

The Economics of Hypergamy

Abstract

Partner selection is a vital feature of human behavior with important consequences for individuals, families, and society. We use the term *hypergamy* to describe a phenomenon whereby there is a tendency for husbands to be of higher rank within the male earnings capacity distribution than their wives are within the female distribution. Such patterns are difficult to verify empirically because earnings are both a cause and an effect of the mating process. Using parental earnings rank as a predetermined measure of earnings capacity to solve the simultaneity problem, we show that hypergamy is an important feature of today's mating patterns in one of the most gender-equal societies in the world, namely Norway. Through its influence on household specialization, we argue that hypergamy may explain parts of the remaining gender wage gap.

JEL classification: J12, D10, J22

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Because the empirical analysis is based on Norwegian (encrypted) administrative data that have been leased from Statistics Norway, we are not in the position to make the micro data directly available for other researchers. The data are, however, accessible through Statistics Norway, provided that the user abides by the confidentiality regulations set by Statistics Norway and national legislation regarding data protection. We will cooperate in all efforts to replicate our results, including assisting in seeking permission from Statistics Norway to access the original data and sharing any code used to generate samples and results.

1 Introduction

Whom to mate with and marry is one of life's most important choices. This choice affects well-being directly through emotions, joy, and friendship, *and* it affects social and economic outcomes over the life cycle. While the field of biology states that individuals tend to choose mates who are sufficiently genetically dissimilar to themselves to avoid inbreeding (Roberts et al., 2005), the social sciences indicate that humans generally tend to find partners who are similar economically and socially, i.e., we display homogamy/assortative mating (Fernandez et al., 2005; Schwartz and Mare, 2005; Browning et al., 2014; Greenwood et al., 2014; Bratsberg et al., 2018; Eika et al., 2019). However, there is also a literature pointing toward gender asymmetries in mating patterns, such that women are, on average, likely to mate with men of higher economic and social status than themselves. This phenomenon is sometimes referred to as hypergamy, and it may imply that husbands tend to have higher human capital than wives within couples, even in situations where the unconditional distributions of human capital for men and women are exactly the same.

Existing studies based on observational data have shown that there are indeed important gender asymmetries in actual earnings patterns within couples and that a majority of married women have lower earnings than their spouse (Bertrand et al., 2015; Angelov et al., 2016). However, it is unclear whether men generally earn more within couples because they had a higher earnings-potential than their partners already at the matching stage (hypergamy) or because of decisions made within the household. As individuals' earnings may both affect and be affected by partnering, there is a fundamental simultaneity problem involved in empirically identifying hypergamy as well as its economic consequences. Moreover, as data from virtually all countries indicate that women have lower wages than men (Ñopo et al., 2012), even random matching will result in patterns where husbands have higher earnings than their wives.

In the present paper, we focus exclusively on mating patterns based on gender-specific economic status ranks that, by construction, has exactly the same marginal distribution for men and women. This implies that we abstract completely from the overall gender-gap in human capital, economic power, and labor earnings. This approach contrasts with a literature focusing on educational hypergamy, where much of the interests lies precisely in how changes in the gender-specific marginal distributions (the reversal of the gender gap in educational attainment) have contributed to a decline in male educational superiority also within couples (e.g., Esteve et al., 2012; 2016; De Hauw et al., 2017)

The type of hypergamy discussed in this paper has potentially wide-ranging economic consequences. It may be a decisive determinant of the gender-specific distributions of parenthood and economic wealth, as well as an important contributor to the gender gap in labor earnings. Yet, there is, to our knowledge, no existing empirical research based on representative populations, examining hypergamy in the context of within-gender ranks in economic status. This paper seeks to fill this gap. Based on administrative registers and survey data from Norway, we provide new empirical evidence on the existence of hypergamy. Norway is arguably of particular interest in this context because the country has for the last 15 years been declared “the most gender equal society in the world” by the United Nations (United Nations, 2017). Hence, using data from Norway facilitates an empirical analysis of hypergamy in an environment of relative gender equality, where labor force participation rates are roughly the same for women and men, and where men are no longer the undisputed breadwinners of the households.

To empirically disentangle the impacts of earnings potential on partner matching from the effects of the match on subsequent earnings, we exploit the well-established intergenerational correlation in earnings ranks; see, e.g., Dahl and DeLeire (2008), Chetty et al. (2014), Corak et al. (2014), Pekkarinen et al. (2017), Bratberg et al. (2017), and Markussen and Røed

(forthcoming). More specifically, we rank all men and women separately on the basis of their parents' prime age labor earnings and use this rank as a strictly predetermined proxy for the offspring's own earnings-potential rank. In addition to being a reliable (though admittedly noisy) predictor of the offspring's earnings potential, parental income rank has the advantage that it, by construction, exhibits exactly the same distribution for men and women. Hence, it is an ideal tool for detecting asymmetries that are not due to the more powerful economic position of men per se. Based on complete multigenerational data for all offspring born from 1952 through 1975, we show that there is a steeper positive relationship between own earnings-potential rank and the probability of finding a partner for men than for women and that there are more unmatched men than women, particularly at the bottom of the rank distribution. We also show that men with higher rank tend to mate multiple times, and that the man's rank tends to exceed the woman's rank within couples. Together, these findings present strong evidence in support of hypergamy.¹ Examining recent trends in marital patterns, we find no evidence that hypergamy has become less prevalent over time.

The finding of hypergamy based on a characteristic that by construction has exactly the same distribution for men and women suggests that full gender-equality in earnings potentials may not be a sufficient condition for ensuring gender-equality in actual earnings. Hypergamy implies that *his* earnings potential will tend to exceed *hers* even in such cases, and this is likely to have implications for the division of market and household work within the household. According to standard human capital theory, a higher earnings potential for the male partner implies an incentive for household specialization whereby his labor market career is prioritized (Becker, 1991). Through learning-by-doing, the initial difference in human capital may be enlarged over time, yielding even stronger incentives for household specialization (Mincer, 1974; Becker, 1993; Polachek et al., 2015; Angelov et al., 2016; Schaller, 2016; Gihleb and Lifshitz,

2016). Hence, hypergamy can give rise to a marital gender earnings gap that widens over the lifecycle, and that continues to prevail (although at a lower level) even if discrimination and other obstacles women face in the labor market cease to exist.

How can hypergamy be explained in this context? We will point to two mechanisms, which we explore in more detail in an online appendix. The first operates through fertility differences, and relates to the biological fact that men are reproductive for a longer period than women. As previously highlighted by, e.g., Siow (1998) and Polachek et al. (2015), this implies that fertile women are relatively scarce and can be choosy with respect to a partner's attributes such as education or earnings potential. We show in the appendix that the fertility mechanism implies that a higher fraction of women marries, that a higher fraction of men marries twice, and that the marriage propensity is more highly correlated with earnings potential among males than among females.ⁱⁱ The mechanism is more important the higher is the divorce rate and the higher is the gender differences in remarrying rates. If no-one divorces, the mechanism has no bite.

The second mechanism operates through gender differences in preferences over potential mating partners. Men and women care about features other than earnings when choosing a partner, such as physical attractiveness and the ability of caring/parenthood, and may weight these attributes differently. Our driving assumption is that females give more weight to income potential than men when choosing between partners. Again our model implies a stronger relationship between own income potential and the propensity to marry for males than for females. Furthermore, except for the special case in which everyone marries, married males on average have a higher income potential than their spouses. This preference mechanism fits well with a literature indicating that men give more weight to physical attractiveness and beauty than do women, and that women give more weight to IQ and earnings potential (Davis, 1941; Elder,

1969; Buss, 1989; Buss and Schmidt, 2019; Cashdan, 1996; Fisman et al., 2006; Hitsch et al., 2010; Eastwick et al., 2014, Buunk et al., 2002). It is also consistent with the findings that marital stability and satisfaction tend to be lower when women earn more than their partners (Bertrand et al., 2015) and that divorce rates increase when women become promoted (Folke and Rickne, 2018).

To assess the potential empirical relevance of preference asymmetries in today's Norway, we administered a survey experiment (a vignette) involving a representative sample of the adult population. In the experiment, we controlled the wording of a question about the probability that a hypothetical person would want a long-term relationship with another person of the opposite sex with given characteristics in terms of physical attractiveness and earnings. A question about a hypothetical male was given to male respondents and a question about a hypothetical female was asked of female participants. Random variation in the wording was implemented to uncover whether women give higher priority to a prospective partner's earnings than men do. The responses confirmed that this is indeed the case. Taken together, the register-based evidence on actual behavior and the vignette-based evidence on preferences suggest that hypergamy is an important feature of mating patterns in Norway.

2 Data and identification strategy

The main part of our empirical analysis builds on the administrative register data from Norway covering the complete native-born population. These data provide information on family linkages, educational attainment, and annual labor earnings since 1967.

To examine the empirical evidence for the existence of hypergamy, we need to address a fundamental identification problem, namely that individual earnings both *affect* and *are affected by* marital sorting. Our way of addressing this extends the idea that each individual has

an *earnings potential* that is predetermined with respect to any marital union. Viewed from the researcher's point of view, the earnings potential is a latent variable. However, we assume that it (or its correlates) is (at least partly) observable to prospective partners, implying that it can play a role in the mating process.

To isolate the influence of earnings potential on mating patterns, we need an observable that is informative about individuals' latent earnings potential, but at the same time not affected by mating decisions. One alternative is to use the earnings level observed prior to the time of matching as a proxy. This strategy can clearly not be used to examine the influence of earnings potential on the probability of being matched, as pre-match earnings are only defined for those who actually become matched. But even conditional on matching, it is problematic for at least two reasons. First, the matching of partners often takes place long before individual earnings potential has been revealed in the labor market, and sometimes even before labor market entry. This may for instance be relevant for individuals who undertake long and prestigious university studies with the prospect of high incomes later in life. Hence, earnings recorded prior to the matches may be highly unrepresentative of the true permanent earnings potential. Second, observed earnings prior to the matches may have already been influenced by marital aspirations or by planned unions unobserved to the researcher. For example, a woman expecting to marry a man with a high earnings potential may lower her own earnings ambitions long before the union actually takes place. Indeed, there exists empirical evidence indicating that marital and childbearing aspirations affect women's human capital investments long before a spouse has been found (Chevalier, 2007; Bursztyn et al., 2017), implying that earnings observed prior to the match systematically underestimates the true earnings capacity for women planning to marry a rich man.

A more promising alternative is to exploit the intergenerational correlation in earnings. The earnings of parents are predetermined with respect to an offspring's mating behavior, yet it is likely to be informative about his/her earnings potential. Existing empirical evidence has revealed a considerable intergenerational correlation in earnings, although the association is weaker in Norway than in many other countries, see, e.g., Bratberg et al. (2005), Hansen (2010), Pekkarinen et al. (2017), and Markussen and Røed (forthcoming). A key element in our empirical strategy is to use parental earnings as a proxy for the offspring's earnings potential. More specifically, we use observed parental earnings to *rank* all men and women in Norway into different socioeconomic groups, as suggested by, e.g., Dahl and DeLeire (2008), Chetty et al. (2014), Corak et al. (2014), Bratberg et al. (2017), and Markussen and Røed (forthcoming).

We calculate the mother's and the father's average earnings during their respective age range of 52–58 years, and use the maximum of the two (controlled for calendar years) to rank the offspring.ⁱⁱⁱ Based on this strategy, we are able to rank all offspring born between 1952 and 1975 into parental earnings percentiles. Partners are identified as a man and a woman who either are married to each other and/or who have a child together.

While parental earnings rank can safely be assumed predetermined with respect to the mating process, it does not seem plausible that it affects mating only through its influence on the offspring's earnings capacity. Parental earnings rank, as well as the offspring's own earnings capacity, may also be correlated with other individual characteristics potentially influencing mating outcomes directly, such as ability, education, height, obesity, and health.^{iv} The distinction between the influence of the earnings capacity itself and its correlates is not of critical importance in our context, however. What is important is the consequences for the matching process, and, in particular, the resultant earnings capacity difference between male and female partners. It should be kept in mind, however, that our interpretation of the causal relationship

between potential earnings rank and mating outcomes is not built on the idea that these ranks can be manipulated independently of everything they are correlated with.

Another challenge with the use of parental earnings as a proxy for offspring's earnings potential is that the empirical association is bound to be weak, compared to, say, actual earnings obtained prior to a match. As a sort of compromise between predeterminedness and explanatory power, we could exploit data on the offspring's own educational attainment, and use parental earnings rank together with own attainment to predict individual earnings potentials. Since educational attainment clearly may have been affected both by marital aspirations and by the characteristics of an actual partner, this strategy runs into much of the same problems as a strategy based on observed pre-matched earnings. However, it has the advantage that it can be computed for everyone, unconditional on a match actually being achieved.

As a supplement to our usage of the strictly predetermined earnings rank of parents, we compute a predicted earnings rank measure based on separate regression model for males and females where we use the log of total age 28-40 earnings as the dependent variable and parental earnings rank (measured in terms of decile rank indicators) and own educational attainment (measured using the first number in the Norwegian Standard for Educational codes) as explanatory variables. We then take out the predictions from these regressions, and use them to rank men and women separately.

[TABLE 1 HERE]

We use different cuts of the data at different stages of our empirical analysis; see Table 1. The "Total sample" includes all individuals born in Norway over the period 1952–1975, conditional on them residing in Norway at age 40 and that we are able to identify at least one of their parents. This sample is used to examine the likelihood of finding a partner, and a reduced version of it (those born before 1960) is used to examine the occurrence of repeated

partnering. The “partner sample” includes those in the total sample that found a partner. We use this sample to examine the characteristics of partner matches. For a part of this sample, we also compute earnings ranks based on observed earnings prior to the match (i.e., the maximum of annual earnings during years 2-5 before the match). However, this is only meaningful for the relatively minor subset of couples where both partners were well established in the labor market prior to the match – such that they have revealed their earnings potential – implying that we can only use persons who mate at relatively mature age for this purpose; see note to Table 1.

It may be noted from Table 1 that the intergenerational correlation in earnings rank is somewhat larger for men than for women (0.19 versus 0.15). Chen et al. (2013) show that such a difference can arise if earnings potentials are relatively more important in determining marriage outcomes for men than they are for women. The correlation between predicted and actual earnings rank, on the other hand, is roughly the same for men and women in our data (0.39 versus 0.40). Finally, we note that earnings measured prior to the marital union is much more highly correlated with actual (age 28-40) earnings for men than for women (0.70 versus 0.58), most likely reflecting the household specialization taking place in relation to subsequent child births.

3 The empirical evidence for hypergamy

To examine the empirical evidence for hypergamy in Norway, we study the relationship between earnings potential and partner match. As described in the introduction, hypergamy is characterized by:

1. Being partnered at all: There is a stronger positive association between gender-specific earnings rank and propensity to mate for men than for women.

2. Multiple partners: A larger fraction of women than men match with a partner (which means that men are more likely to mate with multiple partners). The gender gap in the probability of having multiple partners is larger the higher is the earnings-potential rank.
3. Partner rank: Within couples, men tend to have higher earnings potential than women.

3.1 The probability of being partnered at all

Figure 1 shows the relationship between alternative earnings rank measures and the probability of having mated by the age of 40 (or higher for early birth cohorts).^v In these and subsequent panels/graphs, we have grouped individuals into vigintiles (i.e., five percent bins) rather than percentiles, to reduce noise. While the left-hand panels show shares having found a partner by rank and gender, the right-hand panels zoom in on the associated gender differences by rank, with 95 percent confidence intervals.

Starting with the ranking based on own prime-age earnings (ages 28–40 years) in the top panels, we note a steep social gradient in the matching probability for men; i.e., a positive relationship between own earnings rank and the probability of being partnered. For women, there is no such gradient, except at the very bottom. To the contrary, for women in the upper part of the rank distribution, the probability of having been matched by mature age declines with own earnings rank. While a man at the top of the earnings distribution has more than a 90 percent chance of having found a partner, the chance of a man at the bottom is less than 40 percent. By contrast, women have similar chances of finding a partner across the earnings distribution, and except at the extreme bottom, there appears to be a negative relationship between own earnings rank and partnering propensity.

[FIGURE 1 HERE]

As the earnings ranks used in panels A and B are based on own prime-age earnings, they are subject to simultaneity with respect to partnering and household specialization. In panels C and D we instead show the partnered shares by vigintile in the distributions of *predicted* earnings, where the predictions are based on parental earnings rank and own educational attainment. Again, we find a steep social gradient for men, but not for women. The gender difference is considerably reduced, however. As educational attainment may be affected by the partner's actual or prospective earnings, we still have a simultaneity problem. In panels E and F we thus show the partnered shares by vigintile in the (strictly predetermined) distribution of parental earnings. Still, there is a steep social gradient among men. The probability of having found a partner is 7–8 percentage points higher for a man born into the richest parental earnings vigintile than for a man born into the poorest parental earnings vigintile. And for women, there is again hardly a visible social gradient at all, and the probability of having found a partner appears to be almost unrelated to the parental background.

The patterns described in Figure 1 imply that more men than women stay permanently unmatched and that the gender gap in the match probability declines rapidly with economic position. This conclusion holds regardless of whether we look at ranks in the actual earnings distribution, in the predicted earnings distribution, or in the distribution of parental earnings. As we move downwards in Figure 1, we reduce, and finally eliminate, the simultaneity problems related reverse causation, but at the cost of inducing more noise into the rank interpreted as representing individual earnings capacity. The latter may be seen as a source of attenuation bias. In order to interpret the magnitude of the effect of parental earnings rank and to evaluate its implications for the relationship between the offspring's own earnings capacity and marital prospects, we can scale it by its influence on own earnings rank outcome. This amounts to using parental rank as an instrument for own rank.

Let P_{ic} be an indicator variable equal to 1 if a person i born in year c finds a partner, and zero otherwise, and let R_i^O i 's own earnings rank within his/her birth cohort (measured during age 28-40). Then, consider the following linear probability model:

$$P_i = \alpha R_i^O + \gamma_c + \varepsilon_i, \quad (1)$$

where γ_c are cohort-specific intercepts and ε_i is a residual. As own rank is likely to be affected by partner choice, e.g., through household specialization, we have a simultaneity problem in equation (1). However, we can deal with this problem by using the parents' earnings rank R_i^P (measured during age 52-58) as instrument for own earnings rank, and thus estimate the first stage equation

$$R_i^O = \beta R_i^P + \delta_c + \zeta_i, \quad (2)$$

and then substitute the prediction from (2) for own rank in (1).

[TABLE 2 HERE]

Table 2 shows the estimation results from this instrumental variables' (IV) model, together with the corresponding IV estimates from a model allowing for quadratic rank effects. In Appendix B, we present the first stage coefficients and show that the instruments are strong. Note that, for the linear model, the first stage coefficients correspond (by construction) to the correlation coefficients presented in Table 1; i.e., 0.19 for men and 0.15 for women. This follows directly from the fact that the variances of the rank distributions by construction are the same for both generations.

Focusing first on results for the linear model in columns (1)–(3), we note that moving one decile (10 percentiles) up in the earnings distribution implies a 3.7 percentage points higher

chance of finding a partner for a man, but only a 1.6 percentage points higher chance for a woman. The difference is substantial and highly statistically significant; see column (3). In the quadratic model, we see that the marginal impacts of moving upward in the earnings distribution are larger the lower is the initial position. As we emphasized in the previous section, our interpretation of the causal relationship between earnings potential and the matching outcome is not built on the idea that earnings rank can be manipulated independently of everything it is correlated with, such as human capital, height, and health. The IV-strategy is still of interest, though, as it presumably gives unbiased estimates of relationships between individuals' own earnings potential and their mating outcomes. And these are the relationships that matter for the subsequent specialization within households. Whether it is the earnings potential itself or the characteristics it is correlated with that lies behind the identified effect is unimportant in this particular context, as long as these characteristics are strictly predetermined with respect to the match.

3.2 Multiple partners

Given that each match, as defined in this paper, requires both a man and a woman, it may appear puzzling that the overall mating propensity is higher for women than for men. Apart from the fact that there are slightly more men than women in the cohorts studied in this paper, the explanation is that men to a larger extent than women are “recycled”; i.e., they mate more than once. Figure 2 shows that this is the case at all earnings ranks.^{vi} While there is a *negative* social gradient in the multiple mating propensity with respect to own (panel A) as well as predicted prime-age earnings rank (panel C) for both men and women, there is a *positive* gradient for men when earnings potential is measured by parental earnings, except at the very bottom (panel E). As a result, when earnings capacity is measured by the strictly predetermined parental earnings

rank, the gender gap in the multiple match propensity rises considerably with parental earnings rank; see panel F.

Table 3 presents IV estimates of the impact of own earnings rank on the probability of mating more than once, again with parental earnings rank used as instrument. Based on the linear estimates in columns (1)–(3), we find that the probability of mating with multiple partners increases with earnings rank for men, whereas it decreases with earnings rank for women. The quadratic estimates in columns (4)–(6) indicate, however, that nonlinearities are important for this outcome. Based on this model, we find a positive marginal effect above the median rank for both men and women.

[FIGURE 2 HERE]

[TABLE 3 HERE]

3.3 Partner rank

The final testable implication of hypergamy is that within couples, men tend to be higher ranked than women. Figure 3 shows that this is indeed the case, regardless of ranking criterion. Based on own earnings rank (panel A), men are considerably higher ranked at all levels of the earnings rank distribution. On average, the husband is ranked approximately 7–8 percentiles above the wife in their respective gender-specific earnings distributions. It is notable that the gender gap in *average* earnings does not influence the rankings in Figure 3, as the gender-specific ranking ensures that men and women by construction have exactly the same rank distribution.

The ranking differences in panel A may be a sign of household specialization and/or of hypergamy. To reduce the simultaneity problem, we move down to panel C, where ranks are

based on predicted earnings. The within-couple tendency for male rank superiority is then reduced considerably, and at the top of the rank distribution, the gender gap appears to have been reversed. Another way of assessing the pre-match earnings potential for matched partners is to look at their actual earnings in a period prior to the match. As we pointed out in Section 2, this can be problematic for the reason that earnings obtained at young age may be unrepresentative for lifetime earnings capacity, and it also fails to solve the simultaneity problem related to household specialization and human capital investments entirely, as many unions may have been planned or expected long before they actually take place. To deal with the first of these problems, we limit the examination of couples based on pre-match earnings to couples established after having completed their education and having worked for several years. As a pre-match indicator of earnings capacity we chose the highest annual earnings observed in years 2-5 prior to the match. The result is shown in panel E. Husbands are ranked above wives at all pre-match earnings ranks, and again there is a tendency that the gender gap rises with rank.

In order to entirely disentangle hypergamy from specialization and endogenous choice of education, we turn to the parental earnings ranks in panel G. The gender gap is again uniformly in favor of men, but it has become considerably smaller. On average, *his* parental earnings rank is about 0.75 percentile higher than *hers*. However, this relatively small difference must be interpreted in light of the considerable attenuation caused by the weak relationship between parental earnings rank and own earnings rank prospects. To assess the implications of such a difference in parental earnings rank for the corresponding difference in *own* earnings rank potential, we created a dataset consisting of new (artificial) couples created by random partner assignment, and then regressed the difference in own earnings rank (within these randomly matched “couples”) on the corresponding difference in parental earnings rank. We then obtained a regression coefficient equal to 0.17, which is also the average of the male and female

intergenerational rank–rank regression coefficients in our data. Using the inverse of this number ($\frac{1}{0.17} \approx 6$) to inflate the observed gender gap in parental earnings rank within genuine couples, we infer that the husband’s *actual* potential-earnings rank is on average about $0.75 \times 6 = 4.5$ percentiles higher than the wife’s. Hence, it is definitely the case that within couples the man’s rank is higher than the woman’s. The difference is significant both from statistical and substantive viewpoints.

[FIGURE 3 HERE]

Another way of assessing the magnitude of hypergamy is to compare it with the influence of *homogamy* (assortative mating); i.e., the degree to which people tend to mate with others of similar rank. Figure 3 also displays a clear pattern of homogamy, as the expected parental rank of the partner rises monotonically with own parental rank. To facilitate a comparison of the two forces of hypergamy and homogamy, in Table 4, columns (1) and (3) report results from linear regressions where the partner’s rank is regressed on own rank. Focusing on parental ranks (column (3)), we note that while being a woman rather than a man raises the expected rank of the partner by 0.74, moving one percentile up in the own gender’s rank distribution raises the expected rank of a partner by approximately 0.09 percentiles for both men and women. Hence, the gender difference in expected partner rank corresponds to an eight percentile change in the own earnings rank ($0.74/0.09$).

[TABLE 4 HERE]

Finally, Table 4 also examines the association between gender and parental earnings rank, on the one hand, and the unconditional probability of partnering with someone with a higher rank on the other; see columns (2) and (4). In this exercise, we classify all people not having a partner as not having a higher ranked partner. This investigation has the advantage of not conditioning on an endogenous variable (having a partner) because it includes the whole sample. Evaluated in the middle of the own parental earnings rank distribution, we find that women have a 5.1 percentage point higher probability of mating up with a higher ranked partner than men have.

3.4 Additional evidence

The previous three subsections provide evidence for the prevalence of hypergamy in Norway. All the testable implications of hypergamy are convincingly confirmed by the data. To guide our interpretation of the revealed empirical patterns, we have also administered a survey experiment, a *vignette*, on a representative sample of Norwegian men and women, eliciting the influence of earnings potential on the preferences for a long-term partnership. The sample consists of 1,586 respondents from a survey panel that respond to surveys on a regular basis (GallupPanelet). The panel is run by Norsk Gallup, which is again owned by Kantar, the largest survey agent in Norway. The panel members constitute a representative sample regarding age, gender and region, of the Norwegian population (see more information in Norwegian here: <https://kantar.no/vare-panelet/mer-om-galluppanelet/>).

We used a between-subject design where participants were randomly assigned to a “control group” or a “treatment group.” We controlled the wording of a question about the probability that a named hypothetical person would want a long-term relationship with another hypothetical person of the opposite sex with given characteristics. The reasons why we chose

a hypothetical situation were both to limit the so-called experimenter-demand effect, i.e., that the responders answer in line with what is believed to be expected of them (Davis and Holt, 1993), and to reach a representative sample of the population—a sample in which a large fraction is already engaged in long-term relationships. To use vignettes such as ours is quite standard in such situations and in line with standard methodologies, we used different versions of the questions for women and men, where women responded to a question about a hypothetical woman and men responded to a question about a hypothetical man. Here is the exact wording used on the male sample (the words are in bold here to mark the treatment, these were not emphasized in the survey):

- Control group: Imagine that Markus is single and looking for a long-term relationship. He meets a woman that is kind and considerate, **does not earn a lot of money**, but that he finds good looking and attractive. How likely do you believe it is that he is interested in a long-term relationship with this woman? [Answer on a scale from 1 to 10].^{vii}
- Treatment group: Imagine that Markus is single and looking for a long-term relationship. He meets a woman that is kind and considerate, **earns a lot of money**, and that he finds good looking and attractive. How likely do you believe it is that he is interested in a long-term relationship with this woman? [Answer on a scale from 1 to 10].

Corresponding questions were asked of women, where the hypothetically named person was given a popular female name and where the gendered words for this person were changed to female, whereas the hypothetical partner, for which the attributes were given, was changed to a male.^{viii} Descriptive statistics for our sample as well as screenshots of the design of our experiment can be found in the Appendix D.

Our interest here lies in the “treatment effect”; i.e., the average difference in the assessment of the likelihood that the man/woman is interested in a long-term relationship when the

potential partner is described as “earns a lot of money” versus “does not earn a lot of money.” The results of this experiment can be summarized as follows. There is a significant positive treatment effect for both men and women. For men, the estimated treatment effect on a normalized scale is 0.173 (p-value = 0.026) whereas for women, it is 0.380 (p-value < 0.000). The coefficient for a difference-in-difference estimator is thus equal to 0.206 (p-value = 0.042). Hence, this experiment confirms that in a representative sample of Norwegians, females give more weight to the earnings of a prospective partner than males do.

4 Trends in hypergamy

As our data describe marital patterns for cohorts born from 1952 through 1975, it is possible to examine time trends in hypergamy. We focus on three summary statistics, all based on parental earnings rank:

1. The gender difference in the class gradient of marital prospects (the IV-coefficient reported for all in Table 2, column (3)). By birth cohort 1952-1975. To ensure consistency over cohorts, we define the outcome as having a partner by age 40.
2. The gender difference in the class gradient of the probability of having had multiple partners (the IV-coefficient reported for all in Table 3, column (3)). By birth cohort 1952-1959. To ensure consistency over cohorts, we define the outcome as having had at least two partners by age 56.
3. The gender difference in parental ranks among actually matched couples. By mating year 1982-1995.

[FIGURE 4 HERE]

The choice of observation window for each of these parameters is motivated by a symmetry requirement; i.e., that the interpretation of the parameter must be approximately the same for all years. The central limitation is then that we can identify parental earnings rank in exactly the same fashion for cohorts born between 1952 and 1975 only. Had we, for example, studied the rank difference for new couples established in, say, 2005, we would only include couples above 30 years of age if born in 1975, above 31 years of age if born in 1974 and so forth. We cannot escape this problem completely, but by restricting attention to couples formed during the 1982-95 period, we reduce the potential selection problems considerably.

The results are presented in Figure 4. Panel A first show that there perhaps was a slight movement toward declining gender differences in the social gradient of marital prospects for cohorts born during the 1950's, but that it (if anything), the gender differences again have increased. The differences do not appear to be statistically significant, however, and the main message coming out of panel A is that of *no clear trend*. Hence, based on this statistic, hypergamy appears to have been stable over the period. Moving on the gradients in the probability of having multiple partners in panel B, we see indications of declining gender differences, and thus less hypergamy according to this particular statistic. However, this panel only covers the years 1952-1959. From panel A there also seems to be a reduction in the gender differences in this period, which is then reversed after 1959. Finally, looking at the rank differences within couples formed between 1982 and 1995, we again see no clear time trend. Hence, based on these summary statistics, there is no clear evidence of either increasing or decreasing hypergamy.

It may appear surprising that the general trend toward gender equality in the labor market as well as in the society more generally, apparently has not had any visible influence on

hypergamy. However, as we pointed out in the introduction, the scope for hypergamy may be increasing in the divorce rate, at least when it comes to the fertility mechanism. If few divorces, the scope for remarrying is limited, and the fertility mechanism is weak. The higher is the divorce rate, the stronger is the mechanism, and the bigger is the scope for hypergamy. In Norway, the divorce rates were substantially lower for the earlier cohorts in the sample than for the later cohorts. In addition, there is a literature arguing that gender differences in personality traits become larger in prosperous and egalitarian societies, in which women have equal opportunities as men; see, e.g., Costa et al. (2001), Schmitt et al. (2008), and Stoet and Geary (2018).

5 Concluding remarks

Although the United Nations over the last 15 years has repeatedly declared that Norway is the most gender-equal society in the world, substantial gender differences in pay and employment patterns remain. In this paper, we have offered one explanation as to why gendered employment and earnings patterns may persist even with full gender equality in labor market opportunities; i.e., even in a society where the distributions of earnings-potential are identical and where there is no gender discrimination. The channel is the matching of men and women into households and the subsequent division of market and household work. Hypergamy implies that couples match such that the man on average has a higher earnings potential than the woman, even if the marginal distributions of earnings potentials are exactly the same for men and women. Combined with the standard economic theory of household specialization (Becker, 1991; 1993), this provides a rationale for prioritizing *his* labor market career over *hers*. In addition, as pointed out by Siow (1998) in relation to the fact that women are fertile for a shorter period of their lives than men, the mechanisms that causes hypergamy in the first place – the competition for female partners – gives men an extra incentive to invest in future earnings potential, similar to the effect that arises in marriage markets with unbalanced sex-ratios (Lafortune, 2013).

We have presented empirical evidence that hypergamy is an important feature of mating patterns in Norway, and we have shown that there are no clear signs of decline. Households are systematically formed such that the man on average has the highest rank within the gender-specific distribution of earnings potential, and men with very poor earnings prospects have a high probability of staying unmatched.

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TABLES

Table 1. Overview of the datasets and descriptive statistics

	I		II	
	Total sample		Partner sample	
	Men	Women	Men	Women
Number of observations	757,868	723,317	533,711	524,981
Average own earnings percentile rank (age 28-40)	50.6	50.6	54.6	50.9
Average parental earnings percentile rank (age 52-58)	50.6	50.6	51.6	51.2
Average percentile rank based on predicted earnings	50.5	50.5	51.9	51.0
Average percentile rank based on maximum earnings 2-5 years before match	NA	NA	54.9	54.4
Correlation between parental and own earnings rank	0.19	0.15	0.19	0.16
Correlation between predicted and own earnings rank	0.39	0.40	0.38	0.41
Correlation between rank 2-5 years before match and own earnings rank	NA	NA	0.70	0.58

Note: Predicted earnings are based on the following regression model estimated by gender: $\log(Y_i^{28-40} + 1) = \phi_d R_{di}^p + \lambda_c E_{yi} + \nu_i$, where Y_i^{28-40} is individual i 's age 28-40 labor earnings, R_d^p is a set of indicator variables for each decile in the parental earnings distribution and E_y is a set of indicator variables for highest education attained. Number of observations with predicted earnings are, for men, 753,173 in the total sample and 529,376 in the partner sample. For women, the corresponding numbers are 719,675 and 520,545. Number of observations based on maximum earnings 2-5 years before match are 95,233 for men and 95,800 for women. This sample is restricted to individuals that have completed their education and had positive earnings before the match.

Table 2. Gender difference in the probability of partnering. Instrumental variables (IV) estimates

	Linear model			Quadratic model		
	(1)	(2)	(3)	(4)	(5)	(6)
	Men	Women	Gender diff. ((2)-(1))	Men	Women	Gender diff. ((5)-(4))
Own rank	0.374*** (0.007)	0.160*** (0.008)	-0.214*** (0.011)	0.688*** (0.061)	0.462*** (0.070)	-0.217** (0.093)
Own rank squared				-0.003*** (0.0006)	-0.003*** (0.0007)	-0.0006 (0.0005)
Mean outcome	0.84	0.90		0.84	0.90	
N	757,868	723,317		757,868	723,317	

Note: Own earnings rank is instrumented with parental earnings rank. Estimates and standard errors in panel B are multiplied by 100, such that they are measured in percentage points. The gender differences in columns (3) and (6) are evaluated within a joint model with gender interactions on all variables. Robust standard errors in parentheses. */**/** indicates statistical significant at the 10/5/1 percent level.

Table 3. Gender difference in multiple partnerships. Instrumental variables (IV) estimates

	Linear model			Quadratic model		
	(1)	(2)	(3)	(4)	(5)	(6)
	Men	Women	Gender diff. ((2)-(1))	Men	Women	Gender diff. ((5)-(4))
Own rank	0.036** (0.017)	-0.232*** (0.022)	-0.268*** (0.028)	-2.424*** (0.214)	-3.973*** (0.307)	-1.549*** (0.374)
Own rank squared				0.022*** (0.002)	0.035*** (0.003)	0.013*** (0.004)
Mean outcome	0.13	0.11		0.13	0.11	
N	200,074	202,449		200,074	202,449	

Note: Own earnings rank is instrumented with parental earnings rank. Estimates and standard errors are multiplied by 100, such that they are measured in percentage points. The gender differences in columns (3) and (6) are evaluated within a joint model with gender interactions on all variables. Robust standard errors in parentheses. */**/** indicates statistical significant at the 10/5/1 percent level.

Table 4. Gender difference in partner's parental ranks. Ordinary least squares (OLS) estimates.

	Ranks based on own earnings		Ranks based on parental earnings	
	(1)	(2)	(3)	(4)
	Partner rank	Partner with higher rank	Partner rank	Partner with higher rank
Own rank	0.158*** (0.001)	-0.499*** (0.002)	0.092*** (0.001)	-0.736*** (0.002)
Female (lowest rank)	6.179*** (0.120)	25.387*** (0.172)	0.739*** (0.115)	9.355*** (0.161)
Female × own rank	-0.006*** (0.002)	-0.307*** (0.003)	-0.000 (0.002)	-0.088*** (0.002)
N	1,065,534	1,242,148	1,058,692	1,237,577

Note: For the dichotomous outcome in columns (2) and (4), the estimates and standard errors are multiplied by 100, such that they are measured in percentage points. The regressions are based on the 1952-1975 birth cohorts. All regressions control for year of birth fixed effects. Robust standard errors in parentheses. */**/** indicates statistical significant at the 10/5/1 percent level.

FIGURES

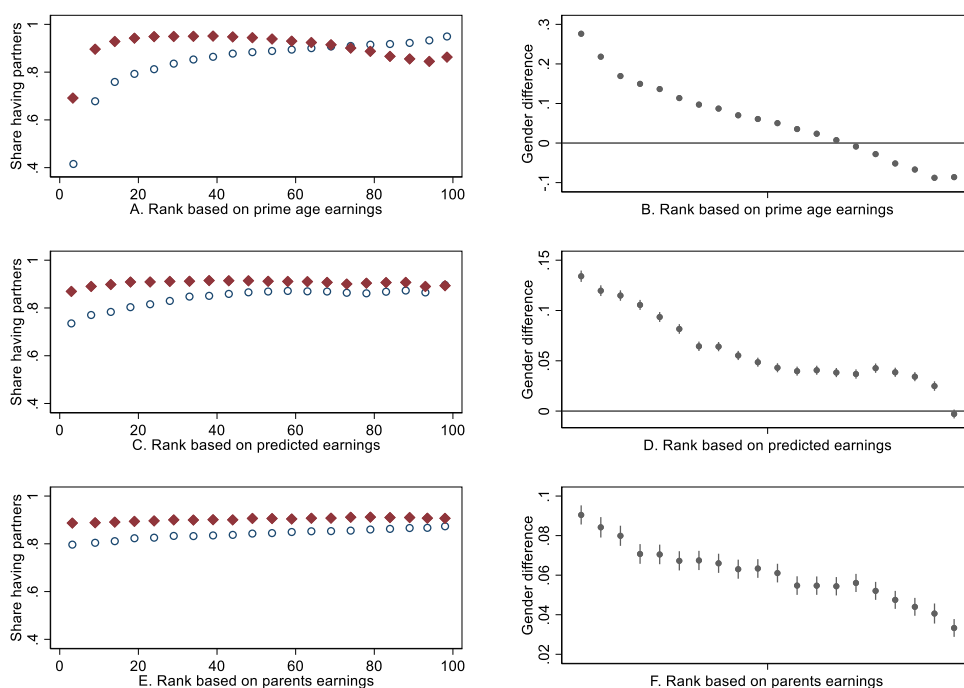


Figure 1. Probability of having found a partner by 2015. By own, predicted, or parental earnings rank

Note: The filled diamonds refer to women and the hollow circles refer to men in the left part of the figure. The graphs cover the 1952-1975 birth cohorts, and show the fractions who have been married and/or had at least one child by 2015. The right-hand side panels include 95 percent confidence intervals. Panels A and B are based on ranks within own birth cohort's distribution of earnings (including self-employment income) during age 28-40. Panels C and D are based on ranks in the predicted age 28-40 distribution. Panels E and F are based on ranks within the age 52-58 earnings distribution of all parents belonging to each offspring birth cohort (inflated to a common calendar year value). Panels B, D, and F include 95% confidence intervals. Number of observations is 757,868 for men and 723,317 for women.

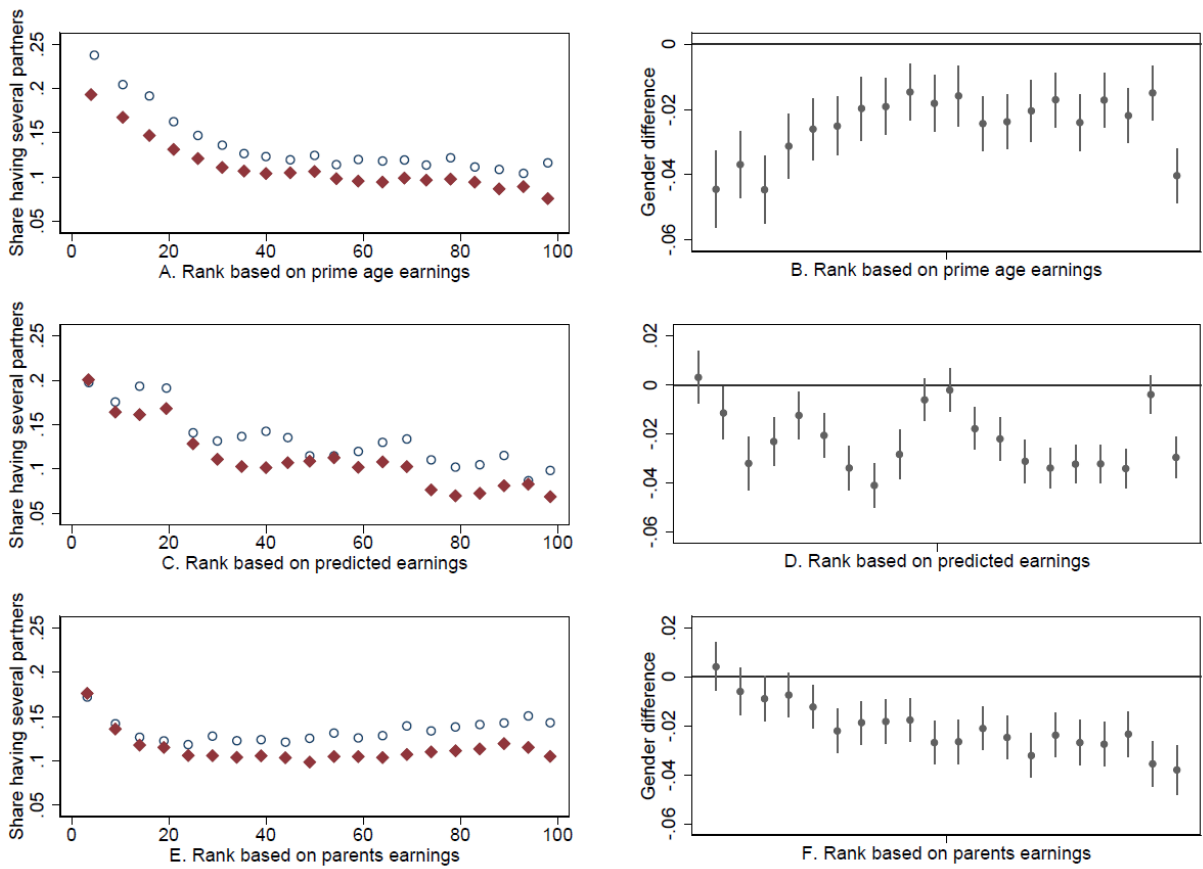


Figure 2. Probability of having had multiple partners by 2015. By own and parental earnings rank

Note: The filled diamonds refer to women and the hollow circles refer to men in the left part of the figure. The graphs cover the 1952-1959 birth cohorts, and show the fractions who have been married and/or had a child with at least two different persons by 2015. See note to Figure 1 for the definition of the different rank measures. The right-hand side panels include 95% confidence intervals. Number of observations is 200,074 for men and 202,449 for women.

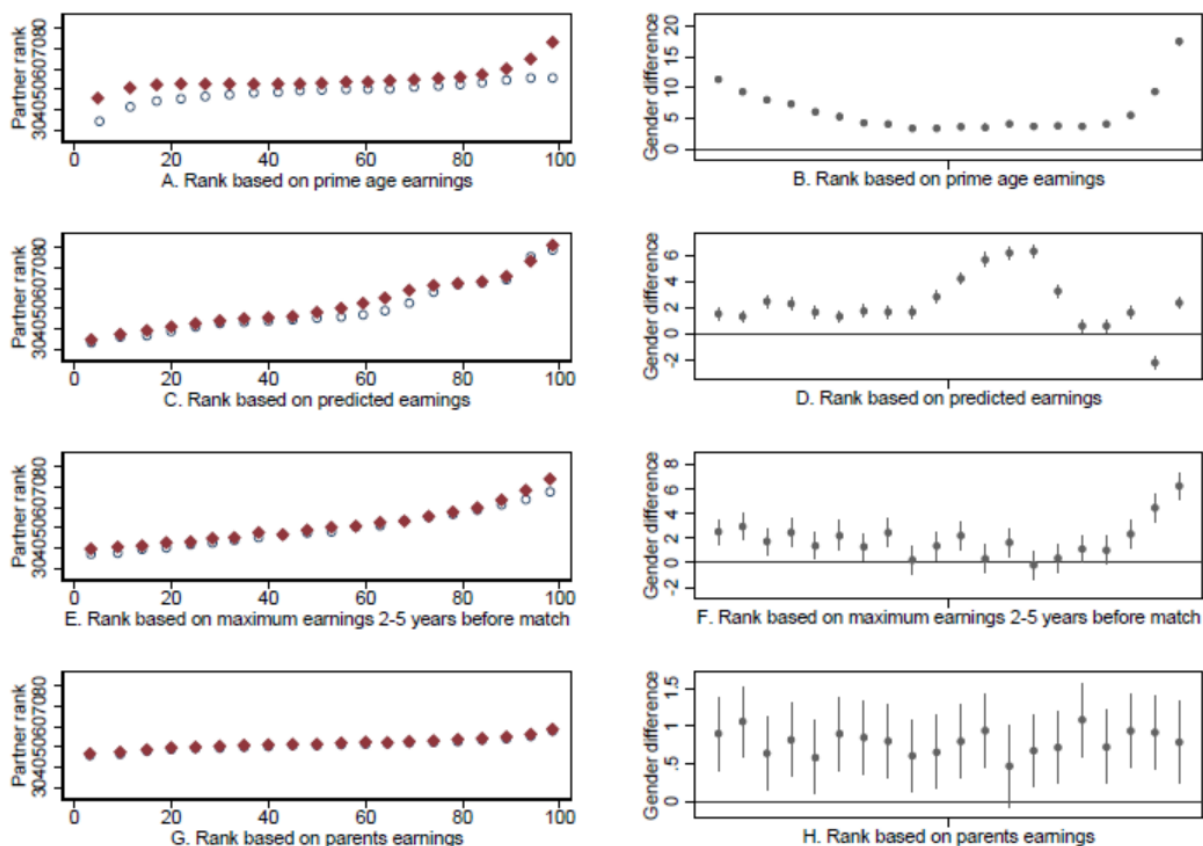


Figure 3. Average partner rank by own rank. Basd on offspring's own or parental earnings.

Note: The filled diamonds refer to women and the hollow circles refer to men in the left part of the figure. The graphs cover all copules formed between men and women in the 1952-1975 birth cohorts and show the average percentile rank of the partner in own and parental earnings distributions, respectively. The two lower panels include 95 percent confidence intervals. For the rank measure based on maximum earnings 2-5 years before the match (panels E and F), we use a reduced sample of actual matches, namely those occurring when both partners have completed their education and had positive earnings before the match ($N=95,233$ men and $95,800$ women).

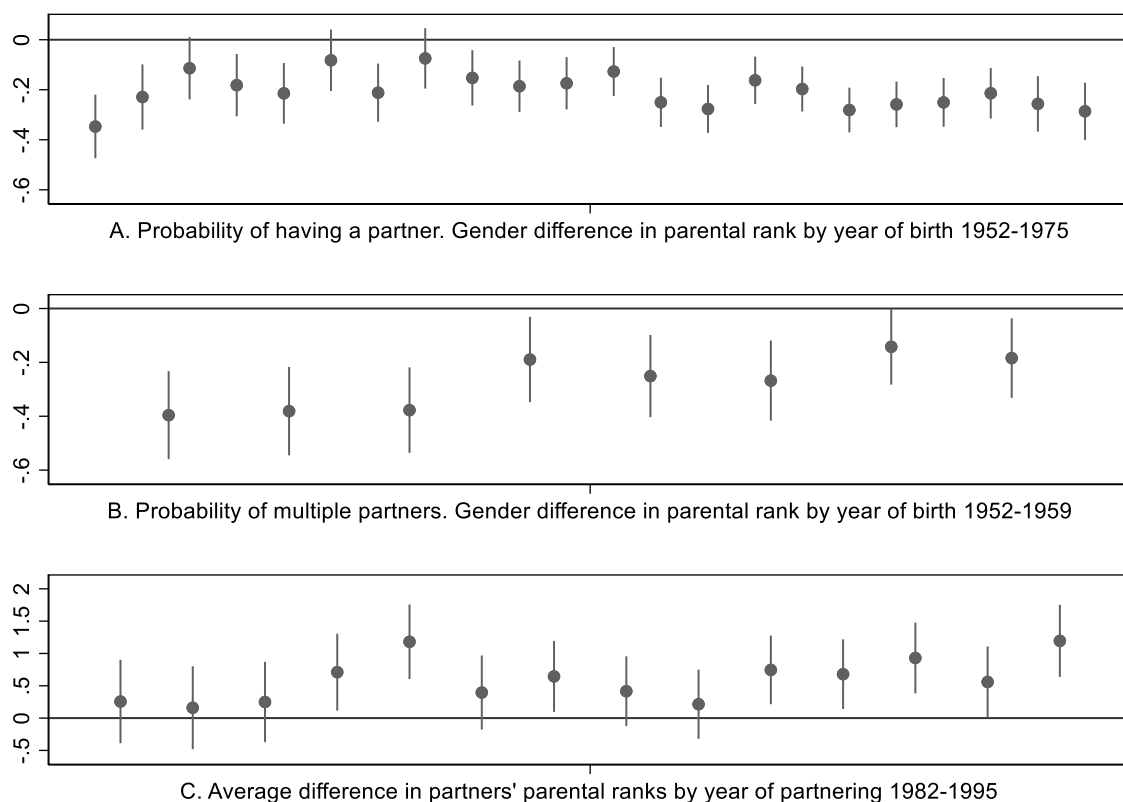


Figure 4. Trends in hypergamy.

Note: Panel A shows for each birth cohort (1952-75) the estimated difference between women and men in the relationship between the probability of being matched by age 40 and earnings rank potential. Each data-point corresponds to the number reported for all cohorts in Table 2, column 3. Panel B shows, for each birth cohort (1952-59), the estimated difference between women and men in the relationship between the probability of being matched multiple times and earnings rank potential, and corresponds to the number reported in Table 3, column 3. The lower number of cohorts in panel B than in panel A reflects that multiple matches typically occur at higher ages, such that we need to observe individuals at mature ages. Panel C reports the average parental rank difference for all couples established 1982-1995. The limited time-period is chosen to avoid selectivity with respect to the age composition of couples for which we are able to identify parental earnings rank (see text). All data points are reported with 95% confidence intervals.

ⁱ Our findings are consistent with recent studies suggesting that labor market conditions affect partnering probabilities differently for men and women, particularly with men at the bottom of the skill-distribution being less likely to partner in lean times (Schaller, 2016; Autor et al., 2018; Kearney and Wilson, 2018).

ⁱⁱ The fertility mechanism is also consistent with historical patterns as recent research in genetics shows that women to a larger extent than men have passed on their DNA, which again is consistent with a larger fraction of women than men mating in human history (Wilder et al., 2004; Keinan and Clark, 2012; Lippold et al., 2014; Karmin et al., 2015).

ⁱⁱⁱ Markussen and Røed (2019) show that the seven-year period from age 52 to 58 years is the period for which annual earnings are most highly correlated to lifetime earnings. As we show in Appendix C, the results presented below are robust to using the average of the parents' incomes, or the fathers' incomes only, instead of the maximum.

^{iv} Based on data collected at military enrolment in Norway, Fevang (2019) show that parental earnings rank, for men, is positively correlated with height and cognitive ability, and negatively correlated with obesity. Belot and Fidrmuc (2010) provide empirical evidence of hypergamy with respect to height.

^v Note that we examine the event of having found at least one partner by 2015. As our analysis covers cohorts born between 1952 and 1975, this implies that we capture all partnerships established up to ages 40–63 years, depending on the cohort.

^{vi} We restrict attention to men and women born before 1960 because a considerable fraction of multiple matches occurs after the age of 40 years. Using this approach, we capture all matches before the age of 56 years.

^{vii} The survey alternated in a random way between four men's names: Markus (most popular name for boys born in 2005 in Norway) and Jan, Arne, and Per (three of the most popular names given to boys born between 1900 and 1999). *Source: Statistics Norway.*

^{viii} The survey alternated in a random way between four women's names: Emma (most popular girls' name in 2005), and Anne, Inger, and Anna (three of the most popular girls' names between 1900 and 1999). *Source: Statistics Norway.*