Age heterogamy and gender-specific earnings: Sweden 1990-2009

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Abstract

Previous research has shown considerable marriage premiums in earnings for men, but often penalties for women of being in a union. In this study we extend this research by analyzing how the age difference between spouses affects the earnings profiles of men and women. As we follow people over time in advance as well as within their marriage we are able to separate pre- from post-marital earnings movements. The data consists of information on annual earnings 1990-2009 for all Swedes born 1960-1974. The results seem to indicate that age-homogamy is best for earnings, for both men and women. Quite interestingly, age-heterogamy has similar effects of earnings regardless of which spouse is being oldest. However, most of these results are explained by assortative mating, in which men and women with greater earnings potentials find partners of a similar age. Overall, the age-difference between spouses seems to have a very limited causal effect on individual earnings.

Introduction

The difference between men and women in terms of power and resources in society is an issue which has received enormous attention in both the scholarly literature and in media and politics. There are a large number of theories and a vast amount of empirical research trying to capture the causes of these imbalances. Often, especially in economics, they have been attributed to the division of labor within the household and its implications for labor supply and wages (Mincer and Polachek 1974). This division is thought to originate from the reproductive roles of men and women as childbearing promotes specialization according to comparative advantages. Hereby initial small gender differences in household and labor market productivity are reinforced (e.g. Becker 1981). Other explanations focus on discrimination of women in the labor market and other public spheres (see, e.g., Blau and Kahn 2000), or to male dominance at home (e.g., Hartman 1981).

As an alternative, Rothstein (2012) has argued that the root cause of the gender inequality can be found in the age difference between spouses. In most western countries women are 2-3 years younger than their spouses (Bozon 1991; Ní Brolcháin 1992; Bergstrom and Lam 1989; Presser 1975; Van Poppel et al. 2001), which creates an advantage for the man in intra-household negotiations, because of his longer work experience and stronger position on the labor market at union formation, implying a higher earnings potential. Although this advantage is small to begin with, it grows with successive bargaining in the household, ultimately creating the gender imbalances in earnings, labor market attachment and status in general.

In this paper we test this theory by studying the impact of age heterogamy on earnings for men and women in contemporary Sweden. Using register based data and following people over time, in advance as well as within their marriage, we are able to separate pre-marital from post-marital earnings movements. This facilitates assessment of whether the association between earnings and the age gap between spouses is primarily due to selection into marriage (i.e. that people of certain earnings tend to match according to specific age patterns) or if the association arises within marriage. Our results clearly show that age homogamy is most beneficial for earnings for both men and women, and that larger age differences generally are associated with lower union premiums quite independently of which spouse is the older. These results do not offer support for Rothstein's theory, and are also difficult to reconcile with standard economic and sociological theories focusing on specialization and relative resources. Instead it seems as if the findings in the sociological

literature linking age homogamy to marital quality and satisfaction also translates into earnings development (Kalmijn 1998; Atkinson and Glass 1985).

Background

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, but not women earn more than unmarried (Nakosteen and Zimmer 1997; Korenman and Neumark 1991; Nakosteen et al. 2004; Richardson 1997, 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 (Budig and England 2001; Budig and Hodges 2010; Ginther and Sundström 2010; Hill 1979; Loughran and Zissimopoulos 2009; Staff and Mortimer 2012) 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 marriage causing men to become more productive, 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). 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. Previous research has devoted considerable attention to the patterns and development of assortative mating, in terms of education, earnings, ethnicity and age, in the marriage market (Blossfeld and Timm 2003; Smits et al. 1998; Björklund 1992, Kalmijn 1998, Mare 1991, Schwartz and Mare 2005, Henz and Jonsson 2003; Birkelund and Heldal 2003, Björklund 1992; Henz and Sundström 2001). More recently there has also been efforts to connect partner selection to earnings, especially when it comes to ethnic endogamy (Meng and Gregory 2005; Meng and Meurs 2009; Dribe and Nystedt 2012a), but also for educational homogamy (Dribe and Nystedt 2012b).

While there is some previous research on both age homogamy and the marriage premium in earnings, few efforts have been made to connect the two in analyzing the impact of the spousal age gap on the career development and earnings profiles of men and women. There are several reasons why the age of the partner could be important in this respect.

In the historical and sociological literature, age homogamy is often connected to gender equality and marital quality (e.g. Atkinson and Glass 1985, Mitterauer and Sieder 1982). In the past man-older heterogamous couples were characterized by male dominance (patriarchy) and overall lower quality of married life, including sexual relations (e.g. Mitterauer and Sieder 1982: 65-66; Van Poppel et al 2001; Van de Putte et al. 2009). In fact, the general

trend in several Western countries towards greater age homogamy from pre-industrial times to today (Esteve et al. 2009; Van Poopel et al. 2001; van de Putte et al. 2009), has been interpreted as a sign of declining importance of instrumental aspects of partner selection, and greater importance of romantic love and a trend towards greater equality between spouses (Van de Putte et al. 2009; Shorter 1975). The fact that greater age heterogamy in favor of the man in the past might have been associated with patriarchal dominance does not automatically mean that it is the same today. That said, it is indisputable that more patriarchal societies with a strong patrilineal kinship structure, also have larger age differences between spouses (man older) than less patriarchal societies (Casterline, Williams and McDonald 1986). However, it does not immediately follow from evidence like this that greater age heterogamy within a certain context (time and place) must be associated with greater gender inequality (see, e.g., Ní Brolcháin 1992).

The normal age difference between spouses in most western countries is about 2-3 years for first marriages (Van Poppel et al. 2001; Presser 1975; Atkinson and Glass 1985). Figure 1 depicts the average age difference at first marriage in Sweden 1871-2010 together with the corresponding figures for a couple having their first child 1970-2010 (Statistics Sweden 2012; see also Bergstrom and Lam 1989). Sweden fits well into the traditional pattern as, since the turn of the nineteenth century, men have been 2-3 years older than their spouses on average. Most first births in contemporary Sweden occur out of wedlock but there is a close correspondence between the age differences for marriage and parenthood during the period for which information on first births are available (i.e. 1970-2010).[1] According to Rothstein (2012; see also 1999, 2005) this creates a better bargaining position for men because they are more strongly attached to the labor market at union formation and has a higher earnings potential. Because of this, women will start losing intra-household negotiations over household work, labor supply, etc., which further weakens their bargaining positions, and in the long run initially small differences widen, which explains the weaker position of women in society generally, and in the labor market more specifically (Rothstein 2012). Overall this explanation fits well into the economic literature on household bargaining, which suggests that the more outside options an individual has, the more influence over the allocation of time in the household (Lundberg and Pollak 1996). However, in this literature the main explanation behind the worse bargaining position of women is ultimately related to

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[1] It should be remembered that though the age difference between partners seems rather fixed, age at first marriage/birth varies over the studied time span and has increased rapidly during the last decades. For instance, average age at first birth has risen from 24 to 29 for women 1970-2010 whereas the corresponding increase for men runs from 26.6 to 31.5.

childbearing and the resulting comparative advantage for the woman in household work, and for men in market work (Becker 1981). Similarly in sociological resource theory, outcomes such as division of household labor and labor supply depend on the relative resources of the partners (Blood and Wolfe 1960; Brines 1993; Edwards 1969; 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. There is also some empirical support for the hypothesis that a smaller income gap between 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).

Figure 1 here

According to Rothstein's theory we would expect women married to older men to have lower earnings than homogamously married women because of a lower labor supply and lower wages following lower investments in market skill formation. But it should also mean that women married to younger men should have higher earnings than the homogamously married. Moreover, as the entire explanation is based on age related productivity differentials, the effects should be similar for men, i.e. that men married to older women should have lower earnings than homogamously married, while those married to younger women should have higher earnings.

However, it has also 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 union (Berk 1985; Brines 1994; West and Fenstermaker 1995; West and Zimmerman 1987). Accordingly, men who earn less than their spouses may reduce their contribution to unpaid housework as a manifestation of their gender (Bittman et al. 2003; Brines 1994). This could also explain why women with similar or even higher status (income or education) than their husbands still do more housework. In terms of age difference this could imply that especially woman-older heterogamy would not be associated with better career opportunities and higher earnings for women, as we would expect from a bargaining perspective, but with a more traditional division of labor, and thus lower earnings.

It is also possible that age homogamy could be beneficial to the career of both man and woman because they could draw upon each other's networks and benefit from mutual understanding of the demands from working life. Although these kinds of effects probably are of greater importance in terms of educational homogamy (cf. Benham 1974, Bernasco 1994), it cannot be ruled out that similar mechanisms could be at work also in terms of age differences.

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Methods

The main problem studying effects of partner characteristics is the endogeneity of partner choice. Assuming there is at least some sharing of resources within the household, individuals will look for a partner maximizing their joint productive potential, and thus marital sorting may create an association between age heterogamy and earnings without there being a causal effect. In the quite extensive literature on the overall marriage premium this issue has been dealt with 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 Sundström 2010; Ginther and Zavodny 2001; Krashinsky 2004). In the standard fixed effects approach, the earnings specification is assumed to contain unobserved *time invariant* individual characteristics captured by the fixed effects. Whereas this procedure effectively handles selection processes according to permanent characteristics (i.e. that more productive men are more likely to be married) it cannot deal with characteristics that are changing over the life course; for instance when individuals 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 premiums.

In this paper we use distributed fixed effects (Dougherty 2006; see also Dribe and Nystedt 2012a; 2012b) to allow for changes over the life course in unobserved characteristics which could influence both partner selection and earnings. The model can be written as:

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

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 stage. Marital stage in turn is given by a set of dummy indicators $M^p_{it,}$ capturing time to and within marriage where p represents years in marriage if positive and years in advance of marriage if negative. α_i is a factor picking up unobserved time invariant individual characteristics and (washed out in the fixed effects estimation) and $\varepsilon_{i,t}$ is the idiosyncratic error term.

Our main concern is not the overall marriage premium but the premium related to age heterogamy. In other words, we want to study the earnings of individuals partnering with spouses of different ages compared to the homogamously partnered. To do this we estimate the following model:

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

where $M_{i,t}^p$ denotes time to/since union formation, and the corresponding H and L dummy vectors denote time to/since union formation for individuals with an older and younger partner, respectively. Hence, whereas γ_p gives the time profile of the marriage premium for age homogamy, δ_p and ρ_p give the additional effect of being married to an older or younger partner. In the analysis we refer to these parameters as the heterogamy premiums. We define homogamy as unions where the man is 0-3 years older than the woman, man-older heterogamy when he is more than 3 years older, and woman-older heterogamy when women are older than men. In a more detailed analysis we also look at the overall union premiums in across different age-difference groups, and then define homogamy as both partners being born in the same year.

In this way we deal with the endogeneity of union formation for earnings by separating out the part of the premium originating before union formation from that emerging within the union. No positive earnings development before union formation, but a strong increase after union formation, would be indicative of a causal effect of the age difference. However, it should be emphasized that this is not equivalent to an experiment with well-defined identification mechanisms in which the treatment, in this case being married to a partner of a certain age, could be viewed as truly randomized. Instead we base our conclusions on earnings profiles in relation to the time of union formation.

Data

We use data from the population registers maintained by Statistics Sweden, including the entire population residing in Sweden. Information from a number of different registers are linked together to study the earnings development for the birth cohorts 1960–1974 during the period 1990–2009 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. The considered birth cohorts are followed from 20–30 years of age (in 1990–1994) until they are 35–49 years old (in 2009).

From 1990 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 include in our definition of partnership 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 age effects, immigrants and

second generation immigrants are excluded as well as all observations for people partnered with a first or second-generation immigrant. 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. In order to observe union formation we exclude ever-partnered in 1990. In total we analyze about 500,000 men and 400,000 women for whom we have about 7 million and 5.2 million observations, respectively (see Table 1 below).

As already mentioned, the explanatory variable of main interest is age difference between spouses in the union. Age homogamy is defined as the man being 0-3 years older than the woman; man-older heterogamy is when the man is more than 3 years older and woman-older heterogamy is when women are older than their husbands. The reason for this categorization is that men are on average 2-3 years older. In a more detailed analysis we also look at age difference in more narrow groups. Educational level is classified in five categories as recorded in the educational register, ranging from "≤9 years" to "≥3 years university" (students are excluded from the analysis).

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 annual 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, and sickness leave benefits. The levels of disbursements of the last three of these sources of income are all taxable and based on earnings. 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 is 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 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 gross salary of about 1100 USD (2009 average exchange rate). It should be noted that this is a very low salary in Sweden. There are no legislated minimum wages in Sweden (or in the other Nordic countries). Instead, wages are subject to bargaining between employers and trade unions, and the resulting effective minimum levels are among the highest in the world (Skedinger 2008). A study of seven major labor market negotiation sectors in 2004 showed that the lowest monthly full-time salary was 12,790 SEK (Skedinger 2006). On an annual basis two PBAs was equivalent to 51% of this. In other words, our income restriction excludes individuals whose attachment to the labor market is so weak that their total earnings do not exceed the revenue from working half time at the lowest wage.

It is necessary to control for age in order to avoid mixing up age effects and effects of time to/since union formation. We include both age and age squared to capture also non-linear dependencies. We also control for education and presence of children at different ages as this will affect labor supply and earnings. To account for broader geographical differences we include type of municipality according to the categorization made by the Swedish Association of Local Authorities and Regions (SKL), which is commonly used in regional analyses. It captures both population density and character of the municipality in 9 categories.

Results

Table 1 shows descriptive statistics of the sample. About 13% are in homogamous unions, when defining homogamy in the most restrictive way, being born in the same year. As expected it is much more common for men to be older than their partners, than the other way around. 66% of men are older than their spouses, and 38% are more than 2 years older. Among women only 7% are more than 2 years older than their husbands.

Table 1 here

Table 2 displays total union premiums by age difference estimated via traditional fixed effects. Looking first at men in panel A, the premium is largest among the homogamously partnered and then it declines with larger age difference. What is most striking, and also most unexpected, is that the premiums are more or less the same regardless whether the man is older or younger. For example, a man 3-5 years older than his partner has the same premium as a man 3-5 years younger (0.025 vs. 0.028). For women the picture is very different. First of all there is no overall union premium, but a penalty in these fixed effect estimations. As will be made clear later this is explained by lower earnings in the years immediately following union formation and could be explained by a low labor supply in

conjunction with childbearing. The penalty is lowest for the homogamously partnered, and highest for women with much older husbands (6 years or more). Thus, it is most beneficial also for women to be homogamously partnered.

<div align="center">Table 2 here</div>

Looking at the pattern by education reveals some interesting differences, even though homogamy is still associated with the highest premiums.[2] In the highly educated group men are clearly better off being the older partner than being the younger, when comparing the same age difference groups, while this is clearly not the case among men with the least education. For women the pattern is less clear. In the high education group heterogamy seems to be associated with greater union penalties if we go outside normal age differences, while there is not much of a coherent pattern in the two lower educational groups

As has been stressed in much previous research, the likelihood of heterogamy varies with age at union formation (e.g. Bozon 1991; Esteve et al. 2009; Ní Bhrolcháin 1992). It also seems plausible that any influence of heterogamy on labor market outcomes could depend on this age. For instance, the relative importance of labor market attachment for initial negotiating positions may decline with age, as both parties have had more time to establish themselves stronger on the labor market. For this reasons it seems relevant to look at the heterogamy premiums taking age at marriage into account. The last rows of Table 2 show that age homogamy is connected to the highest premiums for men regardless of age at marriage. Among the heterogamous it seems more beneficial, given the absolute level of the age difference, to be partnered with an older woman for those entering the union before 30, while the direction of the age difference does not matter for those partnering after 30. For women we find the lowest penalty among the homogamous in both age groups. Among the heterogamous women being younger than the man is connected with a larger penalty for women partnering late, but not for women partnering early.

As has already be been discussed, these kinds of estimates do not take time-varying unobserved heterogeneity into account, which could bias the results. Figure 2 shows the distributed fixed effects estimates of the overall union premium. The development of this premium in advance of union formation is rather gender neutral. The year before the partnership is formed men and women earn premiums of about 0.11 and 0.08 respectively (as the dependent variable is log earnings this is approximately equal to 12% and 8% respectively). For men this positive development continues within marriage and after about 10

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[2] The results by education and age at marriage are obtained by separate estimations for each group.

years in the union the premium is 0.25 which is quite substantial (more than 25%). That almost half of this premium is evident already at the time of union formation highlights the endogeneity of partner selection. Men on a steeper earnings trajectory are more likely to marry, which explains a considerable part of the union premium. This positive earnings development post union formation might be connected either to a higher labor supply of men in unions, or to a better wage development due to spousal support, transfers of network and social capital, or possible discrimination of single men in the labor market.

Figure 2 here

Turning to women, the pattern after union formation is completely different. There is a sharp decline in earnings during the first years of the partnership, connected to a lower labor supply following childbearing, and possibly also a slower wage growth. There is some recovery, but it is clear that women in unions do not earn more 10 years after union formation than they did one year before. This also explains the union penalty we got in the fixed effects estimates.

Looking at the impact of age heterogamy, Figure 3 shows the heterogamy premiums (additional union premium of heterogamy compared to homogamy) for men and women using the broader definition of homogamy (man being 0-3 years older). An heterogamy penalty emerges in advance of the union and the year preceding it, it amounts to about -0.04 regardless of the direction of the age difference. After 10 years in the union heterogamous men more than 3 years older than their wives earn about 8% less than comparable homogamous men, while the corresponding figure for men in woman-older unions is still 4%. That the whole difference in the latter case is visible already at union formation shows that it is entirely explained by selection. For men in man-older unions the decline continues also within the partnership. Nonetheless, also in this case about half the effect came before union formation, again highlighting the importance of selection processes.

Figure 3 here

For the earnings development of women, the age differences play a lesser role. Being in a man-older union implies an additional penalty compared to homogamy of about 3% and in man-younger unions this figure is 2%. In both cases, however, the entire difference emerges before union formation. It is interesting to note that women partnered with younger men have a less negative development the first years after union formation compared to homogamous women, which might be connected to a more equal division of domestic work and time with children. It could also be noted that for both sexes, man-older heterogamy is related to slower earnings development than woman-older heterogamy.

Figure 4 displays union premiums for a number of more detailed age-difference groups.[3] From Figure 4A, it is evident that men in age homogamous unions earn a higher premium than other men. After 10 years in the union their premium amounts to about 0.3. The premium one year in advance of union formation is about 0.12, showing that slightly less than half the final premium has emerged already before entering the union. However, the most striking feature of Figure 4 is the consistent negative association between age heterogamy and earnings. The lowest marriage premium after 10 years of partnership is found for those men who are partnered with women at least 10 years older *or* younger. Then follows, in turn, men in unions with women 6-9 years older or younger, 3-5 years older or younger, 1-3 years older or younger. This clearly indicates that it is the age gap as such, and not its gender distribution, that is related to a slower earnings development for men.

Figure 4 here

The corresponding pattern for women is shown in Figure 4B. The union premium increases before union formation, reaching about 5% one year before entering the union, and then decreases the first few years in the partnership (becoming negative for all age-difference groups one-year post union formation) and then increases to levels comparable to the ones obtained just before union formation. Though the variation is much less pronounced, the ranking of the premiums after 10 years in a union is identical to the pattern found for men, i.e. the premiums decrease with the (absolute value) of the age gap. For women, this pattern qualitatively resembles the results in a recent study on Danish data (Drefahl, 2010), in which it is shown that age homogamy is beneficial for wives in terms of mortality (i.e. the closer in age a married women is to her man, the lower her mortality risk). For men however, the mortality risk is continuously increasing with the age of the partner (i.e. the younger the spouse the smaller the mortality risk).

Now turning to the development within partnership, Figure 5 shows the earnings development subtracted by the premium obtained one year before union formation. For men (Figure 5A), the age gap pattern qualitatively remain unchanged, the age gap is negatively related to the earnings development also within marriage. For women (Figure 5B), the earnings profiles within the partnership are highly similar regardless of the spousal age gap, indicating that any differences in earnings between the groups are due to selection into the union.

Figure 5 here

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[3] These results are obtained by running separate DFE models for each age difference group.

Thus there seems to be strong assortative mating according to age, with men and women on steeper earnings trajectories finding partners of similar ages as themselves. For men, this continues after union formation insofar as the earnings profile is steeper the lesser the age gap. For women, the earnings development within marriage seems to be totally unrelated to the age gap.

Conclusion

Our analysis shows that age difference between spouses matter for their earnings, even though the effects generally are smaller than for educational homogamy (Dribe and Nystedt 2012b) or endogamy by country of origin (Dribe and Nystedt 2012a). Moreover, to a large extent the association between age difference and earnings is explained by selection through assortative mating, rather than being causal effects of age difference on earnings.

Age homogamy appears most beneficial for earnings for both men and women. For men the union premium is largest for those partnered with women born in the same year as themselves, and similarly for women, the union penalty is lowest for those in homogamous unions. Heterogamy is negatively associated with earnings: the greater the age difference the lower the earnings. The pattern is basically the same for men and women, and what is perhaps most interesting, is also similar regardless of which of the partner that is older.

These results do not offer strong support for the theory outlined by Rothstein, in which man-older heterogamy is assumed to be the fundamental explanation behind subordination of women in society in general, and in the labor market in particular. Women in man-older unions indeed earn less than homogamous women, but so do women in woman-older unions, which runs contrary to the predictions of the theory. Moreover, the fact that men show a similar pattern is not in line with the theory, as we would expect men in man-older unions to earn more because they could bargain away household labor and increase labor supply and wages.

The emerging pattern is also difficult to reconcile with the standard theories in economics and sociology focusing on specialization and relative resources as drivers of household division of labor, labor supply and ultimately earnings. To the extent that we expect any effect of age heterogamy, it should go in the same direction as in the Rothstein theory (to which they are very similar), because the older partner should have a greater earnings potential and therefore be more successful in the bargaining over household labor, or through specialization according to comparative advantages.

From gender theory we would instead expect non-traditional unions (in terms of power relations) to be associated with a more traditional division of labor. Hence, in terms of age difference we would expect men in woman-older unions to have higher union premiums because of a higher labor supply and less domestic work, while women in these unions would earn less than homogamous women. Obviously, our results do not support these predictions.

Instead, the picture emerging is one in which individuals with high earnings potential prefer to marry homogamously, which creates an impression of a relationship between age difference and earnings. In all cases except one, there is almost no difference in the development of the union premium after union formation, but everything happens before entering the partnership. The only possible exception is men in man-older heterogamous unions, for whom the earnings relative to homogamous men continue to decline also after union formation.

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Table 1. Distribution of the main variables (%).

	Men	Women
Marital status		
Married/cohabiting	64	77
Never in union	36	23
Union type, Age difference		
Own age - Partner age		
0 (Homogamy)	13	13
1-2 Older	28	12
Younger	12	26
3-5 Older	26	6
Younger	7	25
6-9 Older	10	1
Younger	2	11
10+ Older	2	0.2
Younger	1	5
Education		
1: ≤9 years	12	7
2: 2 years high school	43	33
3: 3 years high school	16	21
4: 2 years university	15	17
5: ≥3 years university	15	21
Presence of children		
Age 0-2	21	26
Age 3-6	19	25
Age 7-15	10	14
Observations	7,007,629	5,215,996
Individuals	513,204	413,015

Note: The distributions are based on the number of observations.

Table 2. Fixed effects estimates of the union premium by sex, education and union type (explanatory variable).

A. Men

	Age difference (Own age – Partner age)								
	Homogamy	1-2 Older	1-2 Younger	3-5 Older	3-5 Younger	6-9 Older	6-9 Younger	+10 Older	+10 Younger
All	**0.061** (0.0015)	**0.049** (0.0010)	**0.046** (0.0015)	**0,025** (0.0010)	**0,028** (0,0019)	**0,010** (0,0014)	*0,009* (0,0030)	0,000 (0,0029)	0,000 (0,0054)
Education:									
1: <=9	**0,043** (0,0048)	**0,044** (0,0032)	**0,045** (0,0045)	**0,026** (0,0029)	**0,039** (0,0055)	**0,027** (0,0039)	**0,032** (0,0080)	**0,035** (0,0073)	*0,031* (0,0128)
2: High School	**0,039** (0,0019)	**0,026** (0,0013)	**0,031** (0,0019)	**0,013** (0,0012)	**0,024** (0,0023)	**0,010** (0,0017)	*0,010* (0,0036)	**0,014** (0,0034)	0,002 (0,0064)
3: University	**0,047** (0,0027)	**0,042** (0,0019)	**0,031** (0,0029)	**0,021** (0,0019)	*0,008* (0,0039)	**0,012** (0,0029)	-0,010 (0,0070)	0,005 (0,0068)	0,001 (0,0133)
Age at marriage									
<=30	**0,074** (0,0018)	**0,055** (0,0013)	**0,063** (0,0020)	**0,019** (0,0014)	**0,040** (0,0025)	**-0,013** (0,0026)	**0,018** (0,0040)	**-0,056** (0,0124)	0,002 (0,0069)
>30	**0,073** (0,0025)	**0,073** (0,0017)	**0,054** (0,0014)	**0,056** (0,0014)	**0,040** (0,0028)	**0,035** (0,0017)	**0,018** (0,0045)	**0,015** (0,0030)	*0,016* (0,0079)
Observations	7,007,629								
Individuals	513,204								

B. Women

	Age difference (Own age – Partner age)								
	Homogamy	1-2 Older	1-2 Younger	3-5 Older	3-5 Younger	6-9 Older	6-9 Younger	+10 Older	+10 Younger
All	**-0,028** (0,0014)	**-0,030** (0,0014)	**-0,031** (0,0010)	**-0,037** (0,0018)	**-0,037** (0,0011)	**-0,037** (0,0033)	**-0,043** (0,0015)	**-0,035** (0,0090)	**-0,042** (0,0021)
Education:									
1: <=9	*-0,017* (0,0065)	*-0,017* (0,0055)	**-0,021** (0,0043)	*-0,013* (0,0062)	-0,008 (0,0041)	-0,010 (0,0111)	**-0,021** (0,0050)	-0,004 (0,0330)	*-0,014* (0,0068)
2: High School	**-0,045** (0,0018)	**-0,044** (0,0018)	**-0,047** (0,0013)	**-0,046** (0,0023)	**-0,048** (0,0013)	**-0,037** (0,0041)	**-0,048** (0,0018)	-0,019 (0,0119)	**-0,048** (0,0027)
3: University	**-0,033** (0,0022)	**-0,032** (0,0022)	**-0,033** (0,0017)	**-0,035** (0,0031)	**-0,042** (0,0019)	**-0,036** (0,0061)	**-0,051** (0,0027)	*-0,048* (0,0150)	**-0,045** (0,0039)
Age at marriage									
<=30	**-0,012** (0,0016)	**-0,016** (0,0018)	**-0,014** (0,0012)	**-0,021** (0,0028)	**-0,019** (0,0012)	*-0,022* (0,0079)	**-0,023** (0,0017)	0,128 (0,0765)	**-0,018** (0,0026)
30+	**-0,022** (0,0025)	**-0,019** (0,0021)	**-0,024** (0,0019)	**-0,027** (0,0023)	**-0,030** (0,0019)	**-0,028** (0,0036)	**-0,040** (0,0025)	*-0,027* (0,0090)	**-0,036** (0,0033)
Observations	5,215,996								
Individuals	413,015								

Note: Robust standard errors in parentheses. Parameter estimates significant at the 0.001 (0.05) level are indicated in bold (italics). Models control for age, age squared, presence of children (aged 0-2, 3-6, 7-15), education and type of municipality.

Figure 1. Average age difference among partners upon first marriages (1871-2010) and first child birth (1970-2010).
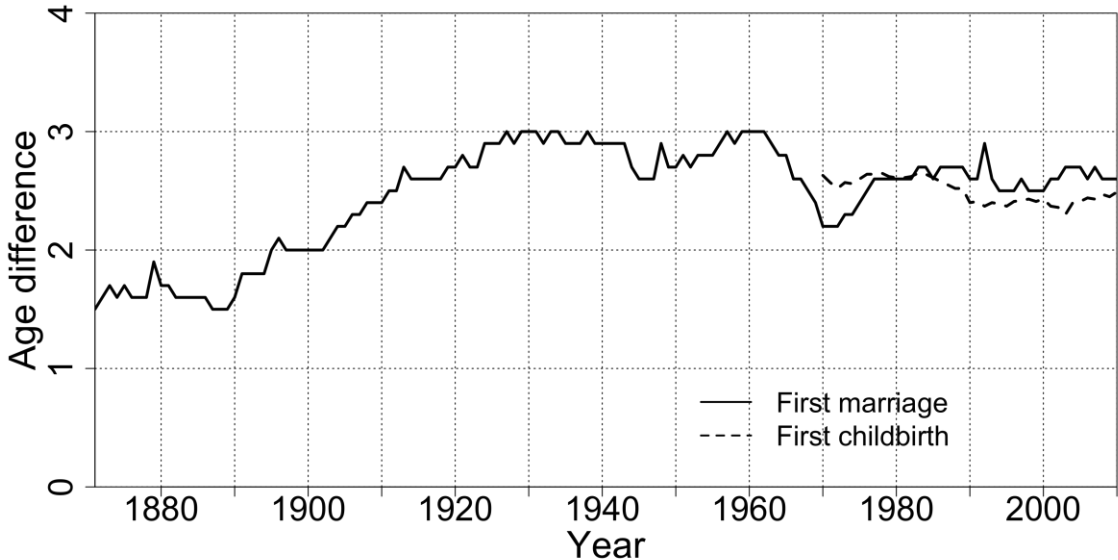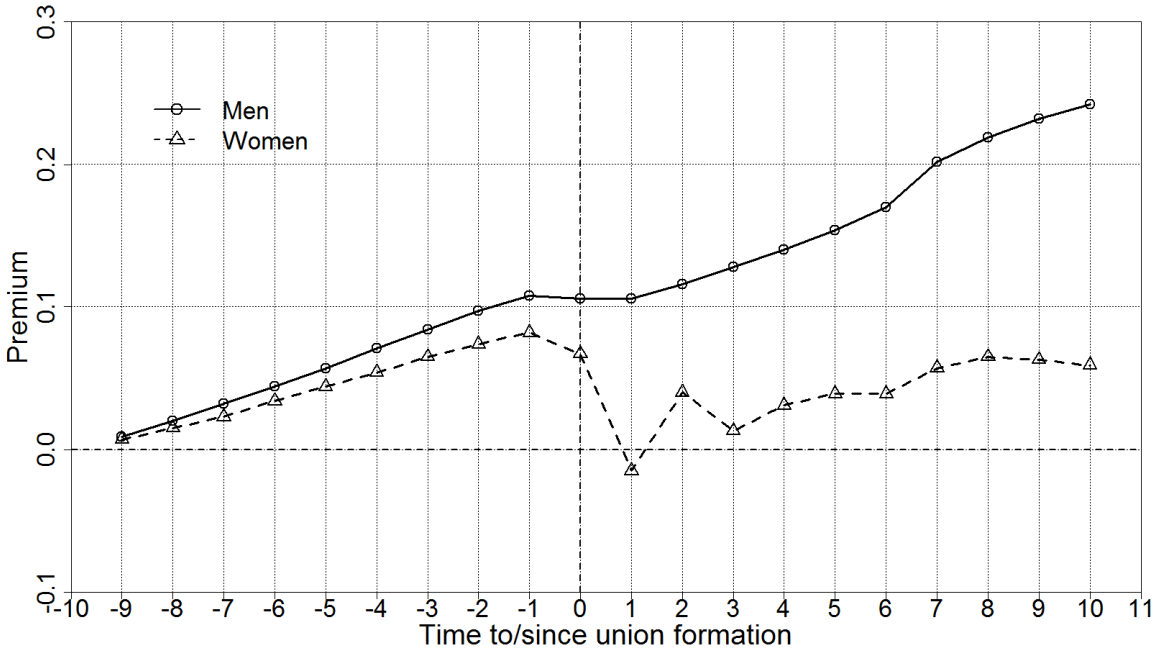

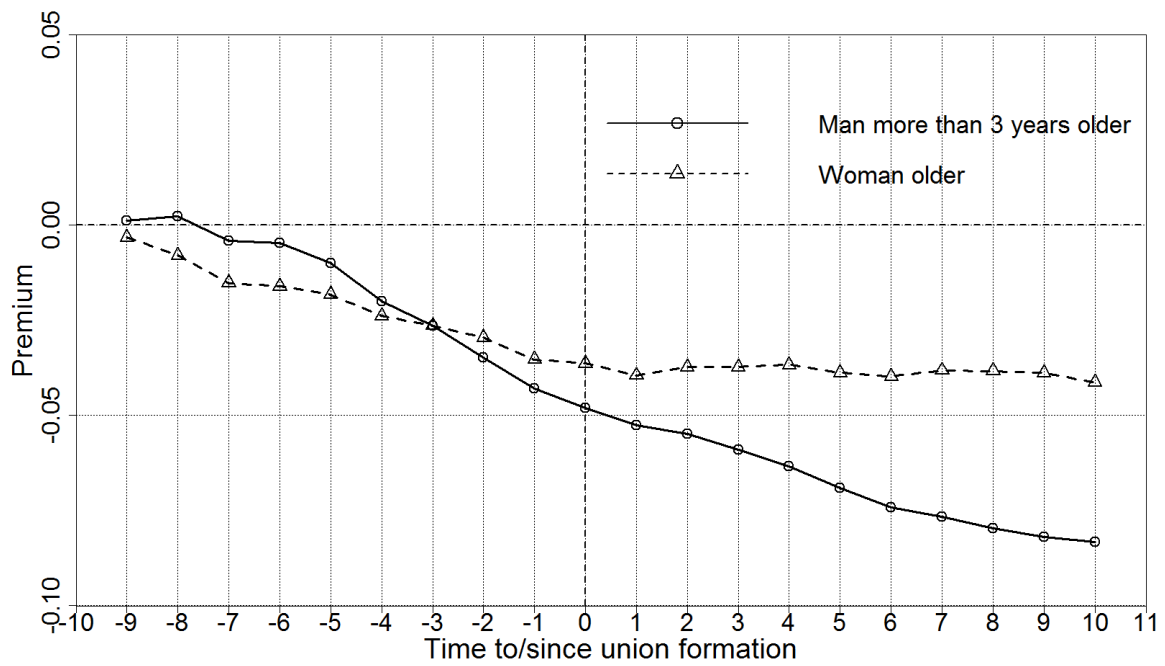Figure 2. Overall union premium for men and women.

Figure 3. Heterogamy premiums.

A. Men.

B. Women.

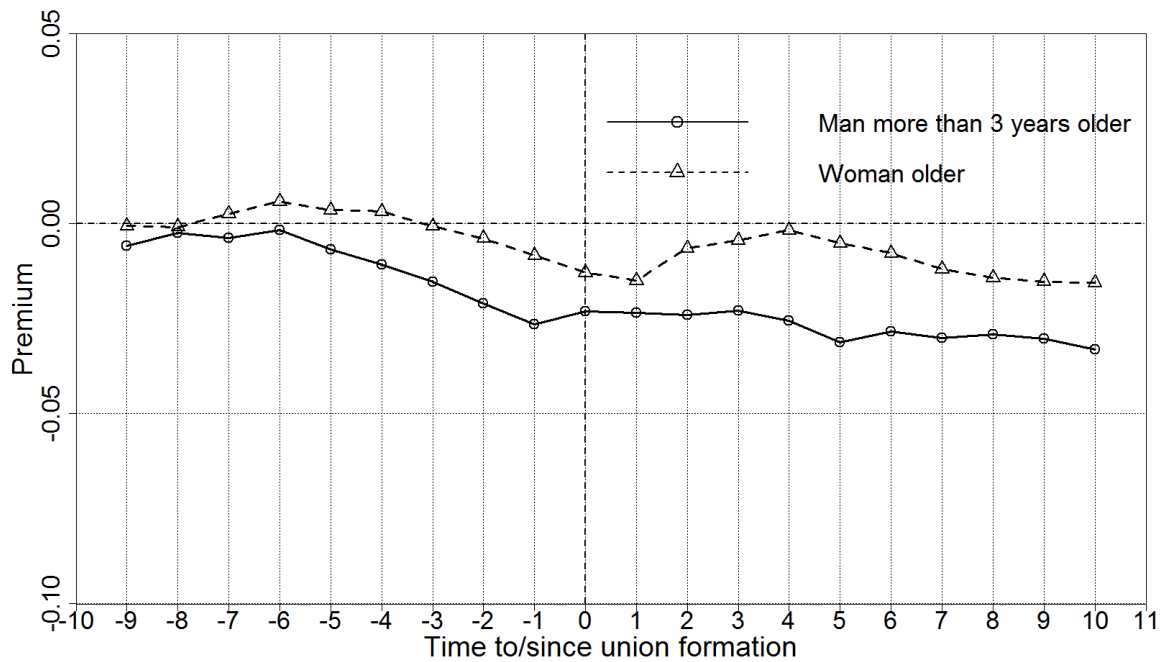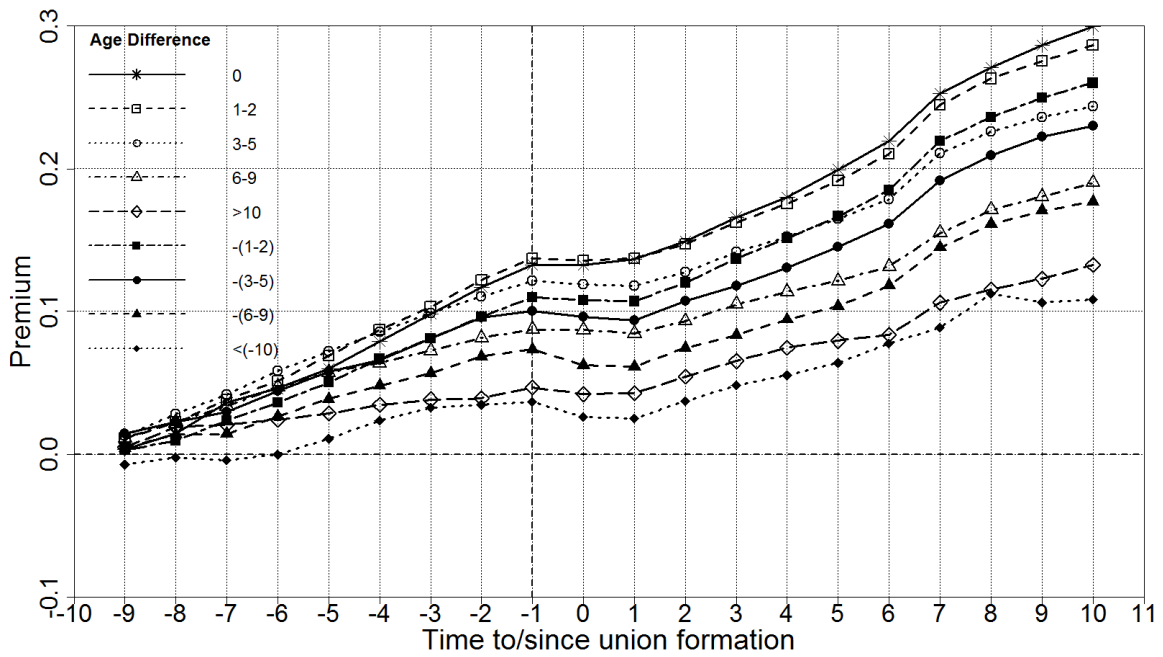Figure 4. Union premiums by age difference between spouses.
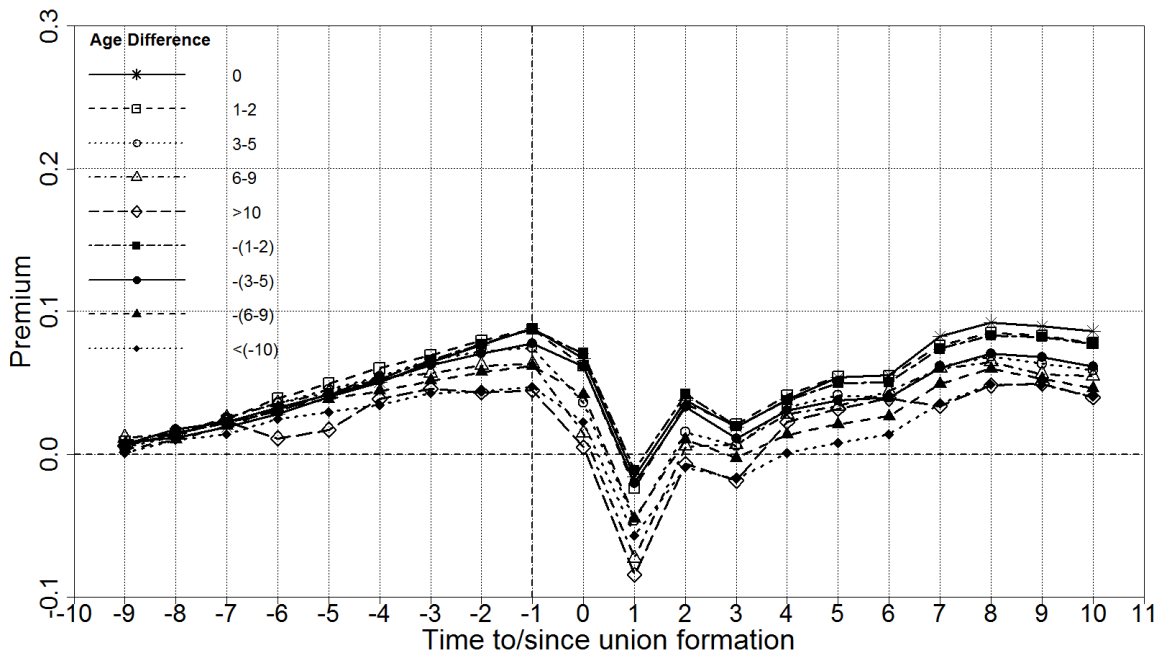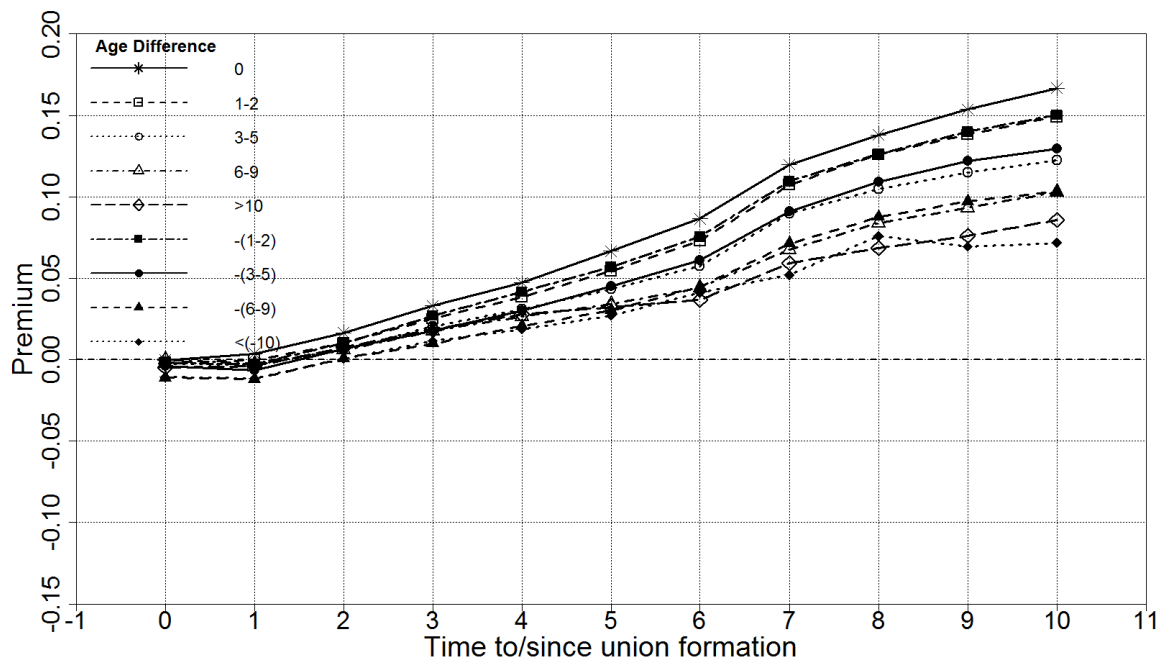
A. Men.

B. Women.

Figure 5. Union premiums by age difference between spouses in relation to one year before marriage.

A. Men.

B. Women.