The Shifting Gender Balance in Higher Education and Assortative Mating in Europe

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Abstract

While men have always received more education than women in the past, this gender imbalance in education has now turned around in most European countries. For the first time in history, there are more highly educated women than men reaching the reproductive ages and looking for a partner. This paper investigates implications for recent trends in educational assortative mating. To this end, we used pooled data from the European Social Survey (rounds 1-6) combined with country level education-specific sex ratios. Descriptive results point to a turnover from female educational hypergamy (women partnering up) to hypogamy (women partnering down) in just one generation. Multilevel regression analyses indicates that the reversal of gender inequality in education has been a driver of the change from hypergamy to hypogamy. The degree of educational homogamy, in contrast, is largely driven by own educational attainment as such, rather than by changes in education-specific sex ratios. Against our expectations, the reversal of the gender gap in education is not associated with highly educated women remaining single more often. Rather, it is highly educated men as well as low educated women who more often living single.

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1. Introduction

A major social development in the second half of the twentieth century has been the dramatic increase of participation in higher education, in particular among women. One important consequence of this development is that differences in the relative educational attainment of men and women have changed: in the past, men were typically higher educated than women, while today women excel men in terms of participation and success in higher education. This holds for almost all European countries (Vincent-Lancrin, 2008), but also for North America (Diprete & Buchmann, 2006) and many other parts of the world (Esteve, García-Román, and Permanyer 2012; Schofer and Meyer 2005). This implies that today, for the first time in history, there are more highly educated women than men reaching the reproductive ages.

Figure 1 charts the major turnaround that has occurred in the participation of men and women in higher education for European countries, Canada, and the U.S.A. Using country codes as symbols, the figure plots the percentage of female students among all students in tertiary education. The upward trend is massive: while in 1971 only one country had reached gender parity in higher education (Bulgaria, BG), a third of these countries had crossed the 50% line by 1983. In 2009, all but one country (Switzerland, CH) had a female majority in higher education. Iceland (IC) exhibited the most spectacular rise: in 1971, it had the lowest proportion female of all countries included in the plot (25%), while it had the highest proportion in 2009 (64%). Countries with similarly spectacular rises over this period include Norway (30% to 60%), Denmark (37% to 58%), the UK (from 33% to 57%), and the Czech Republic (36% to 56%). In Sweden and Poland, the proportion female reached very high levels in 2009 (60% and 57%, respectively), but in both countries this percentage was already relatively high in 1971 (42% and 47%, respectively). For the Baltic states (Estonia EE, Latvia LV, and Lithuania LI), data for the earlier years are missing but the available figures, starting in 1981, are above the 50% line. In Bulgaria, gender parity was already reached in 1971, and the percentage female grew only little (i.e. to 55% in 2009). In Austria and the Netherlands, the proportion female has been, and continues to be, relatively low, although parity has been surpassed in both countries since around the year 2000. For Germany, UNESCO has not published recent data, but OECD data indicate that Germany had reached gender parity in 2005 (Vincent-Lancrin 2008: 267).

–Figure 1 about here–

The trends shown in Figure 1 are highly relevant for demography, given that education–and women's education in particular–is strongly related to all kinds of dimensions of demographic behaviour. Despite this relevance, empirical research on the demographic consequences of the reversal of gender inequality in education is rare (Van Bavel, 2012). Esteve, García-Román and Permanyer (2012) recently pioneered a study about the implications for patterns of educational assortative mating among married couples across a large number of countries. Their findings suggest that an increase in the educational attainment of women relatively to that of men in a given country tends to be associated with a decrease in educational hypergamy (he is more educated than she) and an increase in hypogamy (he is less educated than she). That is, in countries where women are on average more highly educated than men, hypogamy is becoming more prevalent than hypergamy.

This paper investigates how the reversal of the gender gap in education has affected patterns of educational assortative mating in Europe. We aim to go beyond earlier work in three ways. First, earlier studies have focused on the effects that changes in the structure of the marriage market have on educational sorting (i.e. on 'who marries whom'). This focus neglects that changes in the structure of the marriage market might also affect who remains single (Lichter, Anderson, and Hayward, 1995; Oppenheimer, 1988). In this study, we examine both outcomes at the same time, i.e., the proportions living single and educational assortative mating. Second, earlier studies focused on the stock of married couples. Given that unmarried cohabitation is on the rise and by now has attained a status similar to marriage in many European countries (Hiekel, Liefbroer, & Poortman, 2014), we would miss an important part of the demographic picture if we would exclusively focus on married couples. Therefore, we include both married couples and couples living in unmarried cohabitation in the analysis. Third, we aim to go beyond studying aggregate level associations between the educational composition of populations and the share of hypergamic and hypogamic couples. We therefore use multilevel modelling to assess how variation in the composition of mating markets on the aggregate level affects individuals' likelihood to partner with somebody with a similar or different educational background, or to stay single. For convenience, we use the term "mating market" and by that refer to both marriage and unmarried cohabitation. The study is limited to heterosexual unions.

To study assortative mating and singlehood at the individual level, we use micro-data from six rounds of the European Social Survey (ESS), which enables us to include 28 European countries in our analyses. To capture the educational composition of the 28 national mating

markets, we use data provided by the International Institute for Applied Systems Analysis/Vienna Institute for Demography (IIASA/VID)(K.C. et al., 2010; Lutz, Goujon, K.C., & Sanderson, 2007) and calculate age and education-specific sex ratios, which we include as covariates in our multilevel analyses. Compared to analysing one country at a time, our multilevel approach allows us to test whether patterns of assortative mating and singlehood vary significantly across countries and whether such variation is related to imbalances in the educational attainment of men and women. In the following sections, we first develop hypotheses about how the observed changes in the relative educational attainment of men and women might have affected patterns of assortative mating and singlehood. For this, we employ marital search theory (England & Farkas, 1986; Oppenheimer, 1988). This theory is particularly useful for our purposes, given that it explicitly relates both assortative mating and singlehood to the structure of the mating market (Lewis & Oppenheimer, 2000). Subsequently, we test our hypotheses by means of multilevel logistic regression models.

Our findings indicate that the reversal of the gender gap in education has lead to a shift from the traditional educational hypergamy to a new hypogamy: if there is a difference in education between him and her, she tends to be more highly educated. In contrast to our expectations, highly educated women are not more likely to stay single. Rather, it is low educated women who remain single more often.

2. Theoretical background

Marital search theory emphasizes the importance of both individual preferences and mating market constraints for assortative mating and singlehood. That is, given the characteristics that individuals prefer in prospective partners, the availability of members of the opposite sex that have such characteristics determines whether and when individuals will be able to find a partner and what characteristics this partner is likely to have. In this section, we first summarize the basic assumptions of martial search theory (section 2.1). Subsequently, we discuss how shifting preferences regarding education are expected to affect mate choice (section 2.2). Based on this, we develop hypotheses about how changes in the relative educational attainment of men and women in combination with their partner preferences might have affected patterns of assortative mating and singlehood (section 2.3).

2.1 Martial search theory

Marital search theory assumes that individuals have preferences for partners with certain traits and that the search for such partners takes place on a mating market about which individuals have only imperfect information (Lewis and Oppenheimer 2000). The search for a partner is associated with costs and benefits. There are direct costs as well as opportunity costs. Examples of the former include the time individuals invest in the search process and the emotional risk involved in asking for a date. Missed or turned down mating opportunities represent opportunity costs, i.e., the cost of not getting access to the value of the un-chosen partner. Benefits entail finding a partner who is closer to the ideal characteristics than current alternatives (including singlehood). Depending on the structure of the mating market, the costs and benefits can vary greatly: when there are many partners with desired characteristics, costs are low and individuals can afford to continue looking for an ideal match, without much risk; yet, when there are only few individuals with the desired characteristics, the search becomes more expensive, and continuing search (i.e. foregoing current offers) can become risky.

Individuals who experience difficulties in finding a partner due to the structure of the mating market can deal with this problem in one of two ways. They can choose to lower their aspiration level and settle for partners who are less than an ideal match. In this case we would expect that mating becomes less assortative. Or they might refrain from lowering their aspiration level and continue searching, even if this increases the risk that they will not find a partner. In this case we would expect that the number of singles in the population at a given point in time is larger.

Marital search theory encompasses and integrates insights from the demographic approach to union formation from the perspective of the marriage squeeze. Marriage squeeze research focuses on the effect of an imbalance in the number of men and women on the timing and likelihood of marriage. In its most basic form, the marriage squeeze hypothesis holds that marriage rates are lower if the number of potential spouses of the desired age is low. Originally, marriage implications of variations in the age-sex composition of populations have been examined (Akers, 1967; Carol Mulford Albrecht & Albrecht, 2001; Muhsam, 1974; Schoen, 1983). Over the years, other characteristics beside age, such as race (Crowder & Tolnay, 2000; Guttentag & Secord, 1983; Lichter, Leclere, & Mclaughlin, 1991; Lloyd & South, 1996; Spanier & Glick, 1980) employment status (Fossett & Kiecolt, 1991, 1993; Wilson, 1987), income level (Lichter et al., 1995; Lichter, Mclaughlin, Kephart, Landry, &

Mclaughlin, 1992) and educational level (Goldman, Westoff, and Hammerslough 1984; Schoen and Kluegel 1988; South and Lloyd 1992) were introduced as relevant mating market dimensions. Results following from such studies were often inconsistent, depending on how mate availability was computed, which research questions were addressed, and what the theoretical framework of the analyses was. Nonetheless, most scholars concluded that the availability of preferred partners exert some impact on marriage rates. Later studies also looked at the impact on marital sorting, i.e., not just the marriage rates but also the characteristics of the men with whom women marry (Lewis & Oppenheimer, 2000; Lichter et al., 1995). A few studies, conducted at the aggregate level, verified that changes in the educational composition of the mating market are correlated with shifting patterns of educational assortative mating (Albrecht et al. 1997; Esteve, García-Román and Permanyer 2012; Qian 1998).

2.2 Individual preferences and the role of education

The use of martial search theory requires assumptions about the preferences that guide the partner search behaviour of men and women. Becker's (1981) economic approach to marriage has been extremely influential in demography. According to his approach, heterosexual marriage represents a kind of trade between a man and a woman, in which both engage because there is more to gain from marriage than from remaining single. In societies in which men tend to be the main breadwinners and female labour market participation is relatively low, marriage tends to involve a trade of paid work by men for unpaid care and house work by women. In such a context, men's economic resources are positively related to marriage: women tend to prefer to marry men with good labor market prospects. These are typically men with high educational attainment. Men, on the other hand, expect to find a wife who can take care of kids and household chores. In a marriage along these gender stereotypical lines, advanced education and a strong labour market orientation hardly represent trading value on the mating market for women since men are not chiefly looking for such characteristics in their future spouses. As a consequence, in a gender traditional society women are likely to prefer similarly or more highly educated men, whereas men tend to prefer women who are similarly or less educated, which congruent with the traditional mating pattern of female educational hypergamy (Blossfeld, 2009; Esteve & Cortina, 2006; Schwartz, 2013).

With the transformation from a male-breadwinner to a dual-earner society, however, gender roles have changed in Western countries. The changes in time spent in the labor market and in the household have been asymmetric: women have increased their hours spend on paid work

way much more than men have increased their hours on domestic tasks (England, 2006; 2010). Yet, overall, women's labor force participation and men's participation in the household have increased and women's income potential has become a more important determinant for the living standard of families (Sweeney, 2002). As a result, men have been found to increasingly favor women with appealing economic characteristics (Lichter et al., 1992; Zh. Qian & Preston, 1993; S J South & Lloyd, 1992). In line with this, Torr (2011) observed that in the United States, a reversal in the effect of women's educational attainment on the likelihood of marriage has taken place. While in the past highly educated women were the least likely to marry, they are the most likely to marry today. For Europe, the educational gradient seems to vary considerably between countries (Dykstra & Poortman, 2010; Kalmijn, 2013).

Taken together, changes in the importance of women's educational attainment for the economic well-being of families in modern societies have increased the similarity in men's and women's preferences, so that both prefer partners who have attained at least the same educational level (Blackwell, 1998; Blossfeld & Drobnič, 2001; Blossfeld & Timm, 2003; Kalmijn, 1991a, 1991b; Mare, 1991; Oppenheimer, 1988; Christine R Schwartz & Mare, 2005; Scott J South, 1991; Sweeney, 2002). Given this convergence between men and women in their partner preferences, homogamy among the highly educated increased and female hypergamy decreased (Kalmijn, 1994, 1998; Mare, 1991; Christine R Schwartz & Mare, 2005; Christine R Schwartz, 2013).

2.3 The reversal of the gender imbalance in education and mating: Hypotheses

A crucial implication of the reversal of the gender gap in education is the fact that in recent cohorts there is a surplus of highly educated women who enter the mating market. Esteve, García-Román and Permanyer (2012) presented strong evidence that the new imbalance in the educational attainment of men and women has already affected traditional patterns of assortative mating. They found that in populations with a reversed gender imbalance in education female educational hypogamy tends to exceed female hypergamy, suggesting that changes in patterns of assortative mating are affected by structural changes in men's and women's educational attainment. However, according to Blossfeld and Timm (2003), the proportion of couples in which the wife is more highly educated than the husband often remained lower than would be numerically possible. This suggests that the increasing share of highly educated women is not fully absorbed by the mating market and that a growing share of women may remain single (Blossfeld & Timm, 2003).

Based on our discussion of partner preferences in Section 2.2, we assume both men and women prefer partners who are at least as highly educated as themselves. If this is the case, we may expect that low educated men as well as highly educated women are suffering an education-specific mating squeeze when there is an imbalance in educational attainment to the advantage of women. Indeed, there will not be enough low educated women to match the excess of low educated men, and given their preference for a partner with at least the same educational attainment, women will not be inclined to match with lower educated men. An equivalent argument holds for highly educated women: given the relative shortage of highly educated men, highly educated women will experience a mating squeeze (Van Bavel, 2012). Based on our discussion of martial search theory in Section 2.1, we expect that individuals might respond to this mating squeeze in one of two ways. First, if individuals are reluctant to lower their aspiration levels and prefer to continue their search for the 'ideal' match, rather than settling for a 'less than ideal' match, we can expect that individuals who experience a shortage of suitable partners are more likely to be single. More specifically, in line with earlier research on the marriage squeeze, we formulate the following hypotheses:

> *Hypotheses 1a and 1b: An increase in the gender imbalance in education to the advantage of women is associated with increases in the proportions single among (1a) low educated men and (1b) highly educated women.*

Second, if individuals are willing to lower their aspirations and to enlarge their field of eligible partners if they experience difficulties in finding an ideal match, we can expect that they are more willing to select partners who are less than an ideal match. More specifically, we formulate the following hypotheses:

> *Hypotheses 2a and 2b: A shift in the gender imbalance in education to the advantage of women is associated with a decrease in female hypergamy and an increase in female hypogamy, meaning that (2a) men increasingly partner with women who are more highly educated than themselves and (2b) women increasingly partner with men who are lower educated than themselves.*

Hypotheses 2a and 2b address the patterns of heterogamy that we expect to observe. Yet, we also expect that changes in the relative educational attainment will affect patterns of homogamy, especially among highly educated men and women. More specifically, an

increasing supply of highly educated women on the mating market makes it is more likely that highly educated men will meet similarly educated women. Highly educated women, by contrast, are likely to experience a shortage of similarly educated men. We therefore hypothesize that:

> *Hypotheses 3a and 3b: With an increase in the gender imbalance in education to the advantage of women, (3a) homogamy among highly educated men will increase and (3b) homogamy among highly educated women will decrease.*

3. Method

3.1 Analytical approach

Most research on assortative mating has applied log-linear analysis to contingency tables (Esteve, McCaa, and López 2013; Hamplova 2009; Schwartz and Mare 2005; Smits, Ultee, and Lammers 1999). An important limitation of this approach is that people who are not in a union cannot be included in the analysis. Given that being single is a focal outcome in our study, we need to model singlehood simultaneously with patterns of assortative mating. We did so in two separate multilevel analyses. In the first analysis, we applied multilevel binary logistic regression to investigate the factors that determine the likelihood of being single versus begin in a union. In the second analysis, we applied multilevel multinomial logistic regression to investigate the factors that affect the likelihood that individuals are not living with a partner, living with a low educated partner, living with a medium educated partner, or living with a highly educated partner, given their own educational level.

In our multilevel analyses, individuals (level 1) were nested within countries (level 2) to account for possible heterogeneity across countries and to be able to test whether differences in the structure of mating markets across countries are associated with variation in patterns of union formation and assortative mating. To this end, we also included in both analyses measures that enabled us to control for the structure of the national mating market (in terms of the relative educational attainment of men and women) in which individuals were looking for a partner (see Section 3.3. for details). To assess whether the relative educational attainment among men and women in a given country had differential effects for members of different educational categories, we included an interaction term between our measure of the structure of the mating market and individuals' own educational attainment.

We conducted all analyses separately for men and women, because we assumed that men and women would differ in their opportunities for realizing their partner preferences. Furthermore, we controlled in all analysis for individuals' age, birth cohort, and the educational level of their mother and father. Given that the relationship between both age and individuals' education and the dependent variable varied across countries, we specified random slopes for age and education in addition to a random intercept in all models.

3.2 Data

In our analyses, we employed two data sources. Our first data source was individual-level data from the European Social Survey (ESS)[1]. The ESS is a cross-national survey that is conducted every two years and is currently available for the period between 2002 and 2012. We pooled the information of all six available rounds (2002, 2004, 2006, 2008, 2010, 2012) and analyzed 28 countries: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom (see Appendix 1 for more details about the country samples).

The ESS contains information on both cohabitation and marriage. We distinguish between respondents who were not living with a partner (to whom we refer to as 'single') and those who were cohabiting (married or unmarried) at the time of the interview. We selected respondents who were born between 1950 and 1980 and who were at least 30-years-old at the time of the survey. We opted for age 30 as the minimal age, because typically the majority of men and women have completed their education by then. In line with this, only 0.9% of the men and 1.2% of the women in our sample were still enrolled in education at the time of interview.

There is one complication that arises when we include single respondents in our analysis. The complication is based on the fact that mortality rates and repartnering rates differ significantly between men and women, particularly at advanced ages. Widowhood is more common among women due to higher male mortality rates, and also the proportion of divorced singles is higher among women because female repartnering rates after divorce are lower than male rates (de Graaf & Kalmijn, 2003). As a result, the proportion single increases with age among women, but decreases for men. Thus, in order to have comparable reference categories for

[1] http://www.europeansocialsurvey.org/

men and women, we removed those respondents from the data who had ever been divorced or widowed, or who were currently divorced or widowed. This led to an exclusion of 15.7% of the male respondents and 21.8% of the female respondents, leading to total sample size of 45,201 male and 47,467 female respondents (see Appendix 1 for details about the number of respondents per country and round of the survey). Note that as a result of this selection the singles in our sample were singles who were never married. Unfortunately, the ESS does not provide information about earlier cohabitation, so that we do not know if the singles were also never in a cohabiting union.

Our second data source was country-level data on the educational attainment of men and women provided by the IIASA/VID (K.C. et al., 2010; Lutz et al., 2007). The IIASA/VID data provide reconstructions (from 1970 until 2000) and projections (from 2005 until 2050) of the distribution of educational attainment in five-year intervals for five-year age groups in a large number of countries. This data enabled us to approximate the structure of the mating market on which respondents were looking for a partner and to include corresponding covariates in our individual level analysis (see Section 3.3. for details).

3.3 Measures

3.3.1 Dependent variables

The dependent variable in our first analysis had two categories: 'single' and 'living in a union' (1). The category 'living in a union' contained all respondents who indicated that they were living with a partner, either in cohabitation or in marriage. The dependent variable in our second analysis had four categories: 'single', 'living with a low educated partner', 'living with a medium educated partner' and 'living with a highly educated partner'.

Our categorization of the three different levels of educational attainment was based on the International Standard Classification of Education (ISCED) that the ESS uses for measuring respondents' education and that has been harmonized across the different countries and waves that are included in the survey (Schneider 2010). Individuals were classified as low educated when they had obtained a degree lower than secondary education (ISCED 1 and 2), medium educated when they completed upper or post-secondary education (ISCED 3 and 4) and highly educated when they completed tertiary education (ISCED 5). This division somewhat reduces the amount of detail in measuring educational attainment, but facilitates comparison of countries with different educational systems.

Note that our operationalization of assortative mating in our second analysis deviates from earlier research that classified couples as homogamous, hypogamous, or hypergamous. We choose this alternative categorization, because the most highly educated cannot form a union with a more highly educated pattern, making "hypergamy" an outcome occurring with zero probability for them; similarly, low educated individuals cannot form a union with a lower educated partner, which implies that hypogamy is not observable for them. Additionally, our categorization provides more detailed insights into the magnitude of the difference in educational attainment that individuals are willing to accept in partners. Nevertheless, in order to check the sensitivity of our conclusion to the choice of this operationalization, we also conducted analyses based on the classification of couples used in earlier research. This analysis yielded essentially the same conclusions as the ones reported below.

3.3.2 Main explanatory variables

Our first key explanatory variable is the educational level of the respondent. We operationalized this variable with three categories (i.e. low, medium, high) based on the ISCED classification system, as discussed in section 3.3.1.

The second key explanatory variable consists of education-specific sex ratios, which measure the structure of mating market in which we assumed that respondents primarily looked for a partner. More specifically, we approximated the structure of the mating market that respondents encountered around the age when the majority of individuals has completed fulltime education, i.e. around age 30. We achieved this in two steps, using IIASA/VID data. The IIASA/VID dataset comprises information about four educational categories: no education, primary education (ISCED 1), secondary education (ISCED 2,3 and 4) and tertiary education (ISCED 5) (K.C. et al., 2010; Lutz et al., 2007). In the first step, in order to obtain yearly measures, we linearly interpolated the numbers of individuals for the four levels of educational attainment between 1970 and 2010, since the IIASA/VID dataset reports only measures for 5 year intervals. Based on this, in the second step we calculated for each respondent the sex ratio among highly educated men and women who were roughly 5 years younger/older than the respondent at the time he/she was 30 years old. Given that men tend to be 2 to 3 years older than their partners, we assumed that for men this interval was displaced downwards by two years, whereas for women it was displaced upwards by two years. We thus divided the number of highly educated women who were 25-34 years old by the number of

men who were 27-36 years old at the time the respondent was 30 years old.[2] We chose to work with the ratio of the number of women divided by the number of men (rather than its inverse, which is more common in demography), so that an increase in the value of the sex ratio means that the relative number of highly educated women on the mating market increased compared to the number of highly educated men. We take the log of this sex ratio (i.e. $\log(F_{high}/M_{high})$ in order to render the measure symmetric around the value of zero, which represents a balanced mating market. A positive value means that the gender balance in higher education has reversed to the advantage of women. A negative value, by contrast, represents a mating market where highly educated men outnumber highly educated women. For convenience, when we talk about "the sex ratio" or "education-specific sex ratios" we mean the sex ratio for the higher educated as just defined here.

Note that the ten-year age interval that we used here is larger than the five-year age interval that has often been used in earlier research (Fossett & Kiecolt, 1991). We used this interval because broader age intervals are more robust to erratic fluctuations caused by sampling errors. In addition, five-year age intervals may fail to account for the fact that people may look in adjacent age categories when they do not find a mate in their own age group (De Hauw, Piazza, & Van Bavel, 2014). Furthermore, besides calculating age-and education-specific sex ratios, we also calculated the index of female educational advantage (*F*) as proposed by Esteve, García-Román and Permanyer (2012). This index indicates the probability that the educational attainment of a woman who is randomly selected from the population is higher than the education of a randomly picked man. The main advantage of this measure, compared to age- and education-specific sex ratios, is that it takes into account all educational categories, not just one category. When we applied this measure instead of the sex ratio, we obtained essentially the same the results as the ones reported below. We choose to report the results with the sex ratios since, in the European context, higher education is where most of the action is in terms of shifting gender balances.

3.3.3 Control variables

Next to the educational attainment of the respondents' and of their partners, we controlled for the education of respondents' parents. Parental education is associated with social class and

[2] Due to the fact that the IIASA/VID data is based on five-year age groupings (e.g., 25-29 years, 30-36, etc.), we had to approximate the number of highly educated men who were 27-36 years old in a given year. We did so by taking the number of highly educated men of men who were 30-34 years old in a given year and added to this 60% of the number of men who were 25-29 years old and 40% of the number of men who were 35-39 years old.

does not only affect individuals' prospects on the mating market, but also tends to affect their partner preferences (Blackwell, 1998). In other words, beside own education, parental education influences the opportunity to meet a partner with a specific educational level, and also the minimum acceptance level of a person. As a result, we expected a positive association between the education of respondents' parents and the education of their partners. In addition, we expect that both men and women would be less inclined to mate with a partner who has attained a lower educational level than the educational level of their father or mother. This effect may be larger for women, since women traditionally were more likely to trade ascribed characteristics for the achieved characteristics of the spouse (Blackwell, 1998; Blossfeld & Timm, 2003). The operationalization of parents' education (mother and father) was based on the same three categories as used for measuring the educational of the respondent and partners.

We controlled for possible birth cohort effects by including information about respondents' birth cohort in the analysis (dummy coded based on respondents' year of birth in five-year intervals from 1950 to 1980). Furthermore, we controlled for respondents age and also included a quadratic term related to age, to allow for a possibly non-linear relationship between age and the dependent variable. Age and its squared value describe a monotonic relationship with one inflection point. To facilitate interpretation of the polynomial and to enhance the precision of the estimate, age and its square were centered around age 30. Note that because we use cross-sectional data gathered after 2000, members of earlier birth cohorts tend to be older than respondents who belong to younger birth cohorts.

4. Results

4.1 Descriptive results

Table 1 shows the shares of respondents by partnership status, own education, education of the partner (if there is one), education of the mother, education of the father, and birth cohort. It additionally shows respondents' average age and the average value of our measure of the structure of the mating market (i.e. F_{high}/M_{high}). The table suggests that the largest share of respondents were married, followed by respondents who were single and respondents who were living in unmarried cohabitation at the time of the interview. More specifically, 66.5% of the men and 74.5% of the women were married, and only 9.7% of the men and 7.8% of the women were cohabiting. Unmarried cohabitation was much more prevalent in more recent

cohorts. Almost half of the cohabiting respondents were born after 1970 (figures not shown in the table, results can be obtained upon request from the corresponding author). The percentage of singles was with 23.8% higher for men than for women with 17.7%. This difference can be explained by the fact that in relationships women tend to be younger than their partners and because on average men are more likely to remain single throughout the life course (Dykstra & Poortman, 2010; Kolk, 2012; Qian & Preston, 1993; Qian, 1998).

To illustrate the rapid expansion of education that has taken place in the countries that are included in our sample, it is helpful to compare the educational attainment of respondents and their parents as shown in Table 1. The table shows that about 75% of all respondents (and their partners) had attained at least medium education. Among their parents, by contrast, only 45% of the fathers and 35% of the mothers had attained at least medium education. Figure 2 additionally illustrates this shift at the country level and also illustrates the reversal of the gender gap in higher education. The figure shows that the proportion of people in a union with a degree in tertiary education has reversed dramatically over just one generation: the fathers of ESS respondents more often had a college degree than the mothers of ESS respondents; in the generation of the respondents themselves, it was women who most often held a degree in higher education.

–Table 1 and Figure 2 about here–

Figure 3 illustrates the changes in the structure of the mating market as a result of changes in the relative educational attainment of men and women. The figure plots the country-specific development of the log of the age- and education-specific sex ratio between 1980 and 2010 based on the IIASA/VID data. As indicated in the measurements section, a value above zero means that there are more highly educated women than highly educated men on the mating market, whereas a value below zero means that there are more highly educated men than highly educated women on the mating market. Consistent with the enrolment data depicted in Figure 1, the sex ratio among the highly educated increased in all countries, such that by 2010 the gender imbalance in education had turned around in all countries, except for Switzerland, Germany and Austria. In most eastern and northern European countries a reversed gender balance in education among 25-to 34-year old women and 27- to 36-year old men was already reached in 1980.

–Figure 3 about here–

Figure 4 provides a first impression of the types of couples formed in the different cohorts that we considered in our analyses. The figure charts patterns of educational pairings, distinguishing between the cohorts born in the 1950s, 1960s and 1970s. The figure shows that while female hypergamy was more common among respondents born in the 1950s, hypogamy was more prevalent among respondents born in the 1970s. Homogamy was still dominant but has but has not been increasing generally. When interpreting Figure 4, it is important to note that we are analysing cross-sectional data. This means that older cohorts had been exposed to the risk of marital dissolution for a longer period of time compared to younger, more recent cohorts, so these that data not only reflect union formation, but also union dissolution to some extent.

–Figure 4 about here–

4.2 Multilevel regression results

In this section we present the results of our multilevel logistic regression analyses to test our hypotheses about the effect of the reversal of the gender gap in higher education on singlehood and educational assortative mating.

Table 2 presents the results for men and Table 3 presents the results for women. In models 1 and 3, using multilevel binary logistic regression, we investigated which variables affect the likelihood of being in a union versus being single, without looking at the educational characteristics of the partner. In models 2 and 4, using multilevel multinomial logistic regression, we examined the likelihood of being in a union with a low, a medium, or a highly educated partner versus being single. We ran different models in which we included different sets of variables (with and without educational level of father and mother and with and without the interactions between own educational level and the sex ratio among the highly educated). Different specification did not result in major changes in the effects of the other variables in the model. We therefore only present the full models that include all predictors.

–Tables 2 and 3 about here–

4.2.1 Singlehood

Hypotheses 1a and 1b state that an increase in the reversal of the gender imbalance in education to the advantage of women would increase the proportions single among low educated men (Hypothesis 1a) and highly educated women (Hypothesis 1b). To test these hypotheses, we included interaction effects between respondents' education and our measure of the composition of the mating market. In contrast to our hypotheses, the estimates of Model

1 and Model 3 indicate that the sex ratio did not affect the likelihood that low educated men (Table 2) or highly educated women (Table 3) were single at the time of the interview. For medium educated men (b =-0.611; p = 0.054) and highly educated men (b = -0.718; p = 0.059) the effect of the measure was marginally significant and decreased the chance of being single versus being in a union. Taken together, our results do not support our hypothesis that rates of union formation are lower when there are a limited number of potential partners with the at least the own level of educational attainment.

Looking at the main effects of education, we observe that, on average across countries, there is a positive effect on union status of education for men and a negative effect of education for women. In a balanced mating market (when the sex ratio is balanced), better-educated men are more likely to be in a union whereas better-educated women are less likely to be in a union. The significant country-level variance in the effect of education suggests that this educational effect differs between countries (see bottoms parts of tables 2 and 3). Figure 5 illustrates that there is considerable cross country heterogeneity in the effect of education on the chance of being in a union, but the educational gradient goes in the same direction in most cases, with differential strength. In most countries, highly educated women are predicted to be least likely to be a union, all else equal. Exceptions include Denmark and Estonia, where low educated women are predicted to be least likely to be in a union. In most countries, low educated men have the lowest probability to be partnered. Exceptions include Italy, Portugal and Greece, where highly educated men have the lowest probability to be in a union.

On top of the effect of own education, paternal education has a weak negative effect on the likelihood to live in a union and is only significant for women: having a highly educated father decreases the likelihood of being in a union for women.

To check if the effect of education on union formation changed over time, we conducted the analyses separately for cohorts born in the 1950s, 1960s and 1970s (results not shown). For men and women born in the 1970s, own education no longer had a significant impact on the likelihood of being in a union, suggesting that the overall effect of education on the likelihood of being in a union differs not only by gender and country but also by birth cohort.

–Figure 5 about here–

4.2.2 Assortative mating

Next, we discuss the multinomial results related to educational assortative mating (Model 2 and Model 4). The nine coefficients that were estimated for the interaction between the sex ratio among the highly educated and respondents' own education in relation to the four outcome categories can be interpreted as follows: the coefficients on the diagonal are the log odds of being in a homogamous union versus being single; the coefficients below the diagonal are the log odds of being in a hypogamous union versus to being single; the coefficients above the diagonal are the log odds of being in a hypergamous union versus being single.

Hypotheses 2a and 2b state that an increase in the reversal of the gender imbalance in education to the advantage of women would decrease hypergamy and stimulate hypogamy. More specifically, we expected that an increase in the educational attainment to the advantage of women would increase the likelihood that men are in a relation with somebody who is more highly educated (Hypothesis 2a), and would increase the likelihood that women are in a relation with somebody who is lower educated (Hypothesis 2b). In the case of men (Table 2), the effects of our measure of the structure of the mating market on the chance of being with a more highly educated woman were not significant. That is, as the number of highly educated women increased relatively to that of men, low or medium educated men were not more likely to partner with somebody who was more highly educated. We therefore find no support for Hypothesis 2a. However, our results suggest that the measure has a negative and significant effect on the chance that men were with a lower educated partner. That is, when the number of highly educated women on the mating market increases relatively to that of men, medium and highly educated men were less likely to partner downwards. For women (Table 3), the sex ratios for the higher educated affected the chance of being in a hypogamous union among highly educated women and the chance of being in a hypergamous union for low and medium educated women. That is, with an increasing number of highly educated women on the mating market relatively to that of men, the likelihood that highly educated women partnered with a low or medium educated man increased, whereas the likelihood that low or medium educated women partnered upwards with a more highly educated man decreased. These results clearly support Hypothesis 2b.

Hypotheses 3a and 3b focus on the level of homogamy and state that an increase in the gender imbalance in education to the advantage of women would increase homogamy among highly educated men (Hypothesis 3a) and would decrease homogamy among highly educated women (Hypothesis 3b). According to the results shown in Table 2, the likelihood of being in a

homogamous relationship was generally high for highly educated men, but decreased with an increasing number of highly educated women on the mating market. This result contradicts Hypothesis 3a. In addition, for low educated men the chance of being in a homogamous union is negatively related to the sex ratio at a marginally significant level. That is, with an increasing number of highly educated women on the mating market the likelihood of being in a homogamous union versus being single decreased for low educated men. For women, we found no effect of the education-specific sex ratios on their likelihood of being in a homogamous union and thus no support for hypothesis 3b (Table 3).

To assess how robust our results in relation to hypotheses 2a and 2b and 3a and 3b were in terms of including singles in the analysis, we repeated our analyses with those not living in a union removed from the data. The results of the additional analyses (not shown here) led to the same conclusions as drawn from the analysis reported in tables 2 and 3. However, there were two relevant differences. First, when singles were excluded from the analysis, the chance for highly educated men to be in a homogamous union was no longer affected by the education-specific sex ratios. Thus, the significant effect that we observed in our main analysis can at least partly be ascribed to the effect of the sex ratio on the chance of being single. Second, the interaction effects between education and our measure of the structure of the mating market were not significant anymore meaning that the slopes for the effects of the sex ratio did not differ significantly for low, medium, and highly educated men and women.

To further illustrate the the effects that the gender balance in higher education had on union formation and assortative mating in our sample, Figure 6 plots the predicted probabilities for the different outcomes in our multilevel multinomial models against the percentage of women among the higher educated. A value above 0.5 on the x-axis means that the gender balance in education is reversed to the advantage of women. The results shown in the upper right panel of the figure (i.e. in the panel that shows the predicted probabilities that highly educated men are single or are cohabiting/married with a low, medium, or highly educated women), we can clearly observe that with an increasing percentage of highly educated women on the mating market the probability that highly educated men are in a union with a highly educated women decreases (red line) while the probability that they are single increases (dotted line). This is in contradiction with hypothesis 3a, in which we expected that with the shifting gender imbalance in education, homogamy among highly educated men would increase. Assuming that the reversal of the gender gap in education makes highly educated men attractive (and

more scarce) on the mating market, we would have expected them to be living single less often. In fact, we observed the opposite.

The lower right panel of Figure 6 (i.e. in the panel that shows the predicted probabilities that highly educated women are single or are cohabiting/married with a low, medium, or highly educated man) shows that with an increasing percentage of highly educated women on the mating market the probability that highly educated women are single decreases slightly. In contrast, with an increase in the educational advantage for women, the probability of highly educated women to partner with a highly educated men decreased and the probability to partner with a medium educated men increased with a similar magnitudes. This implies that we do not find evidence that women forgo union formation rather than to partner downwards, when faced with a shortage of marriageable men. Instead, women seem to adjust their mate choice according to the mating market opportunities and partner down more often. Still, the probability that highly educated women partner with a low educated man remains very low.

Furthermore, it is interesting to note that as the share of highly educated women increases (i.e. when the share of highly educated men decreases), low and medium educated women are less likely to partner upwards. Additionally, for low educated women, the reversal of the gender imbalance in education increased their probability of being single more strongly than their probability of being partnered with a low educated man. By contrast, the predicted probability of being single for low educated men was always high, regardless of the educational composition of the mating market. For them, we found only a marginally significant and negative impact of the sex ratio on their likelihood of being in a homogamous union, and no significant impact of the sex ratio on their likelihood of partnering upwards.

–Figure 6 about here–

Generally, from the main effects of education in Table 2 and 3 we can infer that in a balanced mating market the chance to partner with a highly educated man or woman is the highest for highly educated respondents. Likewise, the chance that female/male respondents partnered with a low educated man/woman was the highest for low educated respondents. For partnering with a medium educated mate, we observed that the effect for highly educated men (b = 0.506) and highly educated women (b = -0.444) were in opposite directions. That is, the likelihood that highly educated men partnered downwards with medium educated women was higher than the likelihood that low educated men partnered upwards with medium educated women in a balanced mating market. For women we see the opposite: low educated women

partnered more often upwards with medium educated men than that highly educated women partnered downwards with medium educated men in a balanced mating market. This suggests that besides a strong preference for educational homogamy, we observed a tendency for men to partner downwards and for women to partner upwards.

On top of own educational level, there was a significant effect of both fathers' and mothers' educational level. Both men and women were less likely to partner with a mate who had attained a lower educational level than the educational level of their father and mother. When deleting the variables related to parental education from the model (results not shown here), the effect of respondents education become somewhat stronger, suggesting that the effect of parental education partly overlaps with the effect of own level of education.

Note that the estimates for age and birth cohort were consistent for men and women across the different models and across the categories of the dependent variable. The coefficients indicate that with increasing age, the chance of living with a low, medium or highly educated partner (rather than being single) increased. The negative sign of the quadratic term of age means that the curve is concave. This implies that at an older age the chance of being in a union slightly decreased. Furthermore, we observed a negative coefficient for cohort; the effect increased monotonously when we looked at the more recent cohorts compared to the reference cohort born between 1950 and 1955. Members of recent cohorts are more likely to be living without a partner.

5. Conclusion and discussion

In twentieth-century Europe, the dominant pattern of educational assortative mating was that women were at most as highly educated as their husbands (Blossfeld 2009; Esteve, García-Román, and Permanyer. 2012; Kalmijn 1998; Schwartz and Mare 2005). This traditional pattern was compatible with the gender-specific bias in higher education that was in favor of men (Van Bavel, 2012). From the 1970s, this gender gap started to diminish and turned to the advantage of women in the mid-1990s (Schofer & Meyer, 2005; Vincent-Lancrin, 2008). With more highly educated women than men entering the mating market, the old pattern of female educational hypergamy and male hypogamy can clearly not persist. Therefore, this study set out to investigate if the gender balance in higher education affects patterns of educational assortative mating in Europe. In addition, based on the education-specific mating squeeze notion, we expected that the gender imbalance in education influences the likelihood

of being in a union as well. So we examined both outcomes: singlehood and assortative mating at the same time.

The results did not support our first hypothesis that the reversal of the gender gap in higher education increases the proportions of singles among low educated men and highly educated women. Instead, we found that with an increasing number of highly educated women on the mating market the chance for medium and highly educated men to be single increased. This contradicts the education-specific mating squeeze notion that when the availability of desirable mating opportunities are low, rates of union formation will be low. Conversely, when the availability of desirable mates is high, rates of union formation will be high. One possible explanation for these unexpected results is that in a favourable mating market, men can afford to wait longer before committing to a partner and search longer for someone who, for example, also matches well on other dimensions (cf. Li, Bailey, Kenrick, & Linsenmeier, 2002). If this is the case, highly and medium educated men might delay union formation but not forgo union formation. However, Wiik and Dommermuth (2014) observed that the non-occurrence of union formation among highly educated men has increased in Norway, indicating a retreat from union formation. To know whether highly and medium educated men delay union formation or retread completely from it, further investigation using longitudinal data is needed. Longitudinal analyses would allow us to separate the timing effect from the likelihood effect and assess whether better educated men postpone union formation or rather forgo union formation completely.

The results did support our second hypothesis that the reversal of the gender imbalance in higher education decreases hypergamy and stimulates hypogamy. With the shifting gender imbalance in education the likelihood that men partner downwards and women partner upwards decreased. For highly educated women we observed that as the availability of highly educated man decreased, their likelihood to partner with a similarly educated man decreased whereas their likelihood to partner down with a medium educated man increased with approximately the same magnitude. This suggests that on average, in Europe, highly educated women relax their standards to fit the reality on the mating market and enlarge their acceptable field of eligibles when search is difficult. However, while partnering down with a man with less than tertiary education has become a more feasible choice for highly educated women, partnering down with a man who has attained only the lowest level of education is still rare. For low educated men we found no significant impact of the sex ratio for the higher educated on their likelihood to partner upwards neither on their likelihood of being single.

In contrast to our third hypothesis, we observed that homogamy among highly educated men decreased with increasing availability of highly educated women on the mating market, while we expected it to increase since highly educated men's opportunities to find a similarly educated mate increased. Thus again, highly educated men behaved in a way opposite to what expected. When we excluded the single population from the analyses, we failed to detect this decreasing trend because not only the likelihood of being in a homogamous union (versus being single) decreased for highly educated men, but also the likelihood of being in a union at all. Thus even if we did not find support for the education-specific mating squeeze notion in relation to homogamy, it is important to take into account that the reversal of the gender imbalance in education affects singlehood as well as union formation. Overall, we found that homogamy is a function of own educational attainment rather than of the education-specific sex ratio in the mating market.

Furthermore, we would like to reiterate the fact that we our analyses were based on men and women born between 1950-1979 in a cross-sectional data set, so that our results are derived from 30 to 62 year old men and women. Therefore, we opted to remove from the data those respondents who are and who have ever been divorced or widowed. Consequently, the singles in our analyses were singles who were never married before. We do not know if the singles were ever in a cohabiting relationship. When repeating the analyses without excluding the (ever) divorced and widowed respondents our results did not differ for men, but they were slightly different for women (particularly the estimates for the control variables age and birth cohort). This is because for women the percentage singles is higher at older ages and older cohorts. For men, the percentage of singles is higher at younger ages and younger cohorts. When we repeat our analyses excluding the singles, analyzing only people in a union, including or excluding the (ever) divorced or widowed respondents produces very similar results. We preferred to exclude (ever) divorced and widowed respondents because, from a theoretical point of view, the goal was to include singles that were not yet in a 'stable' union. We did not address the problem of repartnering and of the disadvantageous sex ratios that arises for older women due to the fact that men more often partner with a younger woman. Future studies could control for this selection mechanism by adopting a longitudinal perspective which allows analysing entry into first union formation.

By using longitudinal data we would also be able to control for selection out of union. More specifically, in this study we analysed a cross-section of prevailing unions, which is not only affected by patterns of entry into union but also by patterns of marital dissolution. Given the

high incidence of divorce and its variation across time and countries, this could bias results, since older cohorts have been longer exposed to the risk of marital dissolution. Most scholars concluded that unions in which the wife is more educated than the husband have the highest risk to dissolve (Bumpass, Martin, & Sweet, 1991; Clarkwest, 2007; Schwartz, 2010). According to a recent study by Schwartz and Han (2014), in the past female hypogamous couples were indeed the most likely to divorce in the US, but by 2000 female hypogamous couples were not more likely to divorce than hypergamous couples. We cannot assess the extent to which selective marital dissolution influences our stock of unions, or, in other words, how well our sample of existing unions reflects patterns of entry into union. For example, if divorce and separation is highly selective of female hypogamous couples then we are underestimating women's likelihood of entering in a hypogamous union. Schwartz and Mare (2012) determined that selective marital dissolution slightly increases the odds of educational homogamy in prevailing marriages, but these effects have hardly an impact on the trends of educational homogamy in the U.S., where educational homogamy is relatively common.

These limitations notwithstanding, our study contributes to the research literature by focussing on both individual- and macro-level variables, by looking at union formation rather than marriage and by including people who are not in a union. The aim was to study in more detail the way the gender balance in education affects patterns of assortative mating, on the individual level. Our results support the findings of Esteve, García-Román and Permanyer (2012) that an important explanation for the observed trends in assortative mating is due to the educational composition of the mating market, suggesting that with the reversal of the gender inequality in education female hypogamy has become more prevalent than hypergamy, which has been dominating in the twentieth century.

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Appendix 1

Table A1: Number of female respondents per country and per ESS round.

Country	ESS1	ESS2	ESS3	ESS4	ESS5	ESS6	Total
AT	468	482	521	0	0	0	1471
BE	272	277	346	333	327	326	1881
BG	0	0	297	491	505	483	1776
CH	370	417	365	362	287	286	2087
CZ	159	420	0	359	351	315	1604
DE	498	511	500	506	559	516	3090
DK	235	281	276	319	295	305	1711
EE	0	295	229	432	322	418	1696
ES	314	321	400	567	416	426	2444
FI	307	327	283	358	317	369	1961
FR	288	333	407	413	341	0	1782
GB	305	301	381	406	427	436	2256
GR	484	485	0	548	641	0	2158
HR	0	0	0	330	350	0	680
HU	233	264	226	289	278	0	1290
IE	448	535	378	440	562	615	2978
IT	279	322	0	0	0	0	601
LT	0	0	0	0	282	0	282
LU	248	279	0	0	0	0	527
LV	0	0	0	357	0	0	357
NL	514	415	387	352	420	367	2455
NO	347	335	317	279	267	284	1829
PL	356	326	331	327	343	373	2056
PT	282	383	472	456	453	471	2517
RO	0	0	0	509	0	0	509
SE	311	301	344	341	264	313	1874
SI	276	256	296	266	316	272	1682
SK	0	264	366	419	417	447	1913
Totaal	6994	8130	7122	9459	8740	7022	47467

Table A2: Number of male respondents per country and per ESS round.

Country	ESS1	ESS2	ESS3	ESS4	ESS5	ESS6	Total
AT	415	392	454	0	0	0	1261
BE	315	329	309	359	321	366	1999
BG	0	0	190	395	447	425	1457
CH	417	374	344	322	294	299	2050
CZ	175	449	0	419	464	420	1927
DE	513	478	540	588	598	574	3291
DK	266	253	307	311	319	313	1769
EE	0	245	241	343	247	343	1419
ES	298	342	381	533	444	438	2436
FI	304	310	326	417	337	420	2114
FR	239	292	403	390	317	0	1641
GB	297	302	357	408	377	333	2074
GR	410	399	0	444	494	0	1747
HR	0	0	0	272	344	0	616
HU	269	274	198	268	297	0	1306
IE	356	371	330	396	458	538	2449
IT	220	314	0	0	0	0	534
LT	0	0	0	0	190	0	190
LU	241	320	0	0	0	0	561
LV	0	0	0	266	0	0	266
NL	433	329	355	348	349	360	2174
NO	433	358	348	348	346	364	2197
PL	375	340	339	310	385	401	2150
PT	210	280	321	336	324	321	1792
RO	0	0	0	438	0	0	438
SE	373	346	368	360	269	335	2051
SI	272	243	255	236	291	296	1593
SK	0	313	340	332	347	367	1699
Total	6831	7653	6706	8839	8259	6913	45201

Tables and Figures

Table 1. Descriptive information for male and female respondents, pooled data across all countries

	Men		Women
Partnership status			
Married	66.5%		74.5%
Cohabiting	9.7%		7.8%
Single	23.8%		17.7%
Education respondent			
Low	21.9%		23.3%
Medium	50.8%		47 %
High	27.4%		29.7%
Education partner			
Low	22.0%		24.1%
Medium	50.2%		49.8%
High	27.8%		26.1%
Education father			
Low	52.5%		55.0%
Medium	34.5%		32.4%
High	13.0%		12.6%
Education mother			
Low	62.7%		63.7%
Medium	29.7%		28.4%
High	7.6%		7.9%
Birth cohort			
1950-1954	16.3%		15.8%
1955-1959	17.0%		16.7%
1960-1964	18.5%		18.3%
1965-1969	19.2%		19.6%
1970-1974	18.5%		18.6%
1975-1979	10.5%		11.1%
Age (range 30-62)			
Mean	43.66		43.49
SD	8.27		8.26
F_{High}/M_{High}			
Mean		1.09	
SD		0.30	
N	45,201		47,467

Note: In the case of *partnership status*, the categories 'cohabiting' and 'married' are combined in the category 'living in a union' for the analysis that compared the likelihoods of singlehood vs. living in a union (Model 1)

Table 2. Multilevel logistic regression model of being in union versus being single (ref.) and multilevel multinomial logistic regression of being in a union with a low, medium or highly educated women versus being single (ref.). Results for *men* in 28 countries in 2002-2012, born 1950-1980 and minimum 30 years of age.

Men	Model 1		Model 2					
			Low		Medium		High	
Intercept	0.875	**	0.581	+	-0.325		-2.023	**
	(.172)		(.306)		(.199)		(.344)	
Age	0.082	**	0.073	**	0.007	**	0.103	**
	(.008)		(.073)		(.011)		(.012)	
Age²	-0.002	**	-0.002	**	-0.002	**	-0.003	**
	(.000)		(.000)		(.000)		(.000)	
Cohort (ref.=Cohort50-54)								
Cohort55-59	-0.241	**	-0.41	**	-0.153	+	-0.246	*
	(.074)		(.099)		(.084)		(.077)	
Cohort60-64	-0.328	**	-0.568	**	-0.221	+	-0.353	*
	(.101)		(.136)		(.116)		(.140)	
Cohort65-69	-0.335	*	-0.598	*	-0.234	+	-0.347	*
	(.116)		(.190)		(.124)		(.166)	
Cohort70-74	-0.324	**	-0.640	*	-0.263	+	-0.262	
	(.126)		(.225)		(.140)		(.200)	
Cohort75-79	-0.468	**	-0.841	*	-0.433	*	-0.329	
	(.146)		(.267)		(.168)		(.246)	
Education father (ref.=Low)								
High	-0.086		-0.602	**	-0.313	**	0.295	**
	(.047)		(.108)		(.041)		(.071)	
Medium	-0.015		-0.512	**	0.041		0.169	*
	(.032)		(.070)		(.033)		(.053)	
Education mother (ref.=Low)								
High	-0.098		-0.713	**	-0.422	**	0.234	**
	(.057)		(.109)		(.075)		(.064)	
Medium	-0.024		-0.873	**	0.012		0.186	*
	(.059)		(.121)		(.061)		(.061)	
Education (ref.=Low)								
High	0.488	**	-1.654	**	0.506	**	2.473	**
	(.096)		(.138)		(.093)		(.174)	
Medium	0.319	**	-0.707	**	0.957	**	1.124	**
	(.054)		(.068)		(.074)		(.104)	
Sex ratio * Education								
Sex ratio*Low	-0.274		-0.528	+	-0.003		0.415	
	(.244)		(.289)		(.217)		(.353)	
Sex ratio*Medium	-0.611	+	-1.077	**	-0.322		-0.038	
	(.318)		(.409)		(.274)		(.399)	
Sex ratio *High	-0.718	+	-1.656	**	-0.858	*	-1.027	*
	(.381)		(.517)		(.347)		(.484)	
Variance intercepts	0.102	*	0.464	**	0.101	*	1.071	**
Variance age	0.000	**	0.000	*	0.000	*	0.000	*
Variance education	0.053	**	0.121	**	0.028	*	0.141	**

+p<.10; *p<0.05; **p<0.01 (N = 40410)

Table 3. Multilevel logistic regression model of being in union versus being single (ref.) and multilevel multinomial logistic regression model of being in union with a low, medium or high educated men versus being single (ref.). Results for *women* in 28 countries in 2002-2012, born 1950-1980 and minimum 30 years of age.

Women	Model 3		Model 4					
			Low		Medium		High	
Intercept	2.523	**	2.119	**	1.197	**	-0.362	
	(.187)		(.381)		(.250)		(.238)	
Age	0.042	**	0.019		0.051	**	0.044	**
	(.009)		(.013)		(.012)		(.009)	
Age²	-0.002	**	-0.001	**	-0.002	**	-0.002	**
	(.000)		(.000)		(.000)		(.000)	
Cohort (ref.=Cohort50-54)								
Cohort55-59	-0.384	**	-0.393	**	-0.272	*	-0.481	**
	(.096)		(.137)		(.084)		(.107)	
Cohort60-64	-0.553	**	-0.550	**	-0.395	*	-0.699	**
	(.141)		(.256)		(.117)		(.148)	
Cohort65-69	-0.673	**	-0.816	*	-0.415	*	-0.846	**
	(.183)		(.350)		(.151)		(.195)	
Cohort70-74	-0.857	**	-1.112	*	-0.523	*	-1.027	**
	(.216)		(.405)		(.181)		(.216)	
Cohort75-79	-1.041	**	-1.257	**	-0.643	*	-1.285	**
	(.244)		(.464)		(.230)		(.251)	
Education father (ref.=Low)								
High	-0.250	**	-0.976	**	-0.576	**	0.247	**
	(.059)		(.123)		(.067)		(.065)	
Medium	-0.124	**	-0.842	**	-0.056		0.126	*
	(.031)		(.077)		(.040)		(.046)	
Education mother (ref.=Low)								
High	-0.098		-0.489	**	-0.356	**	0.156	*
	(.060)		(.111)		(.087)		(.076)	
Medium	-0.084	+	-0.611	**	-0.130	*	0.134	**
	(.046)		(.082)		(.047)		(.061)	
Education (ref.=Low)								
High	-0.428	**	-2.348	**	-0.444	**	1.826	**
	(.121)		(.199)		(.088)		(.140)	
Medium	-0.065		-1.058	**	0.500	**	1.032	**
	(.083)		(.106)		(.077)		(.094)	
Sex ratio * Education								
Sex ratio*Low	-0.325		-0.158		-0.734	*	-1.721	*
	(.449)		(.494)		(.373)		(.542)	
Sex ratio*Medium	0.145		0.671		0.101		-1.006	*
	(.428)		(.451)		(.315)		(.492)	
Sex ratio *High	0.774		1.456	**	0.907	*	-0.130	
	(.506)		(.491)		(.370)		(.559)	
Variance intercepts	0.338	**	0.841	**	0.478	*	0.665	**
Variance age	0.000	*	0.000	*	0.000	**	0.000	*
Variance education	0.063	**	0.226	**	0.020	**	0.062	*

+p<.10; *p<0.05; **p<0.01 (N = 47084)

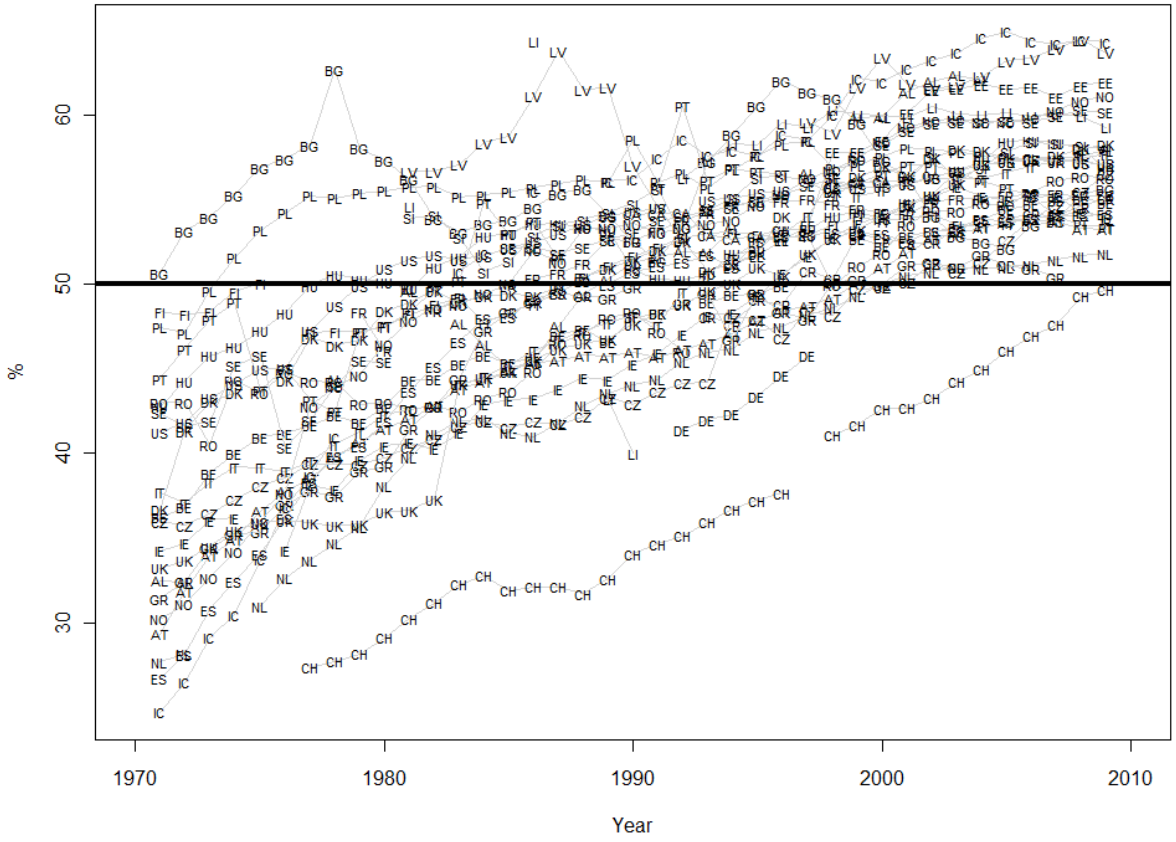

Figure 1. Female students enrolled in tertiary education (ISCED 5-6) as a percentage of all those in tertiary education, 1971-2009

Source: UNESCO Institute for Statistics

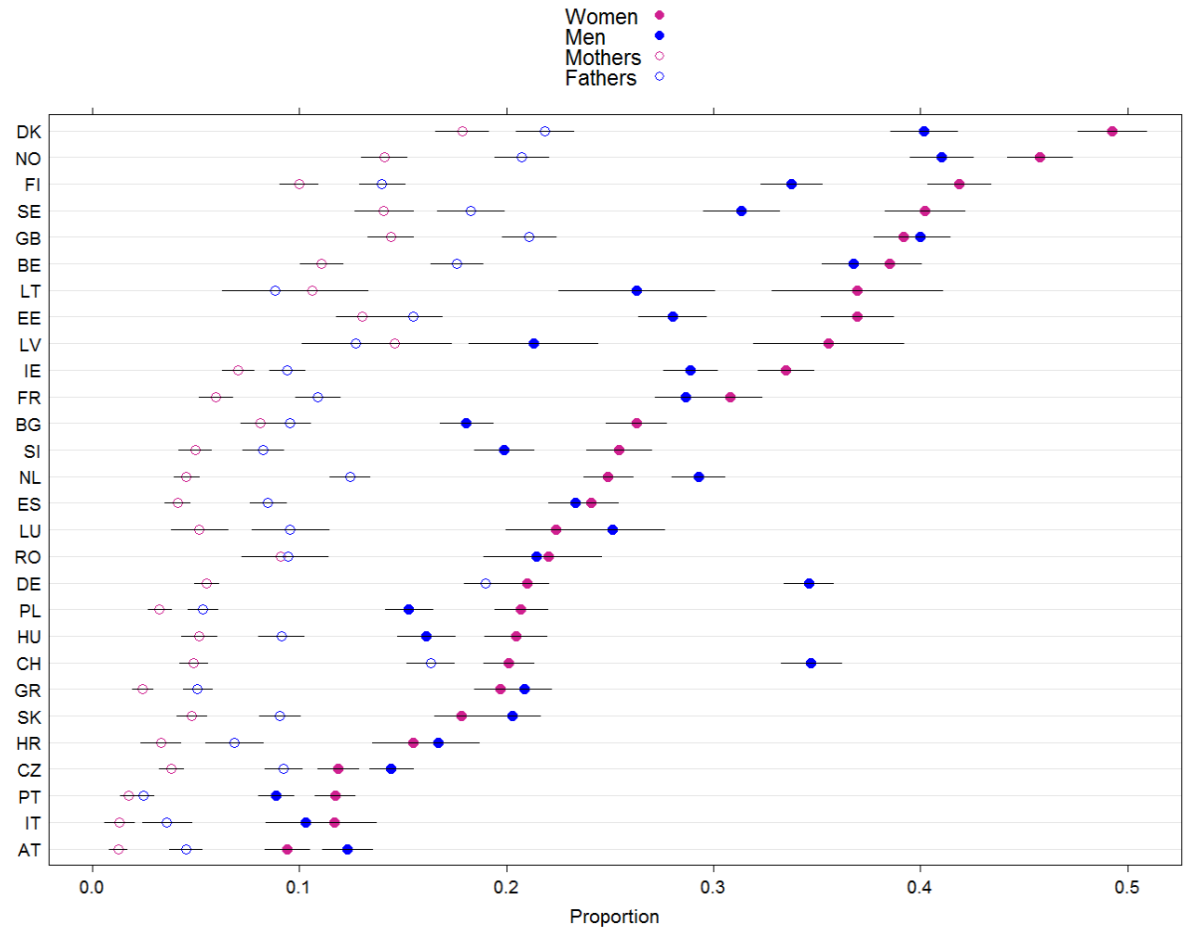

Figure 2. Proportion of people in a union with a degree in post-secondary education: generation of ESS respondents (birth cohorts 1950-1979, filled bullet points) versus generation of their parents (empty bullet points) by country.

Source: ESS1-6

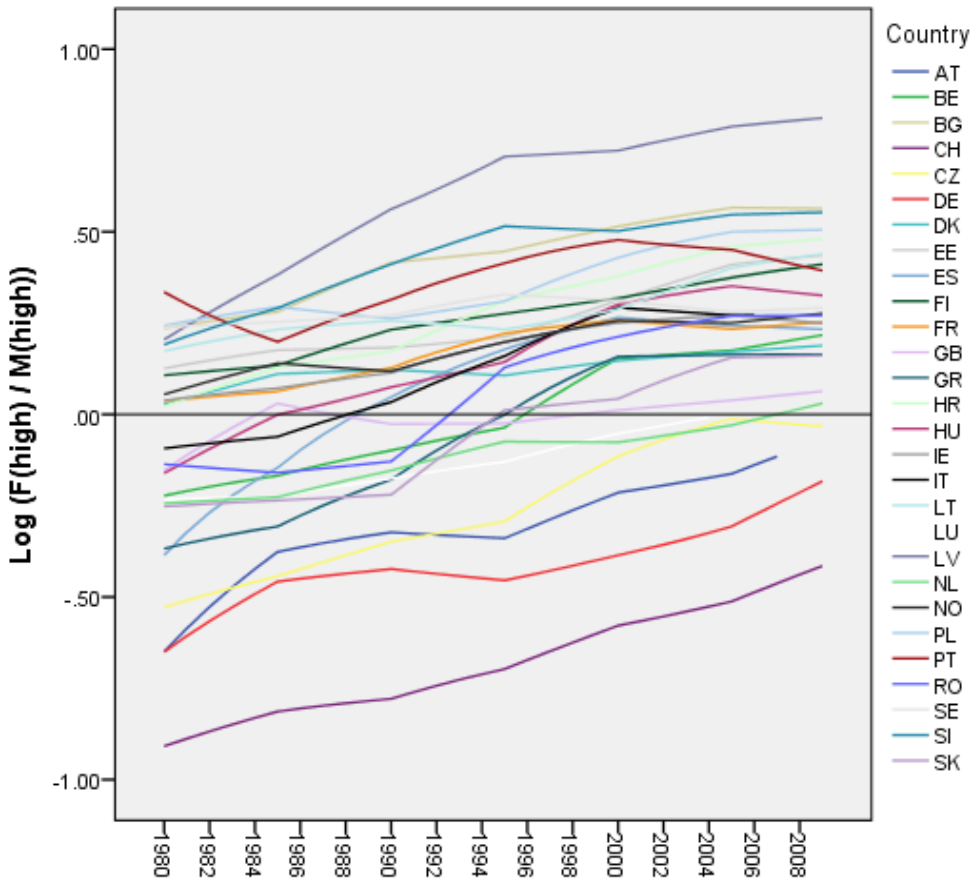

Figure 3. Log of the age- and education-specific sex ratio based on the numbers of highly educated men aged 27 to 36 and highly educated women aged 25 to 34 from 1980 to 2010.

Source: IIASA/VID data.

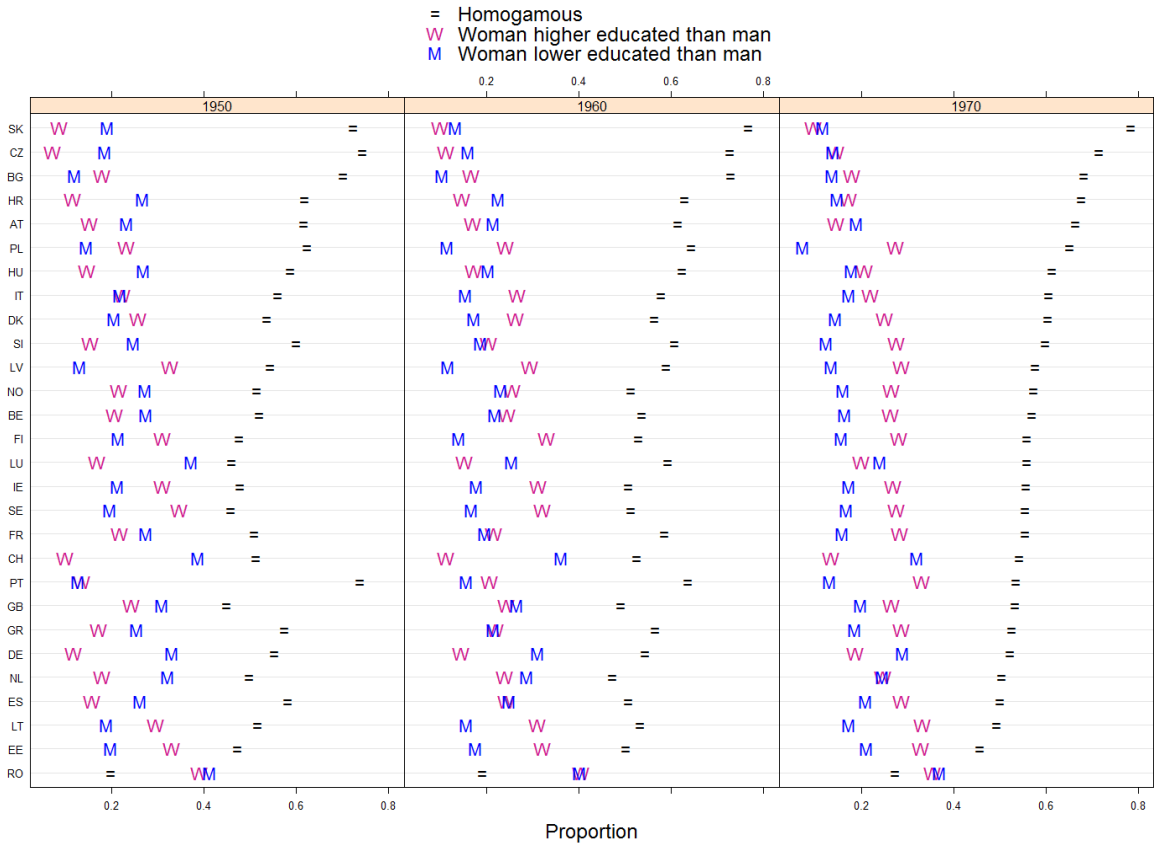

Figure 4. Proportion of homogamous (=), hypergamous (M), and hypogamous (W) cohabiting couples (married or unmarried), by cohort and country.

Source: ESS1-6.

Men Women

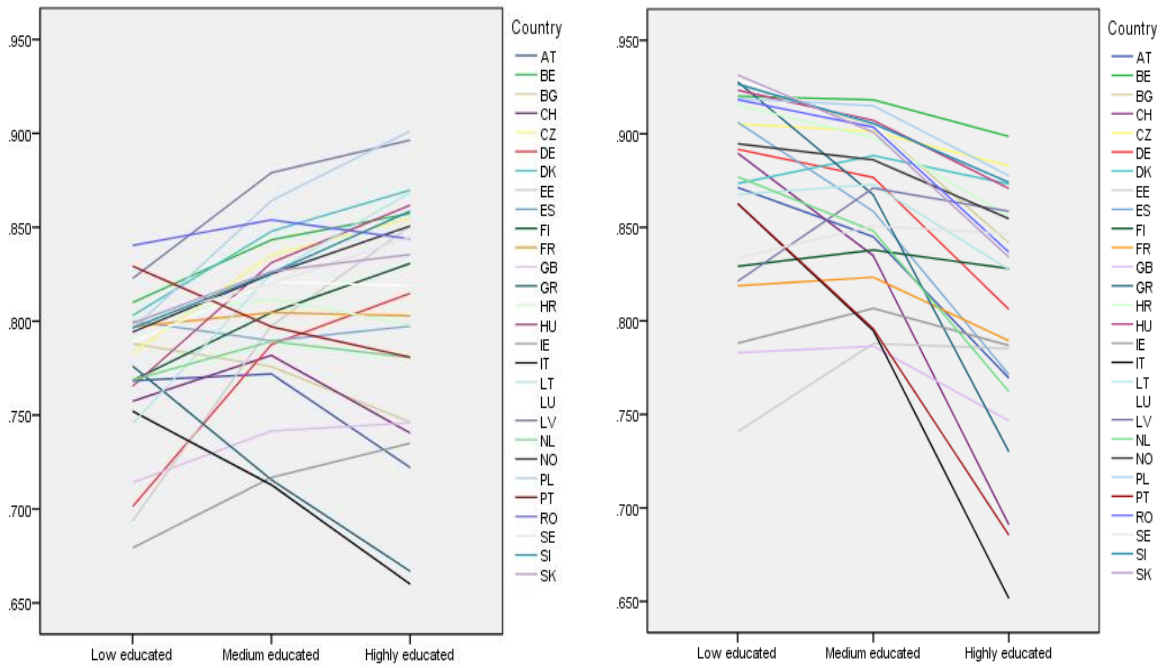

Figure 5. Model based predicted probability of being in a union by level of education and by countries. Men (Model 1) and Women (Model 3) in 28 countries in 2002-2012, born 1950-1980 and minimum 30 year of age.

Source: ESS1-6

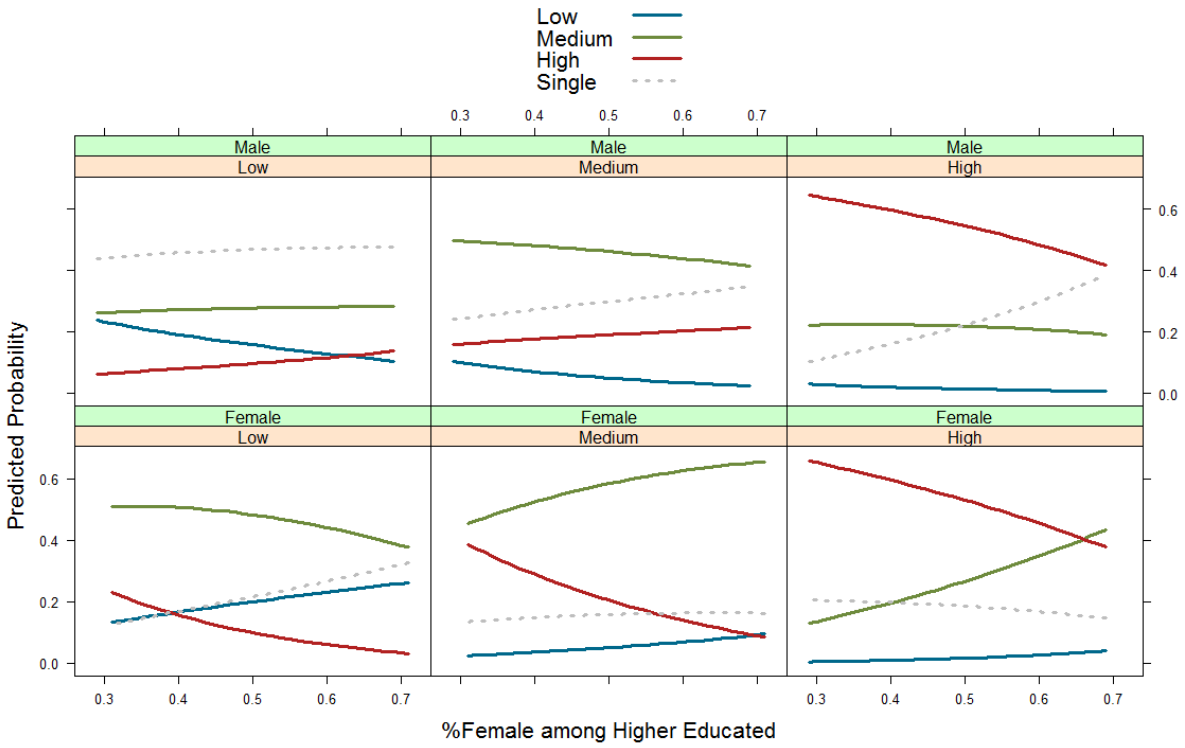

Figure 6. Model based predicted probabilities of living with a low, a medium, a highly educated partner or without a partner for low, medium and highly educated men (top row) and low, medium and highly educated women (bottom row) against the percentage of females among the higher educated.

Note: Age is fixed at 35, cohort = Cohort65-69 and educational level of mother and father = Medium.