Educational Assortative Mating and Gender-Specific Earnings:
Sweden 1990-2005

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Abstract

A large number of studies have indicated that educational homogamy is strong in most Western societies, although the trends over time have differed across countries. In this paper we study the connection between educational assortative mating and gender-specific earnings in a sample containing the entire Swedish population born 1960-1969, and follow them from 1990 to 2005. Our empirical strategy exploits a longitudinal design using distributed fixed effects models estimating the impact of partner education on post-marital earnings, relating it to the income development before union formation. Generally speaking, we find that being partnered with someone with more education (hypergamy) is associated with higher earnings, while partnering someone with less education (hypogamy) is associated with lower earnings. However, most of these differences in earnings exist already at the time of marriage implying that the effect is explained by marital selection processes rather than partnership educational characteristics affecting earnings. The exception is hypogamy among the highly educated, for which there is a strong indication that, in comparison with homogamy and hypergamy, earnings grow much slower also after union formation.

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Acknowledgements

Introduction

Marriage and cohabitation not only affect immediate family life but may also have long-term economic effects. A large number of studies of Western populations have shown that married men earn more than unmarried (Hill 1979; Nakosteen and Zimmer 1997; Korenman and Neumark 1991; Nakosteen et al. 2004; Richardson 1997). Even though this marriage premium has declined since the 1960s it still amounts to about 10 percent or sometimes even more (Gray 1997, Blackburn and Korenman 1994). For women the association between marital status and earnings is weaker and research is also more limited (Hill 1979; Korenman and Neumark 1992). Often women seem to experience a marriage penalty which, at least partly, is connected to the adverse effects of children on earnings (Hill 1979; Ginther, Sundström and Björklund 2008; Loughran and Zissimopoulos 2009) or labor supply (Angrist and Evans 1998). The extent to which the marriage premium for men is related to selection processes into marriage or to real productivity differences between married and unmarried men is still under debate, despite considerable attention being devoted to this issue in previous research (Akerlof 1998; Chun and Lee 2001; Nakosteen and Zimmer 2001; Nakosteen et al. 2004; Ginther and Zavodny 2001; Loughran and Zissimopoulos 2009; Krashinsky 2004).

The case for causal effects of marriage on earnings is based on two different arguments. According to the specialization model proposed by Becker (1973, 1981) spouses allocate time by specializing according to their comparative advantages in home production and market production respectively. Especially in a traditional one-earner (male-breadwinner) model this usually assumes that the man specializes in market work while the woman specializes in home production. In turn, this implies that married men have an advantage over unmarried men in market production, and thus earns higher wages. The second argument is that the marriage premium is a result of discrimination as employers give their married workers an advantage because they believe married employees are more productive since they are more dependent on their salary to support their family and hence are more afraid of losing their job (Bartlett and Callahan 1984). Married life might also contribute to a more healthy living for men, which in turn would also increase labor productivity of married men compared to unmarried.

However, it is not only marriage as such that might have an impact on earnings of men and women, but also the characteristics of the partner. From this perspective, the choice of partner may well have strategic long-term effects on career development and earnings. Previous research has devoted considerable attention to the patterns and development of assortative mating in the marriage market. Most countries show a strong tendency towards educational homogamy (Blossfeld and Timm 2003; Smits et al. 1998; Björklund 1992), but trends over time differ across countries (Kalmijn 1998). While educational homogamy has increased considerably in the United States since the 1940s (Mare 1991, Schwartz and Mare 2005) it has been declining for example in Sweden and Norway (Henz and Jonsson 2003; Birkelund and Heldal 2003). Several studies have also demonstrated a clear earnings homogamy, which at least partly is linked to educational homogamy (Björklund 1992; Henz and Sundström 2001).

While there is a considerable literature on both educational homogamy and the marriage premium few efforts have been made to connect the two in analyzing the impact of assortative mating on the career development and earnings of men and women. Some studies have found a positive effect of wife's education on husband's income, which could be a result of support and better understanding helping the man in his career (Benham 1974; Bernasco et al. 1998; Duvander 2000; Jepsen 2005). For Sweden there does not appear to be any similar effect for women of their husbands' education (Duvander 2000), and in other European contexts the labor market status of the husband (education, occupational status, experience) sometimes has

a positive effect and sometimes a negative effect on the labor market status of women depending on the gender and welfare regime of the specific country (Bernardi 1999; Bernasco et al. 1998; Blossfeld and Drobnic 2001).

Despite this body of research we still have only limited knowledge about the effects of partner characteristics on earnings of men and women. The aim of this paper is to study the connection between educational assortative mating and earnings for men and women in Sweden 1990-2005. We use longitudinal register based data for the entire Swedish population born 1960-1969. Our empirical strategy is to exploit a longitudinal design with distributed fixed effects models (Dougherty 2006) to estimate the effects of partner choice on post-marital income, relating it to how income developed before union formation. This strategy enables us to control for a substantial part of the possible selection bias when estimating the effects of different educational matches on future earnings

Our findings indicate that there are substantial differences in earnings development connected to educational assortative mating. Overall men and women in hypergamous unions (partner with higher education) have a higher marriage premium than those in homogamous unions, while hypogamy (partner with lower education) is associated with a worse earnings development especially for the highly educated. However, most of these effects are visible already before marriage. Hence, it seems as the effects are due to selection of high-productivity individuals into hypergamous unions, and low-productivity individuals into hypogamous unions, rather than a real impact of partner selection on earnings. Part of the hypogamy penalty, especially for the highly educated, might be causal as indicated by the negative development also during partnership. This penalty could be connected to different attitudes concerning gender equality in different educational groups, and to the importance of support and networks for the career development.

Theory and hypotheses

Assortative mating and career are closely connected through the division of labor in the household, especially when it comes to unpaid housework. From economic and sociological theory three main explanations can be identified: specialization, bargaining/relative resources and gender display. Traditional economic models on household production is based on the idea that the family can be viewed as a single unit with a common utility function, or alternatively where one family member (the head of family) has all the decision making power while other family members must follow the decisions made if they want to remain in the family (Becker 1965, 1981; Gronau 1977).

The household produces goods and services by a combination of inputs from the market and unpaid housework. The allocation of housework and market work is made according to the comparative advantages of the spouses. The spouse with the highest earnings potential will fully specialize in market work while the other spouse will specialize in housework. The model is a valid characterization of the male breadwinner household which dominated in many Western countries in the immediate post-war period and up to the 1960s. In this kind of situation we would expect negative assortative mating on traits related to productivity, i.e. that men with high market potential would tend to marry women with high productivity in home production. However, as pointed out by Lam (1988), this model assumes that household goods are produced in the home. The greater the tendency to buy these goods and services in the market, or subsidized from the state, the greater the gains from positive assortative mating on productivity traits, i.e. that two spouses with high market potential marry each other.

The traditional neoclassical household model does not allow for conflicting interest and different utility functions of the husband and wife. To allow for these kinds of interactions various bargaining models were developed in which the couple are thought to produce both public goods (jointly consumed by the couple) and private goods. In cooperative models spouses negotiate over time and resource allocation based on their bargaining power, which in turn is determined by how well each spouse would fare in the absence of cooperation (e.g. divorce or in a non-cooperative relationship), and the outcome is Pareto efficient (Manser and Brown 1980; McElroy and Horney 1981). In non-cooperative models, the individuals simply maximize their personal welfare commonly yielding under-provision of the household common good (Chiappori 1992, Konrad and Lommerud 1995)

A main result in all these economic models of the family is that a married couple allocates its time and resources according to differences in relative productivity in such a way that the spouse with the highest relative earnings potential spend more time on market work, and vice versa. The degree of specialization varies between different models and can be dependent on the bargaining power of the spouses. In turn, the bargaining power is assumed to be connected to the standard of living that can be obtained outside marriage. To the extent that higher education is connected to higher earnings, education would have a direct impact on time allocation. Education can also have an impact on the bargaining position if better educated individuals have more negotiation skills. Regardless of the mechanism, differences between the spouses is what matters, rather than the level of education or productivity as such.

From a somewhat different perspective sociological theory also predicts that division of household labor is related to the relative resources of the spouses (Blood and Wolfe 1960; Edwards 1969; Brines 1993; Shelton and John 1996). The partner with most resources in terms of income, education or occupational prestige is usually assumed to be able to negotiate away housework and child care and specialize on market work. Empirical studies have also offered some support for the hypothesis that a smaller income gap between the spouses is related to a more equal division of housework, even though the effect seems to be quite small and also bigger for women than for men (Bittman et al. 2003). However, some studies indicate that men with higher education do more housework than men with lower education, which seems to contradict the predictions from the models. One explanation might be that highly educated men have more gender equal attitudes when it comes to housework and women's career and labor force participation (e.g. Presser 1994). There is, however, some evidence indicating that this has changed in recent decades, and that men with low socioeconomic status in Britain and the U.S. have increased their time spent on housework more than men in higher status groups, leading to a convergence in male housework across status groups (see Sullivan 2011).

Women often do more unpaid housework also at equal income and education (Evertsson and Nermo 2007; Meyer 2007; Tichenor 1999), which seems to imply that they need higher education and income than their husbands to attain the same bargaining power and an equal division of housework. In gender theory this imbalance is explained by gender norms being socialized from an early age and then being continuously redefined in the process of "doing gender" (Berk 1985; Brines 1994; West and Fenstermaker 1995; West and Zimmerman 1987). Men and women are affected by societal norms and values, and also contribute to these norms and values by their behavior, through which they confirm or reject the prevailing norms. It has been argued that people who cross boundaries, e.g. by the woman earning more than her husband, compensate by doing gender in other parts of the marriage. An example could be that men who earn less than their wives reduce their contribution to unpaid housework as a manifestation of their gender (Brines 1994; Bittman et al. 2003). This kind of gender display could also explain why women with similar or even higher status (income or

education) than their husbands still do more housework. More recently the empirical support for this hypothesis has been questioned, in particular when it comes to more recent times (Sullivan 2011).

Based on these theoretical models we expect that educational assortative mating affect the division of labor in the household through the bargaining position of the spouses and their comparative advantages in market work and housework respectively. The degree of importance of partner education can be expected to differ according to both gender and level of education. Men with higher education are expected to have less traditional attitudes towards household division of labor and female careers. Women with higher education have higher earnings potentials and thus higher opportunity costs of unpaid housework, which in turn would give incentives to buy these services on the market. Presence of children may also influence careers through a changed time allocation. Previously it was mostly women's labor force participation and careers that were affected by parenthood, but today the time allocation of both men and women change more similarly than before in connection with parenthood, at least in Sweden (Dribe and Stanfors 2009).

Educational homogamy can also be expected to contribute positively to the career development of both men and women through better access to information and social networks, as well as a higher level of understanding of work demands in different career phases (Benham 1974; Bernasco 1994). Even though these kinds of mechanisms could be important in all educational groups, they are probably of greatest importance among the highly educated. Finally, it is possible that the spouse with lower education could make use of their partners' greater information skills and social networks to increase their own skills.

Based on the previous discussion we make the following conjectures: First, according to the specialization/bargaining/relative resources frameworks we expect a positive effect on earnings of negative assortative mating for those with high education, and a negative effect for those with low education. In other words, regardless of gender and educational level, these models predict a positive effect on earnings of hypogamy (marrying someone with lower education), because the investment in market work would be higher following specialization or bargaining.

Second, based on the theories of the importance of networks, support and partner understanding of the demands of having a career, educational homogamy should be positive for earnings, particularly at high levels of education. At lower levels of education the specific career requirements can be expected to be lower and thus not influenced to the same extent by the partner.

Third, gender display theory predicts a negative effect on earnings of hypogamy for highly educated women, and a positive effect of hypergamy for men with low education, because these couples are most likely to "do gender", i.e. to resort to a traditional division of labor to compensate for the untraditional heterogamy.

Fourth, based on the hypothesis that men with higher education have more gender equal attitudes, there should be a positive effect on women's earnings of being married to a man with high education, because this should increase women's investment in market work compared to women married to men with low education, and hence more traditional values.

Finally, we expect that the impact of educational heterogamy on earnings increases with the educational distance between the spouses.

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Empirical design

Using panel data, the earnings equation used to estimate the marriage premium commonly is of the following type:

$$\ln Y_{i,t} = \sum_j \beta_j x_{j,i,t} + \gamma M_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where $Y_{i,t}$ is earnings, $x_{j,i,t}$, is the vector of observed covariates j for individual i at time t other than marital status, which in turn is given by the dummy indicator $M_{i,t}$, and $\varepsilon_{i,t}$ is the idiosyncratic error term. In the marriage premium literature considerable attention has been given to the possible endogeneity of marriage for earnings. As has already been pointed out, higher earnings of married men could partly be due to the fact that factors increasing productivity and earnings might also be valuable in the marriage market, and hence that men with higher earnings potentials are more likely to marry. If such factors are unobserved, direct estimation of the marriage premium via the earnings equation (1) would be biased. A similar argument could be made in the case of assortative mating in the marriage market where individuals with high ability and productive potential would be more likely to find a favorable marriage partner.

In previous research the selection bias has been controlled for either by using fixed effects estimations (e.g. Korenmark and Neumark 1991, Richardson 1997) or some kind of quasi-experimental design (e.g. Ginther and Zavodny 2001; Ginther, Sundström and Björklund 2008; Krashinsky 2004). In the standard fixed effects approach, the correct earnings specification is assumed to contain unobserved time invariant individual characteristics captured by a factor α_i rendering the following earnings equation:

$$\ln Y_{i,t} = \sum_j \beta_j x_{j,i,t} + \gamma M_{i,t} + \alpha_i + \varepsilon_{i,t} \qquad (2)$$

Traditionally this equation is estimated via averaging the observed variables for each individual over time, subtract this individual-specific average from equation 2, which washes out the unobserved fixed factor α_i and yields the fixed effects earnings function.

Whereas this procedure effectively handles that married men may earn more than unmarried men due to selection processes according to favorable permanent characteristics (i.e. that more productive men are more likely to be married) it does not account for the fact that some productive personality traits may well change during the life course; for instance when people, at different paces, develop in adolescence and early adulthood into mature adults. Both labor and marriage market success may well be outcomes of such processes questioning the validity of traditional fixed effects models in estimating the earnings equation and hereto related earnings premiums. As an alternative Dougherty (2006) proposes a distributed fixed effects model (DFE) in which a set of dummy indicators $M^p_{i,t}$, capturing time to and since marriage, are included in the wage equation, where p represents years in marriage if positive and years to marriage if negative. Given that the maximum time to/since marriage is s, the model may be written as:

$$\ln Y_{i,t} = \sum_{j} \beta_j x_{j,i,t} + \sum_{p=-s}^{s} \gamma_p M_{i,t}^{p} + \alpha_i + \varepsilon_{i,t} \qquad\qquad (3)$$

In order to identify this model and obtain a relation to the reference of being never married it is assumed that within a certain time frame in advance of marriage, the ones who are to marry do not differ in maturity from individuals who never marry, implying that for large enough *s*, γ_{-s} is zero. Estimated via fixed effects (again subtracting the individual averages, from equation 3) the parameter vector γ_p yields a time profile of how the earnings develop in relation to the marriage.

From the perspective taken here, it is not the marriage premium per se that is of interest but rather whether, and how, it develops depending on the educational assortative mating. In other words, we want to study the relative premium for individuals partnering with spouses of different educational status. To do this we estimate a model in which the earnings function is:

$$\ln Y_{i,t} = \sum_{j} \beta_j x_{j,i,t} + \sum_{p=-s}^{s} \gamma_p M_{i,t}^{p} + \sum_{p=-s}^{s} \delta_p H_{i,t}^{p} + \sum_{p=-s}^{s} \rho_p L_{i,t}^{p} + \alpha_i + \varepsilon_{i,t}$$

$$\qquad\qquad (4)$$

where again the set of indicators $M_{i,t}^{p}$ denotes time to/since union formation, and the corresponding H and L dummy vectors denote time to/since union formation for individuals with a partner with higher (hypergamy) and lower (hypogamy) educational level, respectively. Hence, whereas the resulting γ parameter vector denotes the time profile of the marriage premium for homogamous individuals, the δ and ρ parameter vectors yield the additional effect of being married to a partner of higher (hypergamy) or lower (hypogamy) education.

It should be emphasized that the distributed fixed effects is not equivalent to an experiment in which the treatment, in this case being married to a partner of a certain educational level, could be viewed as truly randomized. On the contrary, selection processes are in full operation on the couples studied. Nevertheless, the resulting time profiles of earnings in relation to marriage are highly suggestive of whether there are any variations in how partner education affects labor market performance before union formation.

Data and sample restrictions

The core data used is from the Swedish population registers maintained by Statistics Sweden consisting of all individuals residing in Sweden at any time from 1961 onwards. We study the earnings development for the birth cohorts 1960-69 during the period 1990-2005 for which we have full information on income, level of education, municipality as well as basic demographic measures such as presence of children in the household. Hence, the considered birth cohorts are followed from 20-30 years of age (in 1990) until they are 35-45 years old (in 2005).

From 1990 onwards, the Swedish population registers record non-marital cohabitation in cases where the couple has common children (based on information about residence at the house-unit level; *fastighet*), and we define marriage as including both formal marriages and non-marital cohabitation with common children, which is the most relevant indicator of a stable partnership in the Swedish context. In order to focus on educational effects, immigrants and second generation immigrants are excluded as well as all observations for people partnering with a first or second-generation immigrant.[1] This leaves information on a total of

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[1] Results on ethnical intermarriages and earnings are presented by Dribe and Nystedt (2011).

about 420,000 men and 390,000 women in the data (see table 1). As we estimate a distributed fixed effects model with a maximum time lag and lead of ten years, observations outside this range, i.e. relating to people partnered more than ten years, or with more than ten years to union formation, are deleted.

Table 1 here

In order to observe union formation we excluded individuals living together in 1990, as well as those who had been married prior to 1990 (about 100,000 men and 150,000 women). Of the remaining 320,000 men, 200,000 partnered during the studied period and 120,000 never partnered. The corresponding figures for women are 170,000 and 70,000 respectively. Removing observations for students leaves a total number of about 4.2 million observations for men and 3.0 million for women.

The explanatory variable of main interest in is the type of partnership, whether with a partner of similar education (homogamy), higher education (hypergamy) or lower education (hypogamy). Educational level is classified in five categories as recorded in the educational register, ranging from "≤9 years" to "3+ years university" (see table 1). The process of assortative mating in the marriage market is obviously complex and multifaceted. For instance, own educational level affects the likelihood of partnering with individuals of certain educational levels and once in a relationship, partner education may or may not affect the propensity to undergo further education. As our objective is to assess the marriage premium by educational level, individuals are censored upon a change in education after marriage. Thus, we follow all individuals as long as they have the same education as they had at union formation. The remaining number of observations amounts to 2.7 and 1.8 million for men and women respectively.

We have no information on hourly wages, which under the assumption that labor markets are competitive, commonly is used as a measure of productivity and earnings capacity. Instead we use yearly earnings, which in principle is a product of hourly wage and time spent working. Under the assumption that household division of labor imply that men specialize in market work and women in household work, making men both more productive as well as spending more time in the former sector, earnings, rather than wage, should capture both these effects. Earnings are defined as the annual income from employment, self-employment, parental leave benefits, unemployment insurance (*A-kassa*), and sickness leave benefits. The levels of disbursements of the last three of these sources of income are all based on current and/or previous work experience and income. Together with income from employment and self-employment they yield a measure of labor-related income. Including these benefits serves the purpose of smoothing temporary earnings shift due to sickness, unemployment or parenthood, and should be a more valid measure of overall market productivity potential than pure labor earnings. In order to focus on people who already have obtained a certain degree of attachment to the labor market, we impose an earnings restriction on included observations of at least two price base amounts (PBAs). The PBA is a measure commonly used in the Swedish law to define benefits and public insurance terms. It strictly follows the consumer price index over time. In 1991 the PBA amounted to SEK 32,200 and in 2009 to SEK 42,800. Hence, the included observations, expressed in current (2009) value, have an income of at least 85,600 SEK, which is equivalent to a monthly salary of about 1100 USD.[2] Note that the excluded observations to a large extent relates to young people that have not yet established themselves on the Swedish labor market and has a rather limited effect on

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[2] The exchange rate has varied since 1990 ranging between 6-11 (SEK/USD). In 2009 the average exchange rate was 7.65 SEK/USD.

the total number of observations decreasing them to 2.5 and 1.6 million observations on men and women, respectively.

We also control for basic demographic characteristics in all regressions: age, age squared, presence of children of different ages and type of municipality, as well as level of education where applicable. The categorization of Swedish municipalities comes from the Swedish Association of Local Authorities and Regions (SKL) and is commonly used in regional analyses. It captures both population density and character of the municipality in 9 categories.

Results

Table 1 presents descriptive statistics on the individuals in the data and their age and educational characteristics upon marriage. Excluding the highest educational category, the mean age at marriage is similar for people regardless of educational level: ranging from 30-31 for men and 29-30 for women. The corresponding mean ages for the most educated are 32.4 and 31.5 years respectively. Turning to the total number of observations under study (table 2), the proportion of people in relationships are 26 percent for men and 34 percent for women.[3] When it comes to the presence of children, 16 percent of men and 21 percent of women live in a household with a child under 3, 10 and 14 percent with child aged 3-6, and 5 and 10 percent with a child aged 7-15.

As it is the relation between educational assortative mating and earnings that is the focus of this study, we present descriptive statistics on ever-partnered and never-partnered individuals in table 3. Mean income increases with education for both women and men regardless of partnership status. Whereas ever-partnered men earn more than never-partnered in all educational categories, the opposite is true among women, except at the lowest educational level.

Table 2-3 here

Turning to the results, the overall marriage premium estimated by OLS and traditional fixed effects (with no time to/since union formation) are shown in table 4. The crude OLS premiums amount to 16 percent for men and 7 percent for women. The corresponding fixed effects estimates are 7 and 0 percent, respectively. Hence, there is no female marriage premium whatsoever in a traditional fixed effects model, but no penalty either.[4]

Table 4 here

Table 5 displays marriage premiums by partner educational level (homogamy, hypergamy, hypogamy) from fixed effects estimations for different educational levels separately. For men a consistent pattern emerges in which the premium, which is always positive, is higher for hypergamy regardless of own education. Whereas the premium ranges from about 4 to 6 percent for hypergamy, it is always less than 3 percent for hypogamy. The premium is generally lower for women and more often negative than positive, but qualitatively a similar pattern appears: the premium is lower (or the penalty higher) for

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[3] Note that the limited fraction of observations for people in relationships is heavily dependent on the censoring principle discarding pre- and post-marital observations if the registered educational level doesn't match to the one upon marriage.

[4] Incidentally, the OLS and FE estimates in this study (on Swedish annual earnings data) for males corresponds well to the results obtained by Dougherty (2006) studying American hourly wages data, who found OLS and FE estimates of the male marriage premiums of 15.1 and 6.2 percent. The estimated premiums for women were 0.001 (OLS) and 2.6 percent (FE).

hypogamy than for homogamy, except for education level 2 (2 years high school), where hypergamy renders the greatest penalty. However, this analysis says nothing about dynamics and to what extent the variance in the premiums, according to partner education, appears in advance of marriage, for instance if people managing to attract a partner of a higher educational level are on a steeper earnings trajectory in advance of their marriage to come.

Table 5 here

Therefore we turn to the distributed fixed effects estimations. First, we present results on the overall marriage premium estimated by OLS and DFE for the entire sample controlling for level of education. The first two columns of table 6 gives the OLS estimates yielding premiums for men that increases from 3 percent 9 years prior to marriage to 37 percent after 10 years in a union. The corresponding estimates for women run from 2 to 18 percent. The DFE model presented in the two subsequent columns yields milder premiums. For men, the premium increases in advance of marriage to 14 percent upon marriage rising to 32 percent after 10 years. Women experience a premium of about 7 percent at the time of union formation, which declines to about 3-4 percent after a couple of years in partnership. Until about six years after union formation earnings are lower than at the time of union formation, indicating an earnings penalty, but then they increase to about 10 percent 10 years after marriage.

The results could be affected by endogeneity of separations: if people who stay as a couple tend to be on a steeper earnings trajectory, positive selection into late stages of partnership will occur and bias the results. Therefore we re-estimated the DFE model excluding all observations for people who separated during the study period (results not shown), which gave almost identical results. Thus separations do not explain the estimated earnings development of those in partnership.

Table 6 here

Table 7 and 8 show the DFE estimates of the marriage premium trajectories by level of education and partner education; whether homogamous (same), hypergamous (partner higher) or hypogamous (partner lower). Coefficients for homogamy are the base effects of the estimations, while the effects of heterogamy are interaction effects. Figure 1 and 2 show these relative marriage premiums for hypergamous and hypogamous marriages, respectively, by level of education.

Tables 7-8, Figure 1-4 here

From Figure 1 it is quite clear that male hypergamy is associated with a higher premium than homogamy at all educational levels except "3 years high school". It seems as if hypergamous men have 5-10 percent higher earnings after marriage than comparable homogamous men. However, it is equally clear that the entire premium originates before marriage, and thus most likely is due to a selection effect, i.e. that men experiencing a positive earnings growth are more likely to marry up than men with lower earnings. Also hypergamous women (figure 2) get an earnings premium compared to homogamous women at all education levels except the lowest ("≤ 9 years"). The premium increases with higher education. However, also in this case the entire premium is due to selection as shown by the peak in the trajectory around the time of union formation. It is also interesting to note that the earnings premium declines after union formation for these hypergamous women compared to homogamous women with similar characteristics. This could be due to a different time allocation following marriage where hypergamous women are more likely to end up doing more housework and less market work compared to homogamous women, which would be in line with expectations from a bargaining/relative resources framework.

Looking at hypogamy the pattern is quite different. For men in figure 3, there is hardly any additional effect compared with homogamy in education groups 2 (2 years high school) and 4 (2 years university), whereas educational levels 3 (3 years high school) and 5 or (3+ years university) both have a negative effect. For women there is a more apparent ranking in which the negative association between hypogamy and earnings grows with educational level (see figure 4). The educational ordering is established already in advance of marriage, but the adverse earnings development of hypogamous women in the highest educational degree is striking. Summarizing, there seems to be a relative earnings penalty of hypogamy compared to homogamy in most educational groups for both men and women. It is most pronounced for those with university education. To a large extent this penalty is connected to selection as shown by the negative effects well before marriage. However, this development continues after union formation, reaching about 10 percentage points for men and over 15 percentage points for women, which indicate a possible causal relationship as well.

If there is an effect of partner education, the degree of dissimilarity between partners should matter for its magnitude. As a final analysis we therefore separately look at the earnings trajectories for people in the two outer educational groups (denoted "high" and "low" education), by level of partner education. The results are presented in tables 9 and 10, and also in figures 5-8. The "a" figures shows the full trajectory from 9 years pre- to 10 years post union formation. In order to more closely visualize the earnings development in marriage, and attempting to neutralize sorting by earnings into marriage according to partner education, we subtracted the premium obtained one year in advance of marriage from the post marital premium. The results are presented in the "b" figures.

Tables 9-10, Figures 5-8 here

For lowly educated women, the earnings trajectories are qualitatively similar across partner educational characteristics: the earnings premium decreases a few years within marriage and then increases (see figure 5a). The trajectories are indeed on different locations; a partner of high education (level 4 and 5) implies higher marriage premium throughout most of the partnership. Discerning the development in partnership relative to the premium one year in advance of union formation (figure 5b) the similarity of the earnings profiles are striking: a decrease of about 5 percentage points 1-4 years in marriage, hereafter increasing becoming positive 7 years post marriage. Hence, it seems as if the differences in final marriage premiums, especially that low educated women married to high educated men have higher premium is mostly due to selection processes.

The earnings pattern of highly educated women is somewhat different and there are more apparent partner education dependencies. First of all, the earnings premiums are lower than among lowly educated women and positively related to partner education so that women married to partners of educational levels 1 and 2 earns less than those married to partners of levels 3,4 and 5 (see figure 6a). This ranking is visible well before marriage and we turn to figure 6b for an analysis of the development within marriage. As for women with low education, highly educated women experience a negative development of about 3-7 percentage points the first few years in a union. However, this decline, and the resurrection of their earnings, is more dependent on partner education, insofar as women married to a partner of high education face a lower initial decline and a more pronounced restoration of pre-partnership earnings. Compared with women of low education the resurrection of earnings is overall much less pronounced. In fact, highly educated homogamous women are the only group earning more 10 years after marriage than one year before. Hypogamous women in the same group earn more than 5 percentage points less 10 years after marriage than one year before, which indicates a considerable earnings penalty in this group.

The marriage premium trajectories of lowly educated men are positive and dependent on partner education; higher partner education in general implying higher premiums. 10 years after marriage the premium exceeds 25 percent for those married to women with at least three years of high school (figure 7a). However, this ranking appears well before marriage indicating prominent sorting mechanisms at work. Turning to the more specific post-marriage earnings development (figure 7b), it is clear that the earnings development is qualitatively similar regardless of partner education, again indicating that selection explains most of the variation in premiums across partner education.

Highly educated men also experience a positive earnings premium development that is heavily dependent on partner education: men married to women of the two lowest educational groups having flatter earnings trajectories (figure 8a). Compared with earnings one year before marriage (figure 8b), the impact of partner education is striking. Whereas highly educated men marrying women of the two lowest educational groups earn about 6 percent more after ten years of marriage, men marrying women of three years of high school or two years of university studies earn about 12 percent more, and men marrying women of the highest educational degree about 17 percent more.

Discussion

Despite the quite extensive literature on the effect of education on wages and earnings, and also on the overall marriage premium in earnings, little is known about how partner education affects the earnings trajectory of married individuals. Partner characteristics may certainly have a considerable impact on the life course of individuals, including career development and earnings. Educational assortative mating can be assumed to be a particularly important dimension of partner choice in this regard, because education clearly has an impact on individual productivity, attitudes towards gender equality, and other factors that could be expected to be of great importance for household division of labor and career decisions of both men and women. Based on economic and sociological theory partner selection by education can be expected to affect individual earnings development through four main factors, as outlined in the theoretical discussion. First we expect it to affect the relative productivity and bargaining position of the partners. From this perspective, being partnered with someone with lower education should imply a better earnings development because of a more favorable division of labor due to comparative advantages in market production and/or better bargaining position. Our findings do not support this hypothesis. Quite the contrary, hypogamy (being partnered with someone of lower educational status) is associated with a negative earnings premium relative to homogamy for both men and women in most education groups, and in the other groups there is no visible effect. There is absolutely no evidence that hypogamy increases individual earnings.

Second, the career development of both men and women could be facilitated by having a partner with equal or higher education, because this could help in acquiring the right information, getting support and better understanding of the demands of working life. This kind of support should be of greater importance for the highly educated where the demands and challenges of a career can be expected to be greater than for those with lower education. Our findings give at least some support for this hypothesis. As already mentioned, homogamy is associated with better earnings development than hypogamy at all levels of education. The effects are particularly strong for men and women with university education, i.e. the ones for which we expect the career demands to be greatest. Most educational groups also show a hypergamy premium compared to homogamy. For men, all educational groups except one (3

year high school) show a hypergamy premium of about 5-10 percent. For women this premium is a bit lower.

Third, from the gender display theory we hypothesized that non-traditional couples in terms of assortative mating (woman high education/man low education) would "do gender" by resorting to a traditional division of household labor in order to compensate for the higher status of the woman. This would in turn imply that hypogamous women with high education would have a worse earnings development than homogamously partnered women of the same education, while for hypergamous men with low education the situation would be the opposite. Our findings seems to be consistent with this explanation, as women with high education have a clear hypogamy penalty, while men with low education show a clear hypergamy premium. Low education women do not show a similar hypergamy premium, which lend some support for the doing gender explanation. The detailed analysis of the women of lowest and highest educational status revealed a pattern where the overall marriage premium indeed was greatest among those married to a partner with high education for both groups. However, this advantage was obtained already in advance of marriage for low educated women, the earnings development within marriage being strikingly independent of partner education and much stronger than among women of high education. The earnings development within marriage for women of high education was positively linked to partner education and generally weaker. In fact, whereas low educated women earned more after six years of marriage, in comparison to what they earned one year before marriage, the only women of high education who did this was the ones married to a partner of highest educational status. All other highly educated women earned less throughout the whole observed union duration of ten years compared to what they earned one year in advance of union formation. These facts also point to the doing gender explanation. On the other hand, highly educated men also have a hypogamy penalty even though it is a bit lower than for women. Nonetheless, it makes it difficult to fully discriminate between the doing gender explanation and the support/network explanation, implying that both could be at work.

Fourth, we expected women partnered with highly educated men to have a better career development because these men are supposed to have more gender equal attitudes both when it comes to division of household labor and the importance of women's careers. This hypothesis also receives some support from our findings. For women of both high and low education being married to men in the highest education group is associated with the greatest marriage premium. The premium is actually greater for women with low education, which might be taken as an indication that this explanation is more important than the simple network/support explanation focusing on having a spouse with the same level of education. Apparently, all women benefit from having a highly educated partner.

Thus, our results seem consistent with some of the hypotheses derived from economic and sociological theory. Generally speaking hypergamy is good and hypogamy is bad, and this is true for both men and women. The effects vary somewhat by own educational status. Clearly, there is no support in our findings for the basic relative resources explanations, which predicts positive effects on earnings of hypogamy. The other hypotheses are more or less consistent with the empirical findings, but it is difficult to fully discriminate between them, which seems to imply that they could all could contribute to explain the pattern observed. Hence, the penalty of hypogamy for the highly educated could at least partly be a result of less support and less access to career facilitating networks. For highly educated women there is also a possible additional hypogamy penalty from doing gender and from not having a highly educated husband with more gender equal attitudes.

However, our results also make it quite clear that a substantial part of the effect of educational assortative mating on earnings is due to selection rather than being a causal effect

of the partner's educational characteristics. At least half of the negative hypogamy effect ten years after marriage is visible already at the beginning of the partnership, which shows that low productivity individuals are more likely to end up in hypogamous partnerships. Nonetheless, taking the pre-partnership earnings into account, this negative development continues also during the partnership indicating that the educational status of the partner may affect earnings growth. In the case of hypergamy, selection is even more pronounced. In fact, all the observed premiums after 10 years are visible already before partnership, and for women the premium was actually higher at the beginning of the partnership than five to ten year later. Thus, it is not so much that being married to someone with higher education improves ones career development as a result of more productive individuals, at all educational levels, being more likely to match with someone with higher educational status. In a way this says more about preferences for more educated partners that it does about the impact of such partners one one's career and earnings.

However, it should be stressed that we define union formation as either a formal marriage or a cohabiting couple having a child, but we do not know for how long the couple has been cohabiting before marriage or first birth. Hence, parts of the pre-partnership earnings premium we find could be attributed to partnership effects, if starting to live together rather than actually marrying or having children is the relevant onset of a stable relationship. If this is the case, the presented figures and discussion above exaggerate the importance of selection processes into marriage and underestimate the true partnership effects on earnings, as some of this effect will be attributed to selection. Nonetheless, while our analysis confirm substantial differences in earnings development connected to educational assortative mating, it seems as if most of these differences are due to selection of high-productivity individuals into hypergamous unions, and low-productivity individuals into hypogamous unions. Part of the hypogamy penalty, especially for the highly educated, might be causal as indicated by the negative development also during partnership. This penalty could be connected to different attitudes concerning gender equality in different educational groups, and to the importance of support and networks for the career development.

Earnings are a function of both wages and hours worked, as well as of benefits based on current and previous wages and working hours. Hence, we cannot discern whether the earnings trajectories are primarily due to variation in wages or time spent working. This implies that we do not know to what extent the weaker resurrection of the marriage premium among highly educated women, a resurrection that was positively associated with partner education, is a consequence of part-time work or of a slower wage growth than the lowly educated. It could be that women with high education, and presumably higher wages and a less limited budget constraint, allocate their time between family and market work differently by choosing to work part time to a higher degree, which would be consistent with the weaker earnings development in marriage. But familial budget considerations as such do not explain why the inclination to stay home is negatively linked to partner education (and presumably family earnings) among highly educated women, whereas a motivation to "do gender" may well increase with educational distance to the partner and hence constitute such a motive. It could also be that highly educated women have jobs where they are more heavily penalized, wage- and career-wise, by marriage and lost working time due to family formation and child care, and that this negative effect is mitigated by partner educational status through the access of social support and networks. However, annual earnings, as defined here, and intended to measure market career should capture a general level of attachment to and activity in the labor market.

Conclusion

In this paper we look at the possible impact of educational assortative mating on the earnings of men and women. As in the case of assessing the overall marriage premium, which has attracted great attention in previous research, a crucial issue in the analysis is to deal with selection bias. To do this we estimate distributed fixed effects models as a way to take the development of earnings prior to partnership fully into account. Even though this empirical strategy cannot be compared to a randomized experiment, it effectively handles time-invariant individual unobserved heterogeneity, and also deals with the potential change in such factors in the period leading up to partnership. Using Swedish register data for the period 1990-2005 it is quite clear that educational assortative mating is associated with differences in earnings. Generally speaking, being partnered with someone with more education is associated with higher earnings, while partnering someone with less education is associated with lower earnings. However, most of these effects are explained by selection into partnership rather than by partnership characteristics causally affecting earnings. The exception is hypogamy among the highly educated, for which there is also a strong indication of a post-marriage effect of partner educational status on earnings. Such an effect might be explained by different attitudes concerning gender equality in different educational groups, and by the importance of support and networks for the career development.

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Table 1. Descriptive statistics: Individuals

	Men		Women	
	Individuals	**Percent**	**Individuals**	**Percent**
Marital Status				
Married/cohab 1990 *(deleted)*	98,293	23	147,107	38
Partnered post 1990	200,881	48	169,233	44
Never partnered	119,449	29	69,590	18
Education level **upon marriage**				
1: ≤ 9 years	21,877	11	11,702	7
2: 2 y. high school	87,817	44	60298	36
3: 3+ year high school	23,647	12	30,791	18
4: 2 y. university	37,291	19	36,426	22
5: 3+ y. university	29,923	15	29,856	17
1: ≤ 9 years	326	0	160	0
Total	200,881	100	169,233	100
Mean age at marriage				
1: ≤ 9 years	30.4		29.0	
2: 2 y. high school	30.1		28.9	
3: 3+ year high school	30.6		29.3	
4: 2 y. university	31.0		29.9	
5: 3+ y. university	32.4		31.5	
N	418,623	100	385,930	100

Table 2. Descriptive statistics: Observations

	Men		Women	
	Number of obs.	**Percent**	**Number of obs.**	**Percent**
Marital status				
Married/cohab	632,634	26	541,704	34
Partner has:				
Same EDU	*250,660*	*40*	*214,307*	*40*
More EDU	*212,651*	*34*	*131,801*	*24*
Less EDU	*169,323*	*27*	*195,596*	*36*
Singles	1,843,366	74	1,068,895	66
Education level				
1: ≤ 9 years	329,867	13	140,491	9
2: 2 y. high school	1,083,501	44	558,185	35
3: 3+ year high school	297,800	12	292,601	18
4: 2 y. university	411,898	17	313,042	19
5: 3+ y. university	345,212	14	302,281	19
Unknown	7,722	0	3,999	0
Presence of children				
age 0-2	384,043	16	330,198	21
age 3-6	236,116	10	224,070	14
age 7-15	132,905	5	156,242	10
N	2,476,000		1,610,599	

Table 3. Descriptive statistics on earnings and age for men and women based on number of observations

| | Mean income | | Mean age | | Mean age at marriage |
	Ever-partnered	Never-partnered	Ever-partnered	Never-partnered	Ever-partnered
Women					
Education level					
1: ≤ 9 years	4.1	4.0	30.6	33.0	30.3
2: 2 y. high school	4.2	4.6	30.4	32.6	29.5
3: 3+ year high school	4.9	5.1	30.5	32.5	29.3
4: 2 y. university	5.2	5.7	31.5	33.5	29.8
5: 3+ y. university	6.6	6.9	32.7	34.8	30.8
Men					
Education level					
1: ≤ 9 years	5.5	4.8	31.6	33.1	31.1
2: 2 y. high school	5.9	5.4	31.1	32.4	30.4
3: 3+ year high school	7.2	5.9	31.6	32.6	30.7
4: 2 y. university	7.8	6.7	32.0	33.0	31.1
5: 3+ y. university	10.2	8.3	33.5	34.5	31.9

Table 4. Estimates of the crude earnings marriage premium

	Men		Women	
	Beta	Robust s.e.	Beta	Robust s.e.
OLS	0.156	0.0016	0.068	0.0015
FE	0.068	0.0012	-0.000	0.0012
n:individuals	307,106		225,258	
N	2,468,278		1,606,600	

Note: Models control for level of education, age, age squared, presence of children and type of municipality.

Table 5. Fixed effects estimates of the earnings marriage premium (relative to never-married).

Own educational level	Men						Women					
	Homogamy		Hypergamy		Hypogamy		Homogamy		Hypergamy		Hypogamy	
	Beta	Robust s.e.	Beta	Robust s.e.	Beta	Robust s.e.	Beta	Robust s.e.	Beta	Robust s.e.	Beta	Robust s.e.
1: ≤ 9 years	0.034	0.009	0.038	0.004	n.a.	n.a.	-0.001	0.010	-0.012	0.006	n.a.	n.a.
2: 2 y. high school	0.014	0.003	0.040	0.002	0.010	0.006	-0.027	0.002	-0.032	0.003	-0.024	0.005
3: 3+ year high school	0.061	0.006	0.069	0.005	0.010	0.006	0.006	0.006	-0.008	0.004	-0.022	0.004
4: 2 y. university	0.034	0.004	0.062	0.005	0.019	0.004	-0.013	0.004	-0.024	0.005	-0.037	0.004
5: 3+ y. univ.	0.057	0.004	n.a.	n.a.	0.026	0.004	0.025	0.004	n.a.	n.a.	-0.035	0.004

Note: Estimates from separate regressions by own education level. Models also control for age, age squared, presence of children and type of municipality.

Table 6. OLS and Distributed Fixed Effects estimates of the overall marriage premium in earnings.

| | OLS | | DFE | |
	Male	Female	Male	Female
Years to/since marriage				
-9	0.029**	0.018**	0.008*	-0.004
-8	0.035**	0.019**	0.013**	-0.001
-7	0.043**	0.024**	0.025**	0.007
-6	0.052**	0.031**	0.041**	0.020**
-5	0.063**	0.037**	0.059**	0.029**
-4	0.073**	0.045**	0.076**	0.043**
-3	0.085**	0.051**	0.095**	0.055**
-2	0.093**	0.055**	0.113**	0.065**
-1	0.104**	0.057**	0.133**	0.074**
0 (marriage)	0.101**	0.059**	0.139**	0.074**
1	0.127**	0.050**	0.151**	0.058**
2	0.144**	0.027**	0.164**	0.025**
3	0.169**	0.046**	0.181**	0.034**
4	0.198**	0.058**	0.199**	0.034**
5	0.225**	0.086**	0.220**	0.053**
6	0.255**	0.105**	0.246**	0.068**
7	0.290**	0.128**	0.272**	0.081**
8	0.329**	0.163**	0.294**	0.100**
9	0.357**	0.180**	0.313**	0.108**
10	0.371**	0.182**	0.324**	0.106**
n:observations	2,468,278	1,606,600	2,468,278	1,606,600
n:individuals	307,106	225,258	307,106	225,258

Note: All regressions estimated with robust standard errors. *,** denote significant at 1 and 0.1% level respectively. Models also control for level of education, age, age squared, presence of children and type of municipality.

Table 7. Distributed fixed effects of marriage on earnings for men.

	Own educational level												
	1: ≤ 9 years		2: 2 y. high school			3: 3+ year high school			4: 2 y. university			5: 3+ y. university	
	Partner's educational level (Same is base effect; Higher, Lower are interaction effects)												
Years since marriage	Same	Higher	Same	Higher	Lower	Same	Higher	Lower	Same	Higher	Lower	Same	Lower
-9	0.017	-0.005	0.004	0.000	-0.001	0.008	0.000	0.016	-0.005	0.001	0.023	0.013	-0.010
-8	0.001	0.024	0.000	0.011	0.008	0.014	-0.009	0.015	0.012	-0.009	-0.005	0.012	-0.004
-7	0.009	0.028	0.003	0.015	-0.013	0.022	-0.005	0.021	0.010	0.009	0.011	0.020	-0.006
-6	0.016	0.031	0.002	0.032*	-0.004	0.047*	0.006	0.003	0.014	0.028	0.013	0.038*	-0.019
-5	0.008	0.053*	0.017*	0.028*	-0.005	0.073**	-0.015	-0.016	0.034*	0.013	0.010	0.051*	-0.005
-4	0.012	0.061*	0.022*	0.037**	-0.015	0.097**	-0.021	-0.039	0.034*	0.045*	0.016	0.068**	-0.018
-3	0.002	0.075**	0.026**	0.046**	-0.010	0.112**	-0.009	-0.044	0.046**	0.059*	0.014	0.097**	-0.031
-2	0.001	0.086**	0.038**	0.044**	-0.016	0.120**	-0.003	-0.034	0.057**	0.054*	0.009	0.112**	-0.036
-1	0.014	0.078**	0.045**	0.046**	-0.021	0.133**	0.006	-0.041	0.065**	0.066*	0.014	0.135**	-0.048
0 (marriage)	0.023	0.067*	0.035**	0.053**	-0.017	0.145**	-0.002	-0.067*	0.069**	0.077**	0.006	0.151**	-0.056*
1	0.027	0.061*	0.032**	0.061**	-0.022	0.161**	-0.011	-0.069*	0.076**	0.082**	0.005	0.163**	-0.052*
2	0.029	0.070*	0.037**	0.061**	-0.011	0.157**	0.008	-0.065*	0.088**	0.066**	-0.002	0.168**	-0.057*
3	0.049*	0.065*	0.046**	0.065**	-0.015	0.173**	0.010	-0.071*	0.097**	0.069**	-0.005	0.175**	-0.057*
4	0.067*	0.059*	0.058**	0.066**	-0.011	0.190**	0.009	-0.084*	0.110**	0.064**	-0.007	0.191**	-0.062*
5	0.096**	0.048	0.072**	0.063**	-0.013	0.215**	0.002	-0.088*	0.125**	0.053*	-0.008	0.205**	-0.062*
6	0.115**	0.048	0.087**	0.064**	-0.017	0.236**	0.005	-0.089*	0.137**	0.068**	-0.001	0.225**	-0.068*
7	0.132**	0.061*	0.108**	0.057**	-0.023	0.261**	0.004	-0.095*	0.151**	0.072**	-0.008	0.251**	-0.080*
8	0.144**	0.053	0.119**	0.062**	-0.019	0.282**	-0.008	-0.106*	0.168**	0.073**	-0.012	0.271**	-0.094**
9	0.118**	0.094**	0.132**	0.063**	-0.020	0.304**	-0.009	-0.101*	0.171**	0.072**	-0.009	0.287**	-0.101**
10	0.107**	0.114**	0.134**	0.068**	-0.014	0.297**	-0.001	-0.099*	0.177**	0.068*	-0.009	0.296**	-0.093**
n:observations	329,867		1,083,501			297,800			411,898			345,212	
n:individuals	42,470		142,943			41,215			56,398			45,401	

Note: All regressions estimated with robust standard errors, *,** denote significant at 5 and 0.1% level respectively. Models also control for age, age squared, presence of children and type of municipality.

Table 8. Distributed fixed effects of marriage on earnings for women

	Own educational level												
	1: ≤ 9 years		2: 2 y. high school			3: 3+ year high school			4: 2 y. university			5: 3+ y. university	
	Partner's educational level (Same is base effect; Higher, Lower are interaction effects)												
Years to/since marriage	Same	Higher	Same	Higher	Lower	Same	Higher	Lower	Same	Higher	Lower	Same	Lower
-9	-0.006	0.010	-0.004	-0.004	0.013	-0.023	0.031	0.020	-0.018	0.021	0.002	0.001	-0.015
-8	-0.011	0.017	-0.008	0.013	0.019	-0.008	0.020	0.007	-0.017	0.026	-0.005	0.009	-0.035
-7	-0.017	0.015	0.009	0.004	0.005	0.000	0.021	0.009	-0.019	0.024	-0.001	0.017	-0.031
-6	0.028	-0.006	0.019*	0.009	0.000	0.009	0.029	0.012	-0.023	0.037	0.004	0.019	-0.025
-5	0.027	-0.006	0.019*	0.016	-0.003	0.013	0.037	0.019	-0.007	0.046	-0.003	0.030	-0.043
-4	0.031	-0.002	0.028*	0.019	-0.011	0.027	0.044	0.014	0.002	0.053^	-0.006	0.048*	-0.056^
-3	0.047	0.005	0.028*	0.025	-0.008	0.034	0.051^	0.009	0.022	0.046	-0.020	0.060**	-0.061^
-2	0.047	0.008	0.026*	0.029^	-0.001	0.042*	0.047	0.003	0.027	0.055^	-0.036	0.083**	-0.082^^
-1	0.048	0.007	0.020*	0.034^	0.001	0.049*	0.047	-0.006	0.030	0.060^	-0.034	0.094**	-0.090^^
0 (marriage)	0.038	0.008	0.010	0.036^	-0.001	0.051*	0.049	-0.012	0.030	0.059^	-0.044^	0.105**	-0.109^^
1	0.025	-0.008	-0.013	0.030^	0.007	0.048*	0.039	-0.025	0.004	0.057^	-0.043^	0.098**	-0.114^^
2	0.031	-0.025	-0.030*	0.008	0.006	0.002	0.027	-0.012	-0.045*	0.041	-0.032	0.059**	-0.120^^
3	0.014	0.001	-0.024*	0.011	0.014	0.008	0.026	-0.015	-0.033	0.031	-0.040	0.061**	-0.124^^
4	0.030	-0.018	-0.020*	0.004	0.002	0.011	0.018	-0.020	-0.040*	0.029	-0.043^	0.060**	-0.126^^
5	0.046	-0.018	-0.007	0.012	0.000	0.026	0.026	-0.023	-0.029	0.029	-0.046^	0.080**	-0.141^^
6	0.045	-0.010	0.002	0.019	-0.005	0.029	0.029	-0.022	-0.022	0.035	-0.047^	0.083**	-0.135^^
7	0.073*	-0.002	0.013	0.015	-0.004	0.038	0.028	-0.021	-0.018	0.028	-0.055^	0.090**	-0.154^^
8	0.080*	0.011	0.023*	0.017	-0.003	0.051*	0.032	-0.026	-0.014	0.033	-0.059^	0.106**	-0.165^^
9	0.098*	-0.009	0.022*	0.018	-0.004	0.059*	0.027	-0.035	-0.018	0.030	-0.057^	0.111**	-0.168^^
10	0.104*	-0.035	0.015	0.024	-0.002	0.044	0.030	-0.039	-0.031	0.032	-0.055^	0.103**	-0.170^^
n:observations	140,491		558,185			292,601			313,042			302,281	
n:individuals	20,844		87,269			45,931			48,974			42,852	

Note: See table 7.

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Table 9. Distributed fixed effects of marriage on earnings:
Women with lowest (1: 9 years or less) and highest (5: at least three years of university studies) educational level.

Years to/since marriage	Low educated women (1) Partner's educational level					High educated women (5) Partner's educational level				
	1: ≤ 9 years	2: 2 y. high school	3: 3+ year high school	4: 2 y. university	5: 3+ y. university	1: ≤ 9 years	2: 2 y. high school	3: 3+ year high school	4: 2 y. university	5: 3+ y. university
-9	-0.006	-0.003	0.033	0.044	-0.053	-0.054	-0.013	0.026	-0.026	0.000
-8	-0.013	0.003	0.021	0.054	-0.035	-0.045	-0.030	0.003	-0.034	0.007
-7	-0.017	0.008	-0.044	0.013	-0.001	-0.029	-0.037	0.051	-0.025	0.013
-6	0.029	0.025	0.010	0.028	0.042	-0.025	-0.033	0.028	0.002	0.015
-5	0.026	0.010	0.036	0.065	0.080	-0.075	-0.043	0.033	-0.002	0.024
-4	0.030	0.013	0.041	0.096*	0.092	-0.061	-0.048	0.047	0.003	0.042
-3	0.048	0.035*	0.057	0.127*	0.122	-0.067	-0.039	0.043	0.020	0.054
-2	0.048	0.033	0.076	0.133*	0.144	-0.047	-0.047	0.048	0.025	0.077
-1	0.048	0.030	0.072	0.125*	0.201*	-0.067	-0.054	0.061	0.031	0.087
0 (marriage)	0.035	0.022	0.040	0.106*	0.202*	-0.078*	-0.068	0.049	0.030	0.100
1	0.024	-0.007	-0.008	0.095*	0.157*	-0.099*	-0.088	0.034	0.021	0.092
2	0.023	-0.021	0.000	0.072	0.136	-0.153*	-0.128	-0.012	-0.026	0.053
3	0.008	-0.016	0.030	0.077	0.171*	-0.136*	-0.134	-0.018	-0.022	0.055
4	0.023	-0.008	-0.008	0.074	0.138	-0.154*	-0.141	-0.008	-0.018	0.055
5	0.042	-0.001	0.026	0.100*	0.211*	-0.133*	-0.142	-0.005	-0.007	0.077
6	0.040	0.004	0.077	0.101*	0.173	-0.128*	-0.133	0.014	0.002	0.079
7	0.070*	0.036	0.092	0.149*	0.286*	-0.141*	-0.146	0.009	-0.005	0.088
8	0.075*	0.064*	0.093	0.170*	0.275*	-0.128*	-0.144	0.038	0.000	0.105
9	0.096*	0.064*	0.129*	0.126*	0.255*	-0.120*	-0.141	0.040	0.006	0.111
10	0.099*	0.041	0.084	0.133*	0.239*	-0.147*	-0.154	0.034	-0.003	0.104
n:individuals	114,782	122,873	108,688	108,593	106,794	121,824	139,945	135,332	158,170	214,554
n:observations	13,247	15,838	11,319	11,139	10,665	14,958	18,558	17,038	20,619	27,633

Note: See table 7.

Table 10. Distributed fixed effects of marriage on earnings:
Men with lowest (1: 9 years or less) and highest (5: at least three years of university studies) educational level.

Years to/since marriage	Low educated men (1) Partner's educational level					High educated men (5) Partner's educational level				
	1: ≤ 9 years	2: 2 y. high school	3: 3+ year high school	4: 2 y. university	5: 3+ y. university	1: ≤ 9 years	2: 2 y. high school	3: 3+ year high school	4: 2 y. university	5: 3+ y. university
-9	0.018	0.005	0.007	0.020*	0.031	-0.030	0.018	-0.032	0.015	0.009
-8	0.005	0.026*	0.002	0.029*	0.058*	0.006	0.004	0.002	0.016	0.006
-7	0.012	0.042*	0.026	0.017*	0.051*	0.019	0.014	0.012	0.017	0.017
-6	0.016	0.042*	0.035	0.056*	0.062*	0.030	-0.009	0.021	0.033	0.037*
-5	0.009	0.053**	0.053*	0.076*	0.079*	0.063	-0.003	0.044	0.066*	0.047*
-4	0.012	0.059**	0.067**	0.086*	0.103**	0.072	0.001	0.052	0.070*	0.058**
-3	0.001	0.058**	0.079**	0.071*	0.134**	0.107	0.015	0.058	0.090*	0.088**
-2	0.001	0.064**	0.096**	0.096*	0.132**	0.108	0.013	0.076*	0.102**	0.103**
-1	0.015	0.073**	0.095**	0.092*	0.143**	0.074	0.024	0.093*	0.111**	0.128**
0 (marriage)	0.025	0.070**	0.093**	0.093*	0.150**	0.103	0.021	0.103*	0.122**	0.144**
1	0.029	0.062**	0.106**	0.087**	0.154**	0.102	0.033	0.121**	0.139**	0.159**
2	0.029	0.073**	0.114**	0.102**	0.171**	0.085	0.034	0.122**	0.143**	0.165**
3	0.051*	0.085**	0.140**	0.124**	0.168**	0.081	0.034	0.129**	0.156**	0.174**
4	0.071*	0.093**	0.155**	0.153**	0.190**	0.100	0.031	0.137**	0.174**	0.192**
5	0.100**	0.107**	0.176**	0.185**	0.217**	0.108	0.037	0.152**	0.191**	0.207**
6	0.121**	0.127**	0.206**	0.196**	0.207**	0.101	0.053	0.173**	0.203**	0.227**
7	0.138**	0.154**	0.241**	0.230**	0.236**	0.124	0.072	0.192**	0.217**	0.250**
8	0.151**	0.162**	0.239**	0.223**	0.279**	0.116	0.074	0.206**	0.220**	0.271**
9	0.127**	0.179**	0.253**	0.250**	0.238**	0.113	0.080	0.213**	0.227**	0.286**
10	0.115**	0.187**	0.259**	0.262**	0.264**	0.137	0.092	0.229**	0.242**	0.295**
n:individuals	266,034	288,195	268,485	263,171	258,842	121,824	139,945	135,332	158,170	214,554
n:observations	25,936	32,164	25,576	24,120	23,029	14,958	18,558	17,038	20,619	27,633

Note: See table 7.

Figure 1.

Marriage Earnings Premium Hypergami Advantage Among Men

Figure 2.

Marriage Earnings Premium Hypergami Advantage Among Women

Figure 3.

Marriage Earnings Premium Hypogami Advantage Among Men

Figure 4.

Marriage Earnings Premium Hypogami Advantage Among Women

Figure 5a.

Marriage Earnings Premium, Low Educated Women

Figure 5b.

Marriage Earnings Premium from 1 year before marriage, Low Educated Women
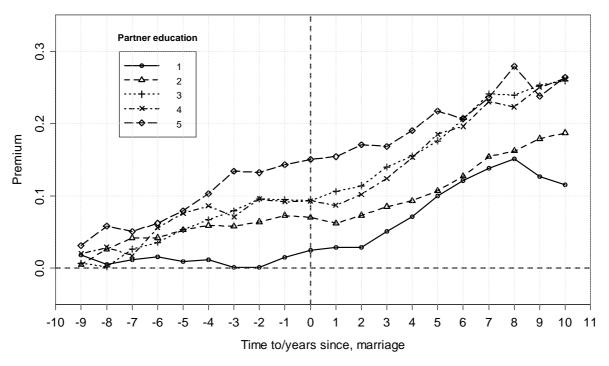
Figure 6a.

Marriage Earnings Premium, high Educated Women

Figure 6b.

Marriage Earnings Premium from 1 year before marriage, High Educated Women

Figure 7a.

Marriage Earnings Premium, Low Educated Men

Figure 7b.

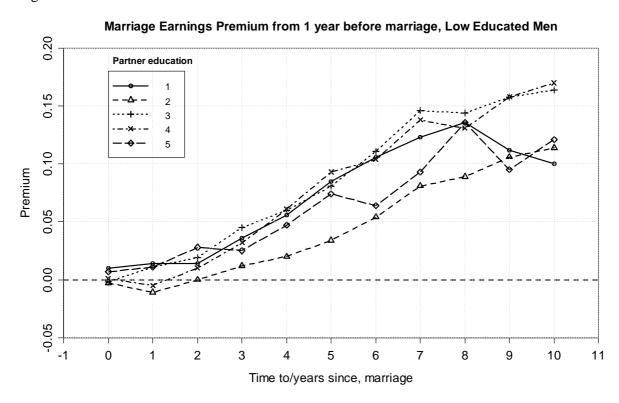**Marriage Earnings Premium from 1 year before marriage, Low Educated Men**

Figure 8a.

Marriage Earnings Premium, High Educated Men

Figure 8b.

Marriage Earnings Premium from 1 year before marriage, high Educated Men

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