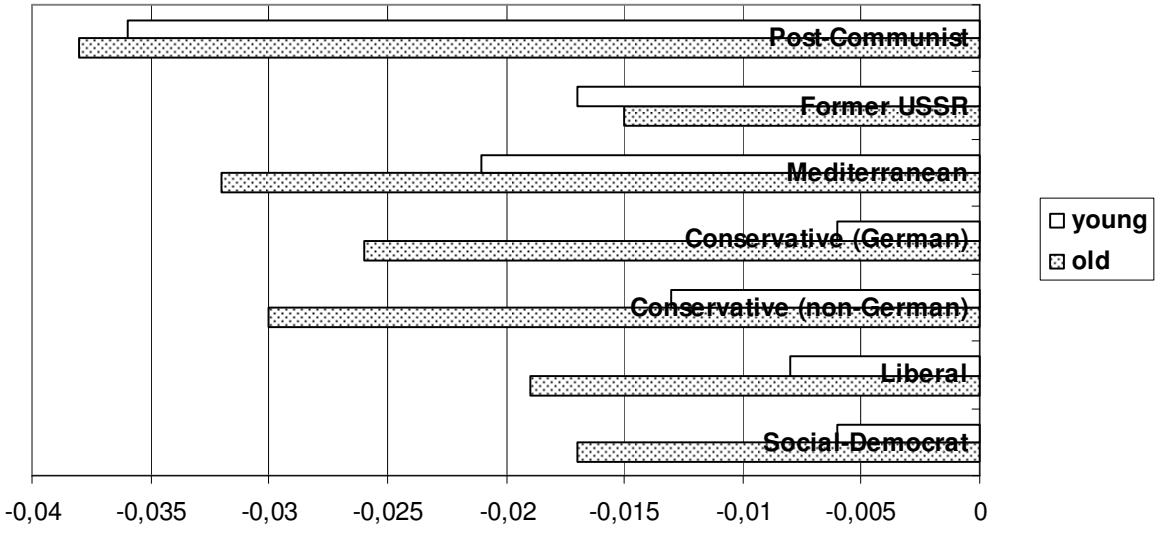

Table 1

Classification Welfare States across Europe

Welfare state regimes	
Conservative-corporatist	Belgium, France, Netherlands
Conservative-corporatist German speaking	Austria, Germany, Switzerland
Social-democratic	Denmark, Finland, Norway, Sweden
Liberal	Great Britain, Ireland
Former-USSR	Estonia, Latvia, Russia, Ukraine
Post-communist European	Bulgaria, Hungary, Poland, Romania, Slovenia, Slovakia
Mediterranean	Cyprus, Spain, Portugal

Notes. This categorization for the "old" European countries is based on Esping-Andersen (1990) and for the Eastern European countries on Fenger (2007).

Table 2

Sample Characteristics Broken Down by Welfare State Regime

Welfare State Regime	Age, *M* (*SD*)	Gender, % female	Ever partnered, % yes	Education, *M* (*SD*)	Number of children, *M* (*SD*)
Conservative-corporatist	57.58 (12.11)	52.41	86.33	12.08 (4.27)	2.11 (1.41)
Conservative-corporatist German speaking	56.90 (12.33)	52.88	93.04	12.82 (3.46)	1.88 (1.27)
Social-democratic	59.17 (12.43)	51.79	96.08	12.39 (4.50)	2.12 (1.41)
Liberal	58.29 (12.35)	52.58	91.02	12.85 (4.03)	2.40 (1.80)
Former-USSR	58.80 (11.91)	60.47	90.85	11.45 (3.72)	1.82 (1.10)
Post-communist European	58.56 (11.69)	55.80	94.30	11.00 (3.83)	2.10 (1.30)
Mediterranean	59.12 (12.55)	58.02	94.98	7.99 (5.15)	2.27 (1.59)
Total	58.35 (12.17)	55.01	92.63	11.55 4.34)	2.07 (1.39)

Table 3

Negative Binomial Multilevel Regression Models Explaining Number of Children across Europe (N_i = 29,035; N_j = 25)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Predictors individual level										
Constant	**0.700**	0.018	**-0.067**	0.027	**-0.065**	0.027	0.024	0.042	0.027	0.043
Gender			**0.041**	0.008	**0.038**	0.008	**0.039**	0.008	**0.037**	0.008
Age			**0.005**	0.000	**0.005**	0.000	**0.005**	0.000	**0.005**	0.000
Age squared			-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000
Ever lived with partner			**0.788**	0.021	**0.787**	0.021	**0.788**	0.021	**0.788**	0.021
Completed years of education			**-0.016**	0.001	**-0.012**	0.001	**-0.011**	0.001	**-0.011**	0.004
Gender*education					**-0.009**	0.002	**-0.009**	0.002	**-0.008**	0.002
Predictors country level										
Conservative-corporatist (ref.)										
Conservative-corporatist German speaking							**-0.215**	0.052	**-0.218**	0.053
Social-democratic							-0.029	0.049	-0.030	0.050
Liberal							**0.121**	0.059	**0.120**	0.060
Former-USSR							**-0.297**	0.051	**-0.297**	0.051
Post-communist European							**-0.096**	0.046	**-0.108**	0.046
Mediterranean							-0.046	0.053	-0.089	0.055
Cross-level interaction										
Education*conservative-corporatist (ref.)										

Education*conservative-corporatist									0.000	0.005
German speaking										
Education*social-democratic									**0.010**	0.004
Education*liberal									0.000	0.006
Education*former-USSR									**0.011**	0.005
Education*post-communist European									**-0.011**	0.004
Education*Mediterranean									**-0.011**	0.005
Random part										
Variance (education)									0.000	0.000
Variance (constant)	**0.037**	0.005	**0.034**	0.005	**0.034**	0.005	**0.019**	0.003	**0.020**	0.003
Covariance (education, constant)									-0.000	0.000

Notes. Gender and *Ever lived with partner* are dummy coded such as 1 = female and yes. Effects that are statistically significant are presented in **bold**.

Table 4

Negative Binomial Multilevel Regression Models Explaining Number of Children for Different Subgroups

	Born before 1945		Born after 1944		Women		Men	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Predictors individual level								
Constant	**0.343**	0.049	**-0.258**	0.049	**0.492**	0.070	**-0.156**	0.052
Gender	0.021	0.013	**0.047**	0.010				
Age	**0.006**	0.001	**0.005**	0.001	**0.003**	0.000	**0.008**	0.001
Age squared	-0.000	0.000	-0.000	0.000	0.000	0.000	-0.000	0.000
Ever lived with partner	**0.625**	0.030	**0.971**	0.031	**0.651**	0.027	**0.969**	0.035
Completed years of education	**-0.015**	0.005	-0.009	0.006	**-0.028**	0.006	-0.004	0.004
Gender*education	**-0.015**	0.003	**-0.004**	0.002				
Predictors country level								
Welfare state regimes								
Conservative-corporatist (ref.)								
Conservative-corporatist German speaking	**-0.182**	0.059	**-0.208**	0.053	-0.170	0.100	**-0.238**	0.057
Social-democratic	**-0.107**	0.054	0.059	0.051	**-0.188**	0.086	-0.017	0.053
Liberal	**0.126**	0.065	0.101	0.062	0.144	0.111	0.056	0.064
Former-USSR	**-0.418**	0.057	**-0.179**	0.052	**-0.433**	0.091	**-0.276**	0.056
Post-communist European	**-0.194**	0.051	-0.044	0.047	-0.020	0.080	-0.085	0.050
Mediterranean	-0.074	0.061	-0.066	0.056	-0.033	0.086	-0.072	0.060
Cross-level interaction								

*Education*welfare state regime*								
Education*conservative-corporatist (ref.)								
Education* conservative-corporatist German speaking	0.004	0.008	0.007	0.008	0.000	0.007	0.000	0.006
Education*social-democratic	**0.013**	0.007	0.007	0.008	**0.015**	0.007	0.006	0.005
Education*liberal	0.011	0.008	0.005	0.010	0.004	0.008	-0.007	0.006
Education*former-USSR	**0.015**	0.007	-0.004	0.009	**0.015**	0.007	0.005	0.006
Education*post-communist European	-0.008	0.006	**-0.023**	0.008	-0.008	0.007	**-0.016**	0.005
Education*Mediterranean	-0.002	0.007	-0.008	0.008	-0.005	0.007	**-0.016**	0.005
Random part								
Variance (education)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Variance (constant)	**0.019**	0.003	**0.018**	0.003	**0.032**	0.008	**0.019**	0.003
Covariance (education, constant)	-0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.000
N	11,574		17,461		16,245		12,769	

Notes. Gender and *Ever lived with partner* are dummy coded such as 1 = female and yes. Effects that are statistically significant are presented in **bold**.