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ABSTRACT

Gender Identity, Co-Working Spouses and Relative Income within Households*

Bertrand, Kamenica and Pan (2015) document that in the U.S. there is a sharp discontinuity to the right of 1/2 in the distribution of households according to the share of income earned by the wife, which they attribute to the existence of a gender identity norm postulating that a wife should earn less than her husband. We propose an alternative explanation for the existence of this discontinuity. We argue that any force that pushes some spouses towards equalizing their earnings, such as family businesses and co-working of spouses, creates a similar discontinuity. Using linked employer-employee data from Finland, we document the existence of a discontinuity of the same magnitude as in the U.S. and show that it can be fully explained by the earnings convergence of spouses who start working together. We also provide evidence suggesting that co-working spouses play an important role in explaining the discontinuity observed in the U.S.

JEL Classification: D10, J16, J21

Keywords: co-working spouses, gender identity norms, spouses' relative earnings

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1 Introduction

According to the World Value Survey, 36% of Americans agree with the statement "(i)f a women earns more money than her husband, it's almost certain to cause problems". In the European Union, this view is shared by 39% of the population.[1] Bertrand et al. (2015) point out that a social norm that assigns a bread-winner role to the husband may affect the formation of couples and it can induce high-earning married women to reduce their labor supply, putting women with high-earning potential at a disadvantage and contributing to the persistence of the gender wage gap. Using data from the U.S., they argue that this gender identity norm generates a discontinuity to the right of 0.5 in the distribution of married couples according to the share of income earned by the wife, with a visible missing mass of households in which women earn slightly more than their husbands. This discontinuity in the distribution can already be observed for recently married couples and it grows with marriage tenure. The existence of this discontinuity has been widely cited both in the media and in academia, and it has also been confirmed by two follow-up studies using data from Germany and Sweden (Weiber and Host 2015, Eriksson and Stenberg 2015). Bertrand et al. (2015) argue that the discontinuity cannot be explained by classical marriage market theories. Models that consider marriage as a partnership for the purpose of joint production and joint consumption do not predict anything unusual around the point where spouses have similar earnings. Similarly, models that consider marriage as a source of gains from specialization do not attribute any special significance to the 0.5 point.

We propose an alternative explanation for the missing mass of households in which women slightly outearn their spouses. We argue that the drop in the distribution may emerge as an outcome of *earnings convergence and equalization* within a subset of households. Differently from the impact of the gender identity norm, earnings convergence compresses the distribution *from both sides of point 0.5* towards the center and creates an excess mass of couples with identical earnings. Since the initial distribution of the woman's share of earnings is centered to the left of point 0.5, earnings conver-

[1] World Value Survey 1995-1998, available at `www.worldvaluessurvey.org`.

gence creates a larger mass to the left of 0.5 than to the right of this point, leading to a sharp discontinuity. We hypothesize that a possible source of earnings equalization within couples may be related to the establishment of family businesses and, more generally, co-employment of spouses. Incentives for income equalization in family businesses may be strong in countries with the progressive scale of income tax and individual income filing (e.g., in Finland, Sweden, Spain), or when itemized deductions (e.g., for dependents or for medical expenses) generate incentives for separate filing of tax returns even when joint filing is possible (e.g., in the U.S., the U.K., Germany). The tendency to equalize earnings when working together may be also related to non-fiscal reasons. Couples working together may prefer to avoid the transaction costs of negotiating salaries when individual income is pooled within the family. Inflexibility of wage scales in some sectors may also play some role. In sum, spouses' tendency to work together may cause earnings convergence and equalization, generating a discontinuity at the 0.5 point.

There are at least three testable implications of this alternative explanation for the existence of a discontinuity at the 0.5 point. First, it does not predict a discontinuity at the time when couples are formed. Instead, the discontinuity should arise over time as some couples start to equalize their earnings. Second, the discontinuity should only affect couples that work together or are self-employed. Third, the mass of couples around the 0.5 point would originate from both sides of the distribution. It would include both couples where the woman initially out-earned the man and couples where the woman had lower earnings that the man.

An empirical analysis of the above hypothesis requires a dataset with detailed information on the individual earnings history of a large sample of couples, as well as information on employer identifiers. Ideally, it would also be convenient to observe individual earnings as close as possible to the time when the couple was formed. Linked employer-employee data from Finland satisfies these requirements. In addition to having detailed information on employment and earnings for the whole population of Finnish individuals for the period between 1988 and 2014, it allows observing not

only when couples get married but also when they start to cohabit.[2] Even though in Finland women have achieved a relatively high degree of equality in many dimensions, survey information suggests that the gender norm regarding relative earnings in the households is as relevant in Finland as in the US. According to the World Value Survey 1995-1998, 33.9% of Finns agreed with the idea that a woman should earn less than her husband to avoid family problems.

As in Bertrand et al. (2015), we observe in the overall population of households a missing mass of couples in which women slightly outearn their spouses, and the discontinuity in the relative earnings distribution is present already in the first year of marriage. However, we document three additional facts that, jointly, suggest that the discontinuity is not caused by the gender identity norm. First, there is no missing mass of households in which women outearn their partners at the start of cohabitation. Instead, the discontinuity emerges over the tenure in the relationship. Second, the discontinuity in the distribution of the relative earnings only arises within a very specific group of couples: spouses who start to work together, creating family businesses or becoming self-employed. This group includes around 15% of couples where both spouses are employed. In the rest of the population, there is no evidence of any unusual phenomena in the vicinity of the 0.5 point. Third, the discontinuity emerges as a result of earnings convergence and equalization between spouses. Immediately after spouses start working together, household earnings tend to converge, both in couples where women initially outearned their partners and in couples where women were initially second earners. In a fraction of co-working couples, earnings completely equalize, resulting in a sharp discontinuity in the relative income distribution to the right of point 0.5. Since in most couples husbands initially outearned their wives, co-employment leads on average to an increase in the relative earnings of women.

The observation that the discontinuity is predominantly observed in couples that work together is not in itself inconsistent with the existence of the gender identity

[2]The start of cohabitation provides a better proxy of the time of union formation than marriage. For instance, according to Kennedy and Bumpass (2008), two thirds of first unions in the U.S. started as cohabitation before marriage.

norm. Couples that choose to work together may be exactly the ones that abide by the gender norm and also gender norms may be difficult to implement when spouses work in different firms. However, the lack of a discontinuity at the beginning of cohabitation and, especially, the observed dynamics of spouses' income, suggest that the gender identity norm does not play a relevant role in generating the discontinuity.

We also provide some suggestive evidence about the potential relevance of this mechanism in the U.S. labor market. We use the SIPP/SSA/IRS Completed Gold Standard Files, which provide administrative information on earnings for a sample of U.S. households during the period 1990-2004. Unfortunately, this dataset does not provide information on whether spouses work in the same firm or are jointly self-employed. Instead, we use the available information on spouses' industry and occupation to identify a group of spouses with a larger probability of working together. As shown by Hyatt (2015), the likelihood to have a shared workplace tends to be particularly high among spouses working in the same industry and occupation. We find that in this group of couples the 'missing' mass of households in which women slightly outearn their husbands is twice as large as in the overall population, a pattern which is arguably more consistent with the hypothesis of earnings convergence in couples working together than with the explanation based on the existence of the gender identity norm.

Our paper contributes to the literature in several ways. First, we add to the discussion on the origin of the 'missing' mass of households in which women slightly outearn their spouses proposing an alternative explanation to this phenomenon. The original study by Bertrand et al. (2015) claims that this discontinuity is explained by the existence of the gender identity norm. Eriksson and Stenberg (2015) point out that in Sweden the discontinuity in the distribution of spouses' relative income can be partly attributed to the existence of an excess mass of couples with exactly identical earnings among couples where at least one of the spouses is self-employed. In this paper, we argue theoretically and show empirically that the observed discontinuity in the relative earnings distribution is driven by earnings convergence among spouses who start working together, and it is mostly driven by an increase in the relative earnings of

women within the couple, instead of a decrease. This mechanism fully explains the existence of the discontinuity in the relative earnings distribution in Finland and it is consistent with the observation that in the U.S. the discontinuity is primarily observed for households whose members work in the same industry and occupation.

Second, the results of this paper may help to improve our understanding of how the gender identity norm affects couple formation and intra-household labor supply decisions. One possible explanation for our results is that the gender norm does not exhibit itself a discontinuity at the 0.5 point. Perhaps couples prefer that the husband earns more than his wife, but small variations around the 0.5 point do not make that much of a difference. This interpretation would explain the absence of a discontinuity among couples that start to cohabit. Alternatively, it may be that the gender norm is discontinuous but it does not create a discontinuity in the earnings distribution of couples because, in general, individuals are not able to perfectly "manipulate" their income.

Finally, we contribute to the scarce literature analyzing co-working couples. Up to our knowledge, the only previous study that quantifies the relevance of this phenomenon is by Hyatt (2015), who estimates that in the U.S. about 11-13% of couples share the same employer. In Finland, we observe that 5% of couples work together when they start cohabiting and around 15% of couples work together at some point in their relationship. We also provide new evidence on how co-working affects the distribution of earnings within the household. While on average marriage is associated with a decrease in the relative earnings of women, in couples that decide to work together female labor market outcomes tend to improve.

The rest of the paper is organized as follows. Section 2 briefly illustrates how earnings convergence within couples can generate a discontinuity in the distribution of couples according to the wife's share of earned income. This section also summarizes the related literature that studies the forces that potentially may generate earnings equalization within couples. Section 4 documents the existence of the discontinuity in the relative income distribution in Finland and compares it to the one observed

in the U.S. It also explores the dynamics of this discontinuity over the tenure in the relationship. We also present some suggestive evidence for the existence of similar forces in the U.S. Finally, in section 5, we discuss the implications of our results.

2 Possible explanations for the 'missing' couples where women outearn their husbands

Bertrand et al. (2015) argue that the existence of a gender identity norm may explain the discontinuity in the distribution of spouses' relative earnings. We argue that the discontinuity could be also generated by any other force that 'compresses' the distribution of relative earnings. In particular, it may be explained by the decision of some couples to equalize their earnings, independently of whether the husband or the wife was initially the main earner. Below we discuss in detail these two theories and their testable implications.

2.1 Gender identity norm versus earnings convergence

The gender identity norm according to which women should not outearn their husbands imposes a utility cost on couples in which women earn more than their husbands. This norm may affect both couple formation and female labor supply. Relatively fewer couples would be formed where the wife outearns her husband and, when couples are formed, high-earning women may try to adjust their labor supply so that their earnings do not surpass their husband's. If individuals can perfectly manipulate their relative earnings, such adjustments may create a discontinuity at 0.5 in the distribution of households according to the relative earnings of women. The norm may also create an excess mass of couples with spouses having identical earnings (see panel (a) of Figure 1).

However, the gender identity norm is not the only possible explanation for the existence of a discontinuity at 0.5. Any force that induces some women under-earning their husbands to increase their earnings up to earnings equality can generate observationally equivalent results. Panel (b) of Figure 1 illustrates that such force can create

a sharp drop in the distribution to the right of point 0.5 and an excess mass of couples with identical earnings. Similarly, a discontinuity would arise if there is some force that compresses the distribution towards 0.5 from both sides. In this case, a discontinuity would emerge as long as the initial distribution of the relative earnings is not centered precisely at 0.5. As we discuss below, a potential source of earnings equalization may be the creation of family businesses.

2.2 Co-working of spouses as a source of earnings convergence

The literature typically emphasizes that the labor supply and the relative income of women tends to decline shortly after marriage and especially after the birth of the first child (Bertrand, Goldin, and Katz 2010; Angelov, Johansson, and Lindahl 2016; Lundborg, Plug, and Rasmussen 2017). However, even if on average the gender gap in spousal earnings increases with age and the time in the relationship, in some couples spouses' earnings may converge or even equalize if spouses decide to work in the same firm, run a family business, or both become self-employed.

Spouses who create a small family business may have a number of reasons to equalize their earnings. If they are going to eventually pool their income, it would be unnecessary to negotiate different salaries. Moreover, self-employed couples may be inclined to report similar earnings to minimize the tax burden (Stephens and Ward-Batts 2004; Schuetze 2006; LaLumia 2008; Kleven, Kreiner, Saez 2009; Kabatek, van Soest, Stancanelli 2014; Harju and Matikka 2016). This may happen in countries with a progressive scale of income tax and individual filing of tax returns (e.g., Finland, Sweden, Spain), or when itemized deductions for dependents or medical expenses create incentives for married couples to file separate tax returns even when joint filing is an option (e.g., the U.S., the U.K., Germany). Beside fiscal incentives, the legal environment may incentivize equal income sharing in firms with certain legal forms. For instance, in Finland and in the U.K., businesses registered as partnerships, in the absence of a specific written agreement, must share entrepreneurial profits equally between the partners. Finally, if spouses decide to work in the same firm, the existence

of wage scales at the firm (or even sectoral) level may also increase the likelihood that both spouses receive identical earnings.

Recent evidence suggests that co-working of spouses is a quite spread phenomenon. Hyatt (2015) uses data from Longitudinal Employer-Household Dynamics (LEHD) program and estimates that in the U.S. about 11-13% of couples with wage-earning spouses share the employer. There are several reasons that may induce some couples to work together or set up a family business. First, some couples may want to spend more time together, the same way that spouses often coordinate their labor supply in order to engage in joint leisure activities (e.g., Blau and Riphahn 1999; Hamermesh 2002; Goux, Maurin and Petrongolo 2014; Shore 2015). Second, family businesses may provide spouses with the necessary flexibility to deal with family duties. Third, it may be a solution to situations where work relations require trust. Fourth, common interests may increase the chance that couples come up with a joint business idea. Finally, spouses may as well have a larger probability of working together if they have an informational advantage about the vacancies in each other's firms.

2.3 Testable implications

Both hypotheses, the existence of the gender identity norm and earnings equalization in couples, predict a discontinuity in the distribution of relative earnings within the couple. However, they have different implications in several dimensions.

First, they differ in terms of which couples should exhibit a discontinuity. The gender identity norm is expected to be more relevant among couples with more traditional values. Bertrand et al. (2015) test this hypothesis proxying for the prevalence of the gender norm using education level. According to the World Value Survey, less-educated individuals are more likely to agree with the statement that the woman should earn less than her husband to avoid problems. Instead, if the underlying force behind earnings convergence is co-employment of spouses, the discontinuity should be only observed among couples that work together, but not in the rest of the population.

Second, the two hypotheses have different implications regarding the dynamics of

the relative earnings distribution and the emergence of the discontinuity. The gender identity norm may affect couple formation, inducing a discontinuity in the relative earnings distribution already at the start of the relationship. Instead, the hypothesis of earnings equalization does not predict a discontinuity among newly formed couples. In this case, the discontinuity is expected to arise over time in the relationship.

Moreover, while the gender identity norm predicts that there will be a decrease in the share of couples where the wife slightly outearns her husband, according to the hypothesis of earnings equalization the discontinuity would arise as a result of earnings adjustments both among couples where women initially outearned their partners and among couples where women were second earners.

3 Data

We use the Finnish employer-employee linked database (FLEED), which contains registry information on all Finnish population from 1988 to 2014. We restrict the sample to working age individuals (18 to 65 years old). In this section, we describe the main features of the dataset.

3.1 Couples

We follow the classification of Statistics Finland, which considers two individuals as a couple if they are cohabiting, married or have a registered civil partnership.[3] The sample includes around 2.6 million couples and each couple is observed on average for 11 years. About 1.5 million of these couples were formed after 1988, which is the first year available in our database.

The main variable of interest is annual labor earnings, which includes individual earned income and entrepreneurial income. As shown Figure 2), at the time of couple formation around 42% of the couple's earnings are earned by the woman. The relative

[3]Two individuals are considered cohabiting if they are of different sex, live permanently in the same dwelling, are at least 18 years old, their age difference is at most 15 years, they do not have a spouse and they are not siblings. 83% of couples are identified by Statistics Finland based on individuals cohabitation status.

earnings of women tend to rapidly decrease afterwards, falling down to 35% after six years into the relationship, and they slowly catch up later on.

3.2 Co-working spouses

Statistics Finland provides information on the identity of employers for about 90% of couples of wage-earners. Both spouses share the same employer in 9% of these couples and, within this group, two thirds of couples work in the same establishment. Employer identifiers are not available whenever this information may allow identifying an individual, something that is more likely to happen in small family businesses. Therefore, the above figure may slightly underestimate the overall share of couples that work together.

Furthermore, in 6% of couples both spouses are self-employed. In general, we do not observe whether self-employed couples actually work together, but we observe that most of them work in the same 5-digit industry. In what follows we treat all couples of self-employed individuals as being jointly employed. In sum, we consider spouses as co-working whenever we observe that they both work in the same firm or they are self-employed.

The workplace appears to be a likely meeting place for future spouses. About 6% of spouses worked in the same firm when the relationship was formed and 0.6% of couples were formed between two self-employed individuals. Co-employment tends to increase over the course of the relationship (Figure 3). Most of this increase is due to spouses who start working together in establishments with less than five employees or become jointly self-employed. Overall, 15% of all spouses worked together at some point during their relationship.

When spouses become co-employed, women are more likely than men to change employer or their main activity. In couples where both spouses were already employed, the woman joins the firm of her husband in 47% of cases, the man joins the firm of his wife in 35% of cases, and in 18% of cases both spouses change the employer. About 39% of women who start working with their partners were not employed the year earlier,

while this is true only for 18% of men.

As shown in Figure 4, the start of co-working is on average associated with an increase in total household earnings (panel a) and a sharp increase in the relative earnings of women (panel b). The share of household earnings earned by the woman jumps from 35% the year before the start of common employment to 39% the year after. The likelihood of having exactly identical earnings also jumps from practically zero to over 3% (panel c).

4 Empirical Analysis

We start the analysis by documenting the existence of a sharp drop at the 0.5 point in the distribution of Finnish households according to the wife's share of earned income. We then examine separately different groups of couples according to their educational level and co-working status. Finally, we explore the evolution of the distribution of spouses' relative earnings over time.

4.1 Discontinuity in the relative income distribution

Figure 5 shows the distribution of couples according to the wife's share of household labor earnings, in the sample of couples where both spouses are employed and have positive earnings. On the y-axis, the figure reports the fraction of couples in 2% relative income bins. As in Bertrand et al. (2015), we use right-closed bins. We observe a sharp drop in the relative income distribution to the right of 0.5. About a third of this drop is due to the existence of an excess mass of couples where both spouses have the same earnings. But even when these couples are excluded from the sample, a sharp drop to the right of 0.5 point remains. The McCrary (2008) test for the discontinuity of the distribution function indicates that this drop is equal to 11.3% (Table 1, first row).

The magnitude of the discontinuity observed in Finland is slightly larger than the one observed in the U.S. Following Bertrand et al. (2015), Figure 6 reports the distribution of spouses' relative earnings using SIPP/SSA/IRS Completed Gold Standard

files for years 1990 to 2004.[4] There is a sharp drop to the right of point 0.5 of the distribution which, according to the McCrary test, is around 12.3%. As in Finland, the exclusion of couples where spouses have identical earnings reduces the drop by a third to 7.4%.

Given that the existence of an excess mass of couples with identical earnings breaks the assumption of the McCrary test requiring the existence of both right and left limits of the derivative of the density function around the cutoff, in what follows we estimate the discontinuity excluding couples where spouses have identical earnings.

4.2 Heterogeneity analysis: co-working spouses and educational level

According to the hypothesis of earnings convergence, we should expect the discontinuity in the relative earnings distribution to be present only among couples that work together, but not in the rest of the population. On the other hand, given that the gender norm tends to be more prevalent among less educated couples, if the discontinuity is due to the gender identity norm it should be stronger among couples with lower education level. Next, we empirically assess these two predictions.

4.2.1 Co-working spouses

Figure 7 reports the relative earnings distribution by co-working status of spouses. In the subsample of spouses not working in the same firm and not being jointly self-employed, we do not observe any discontinuity or missing mass of couples with women just outearning their husbands (panel a). As shown in Table 1, the estimate of the McCrary test is equal to -0.2%, with the 95% confidence interval between 0.6% and -1.0%.

However, in the subsample of spouses working together there is a sharp drop to the right of point 0.5 and there is also an excess mass of couples with partners having

[4]Following the original study, we restrict attention to couples in which both spouses are between 18 and 65 years old and have positive earnings. We exclude observations with imputed data. The resulting sample consists of 51,384 couples.

identical earnings (panel b). The estimated drop at 0.5 is equal to 41% (see Table 1). Figure 8 shows the distributions separately for self-employed couples (panel a) and couples that work in the same firm (panel b). The discontinuity at 0.5 is much stronger among self-employed couples, but it is also visible among those who work in the same firm. As shown in Table 1, in the sample of self-employed couples there are 62% more couples just below the 0.5 threshold, whereas for couples working in the same firm the drop is equal to 9%. In this latter group, the drop is driven by couples working in the same establishment, where the discontinuity is 16%. There is little evidence of discontinuity in households that work in the same firm but in different establishments.

We only observe a discontinuity among couples that work in the same establishment or are self-employed. In Table 2, we investigate whether this discontinuity is driven by couples working in a particular sector of the economy (agriculture, trade, manufacturing, education, or other sectors), in firms with a certain legal form (natural person, partnership, limited company, or other types), or in establishments of a certain size (less than 5 employees, 5-49 employees, more than 50 employees). A significant discontinuity is present in all these different groups of co-working couples. If anything, it is relatively larger among couples working in agriculture and in firms whose legal form is either a natural person or a partnership.

4.2.2 Educational level

Bertrand et al. (2015) document that the drop in the distribution of the relative earnings of spouses is observed both among more educated and less educated couples, but, consistently with the prediction of the gender identity norm hypothesis, the discontinuity is larger in the latter group. We observe a similar pattern in Finland. Figure 9 shows that, as in the U.S., in Finland the 'missing' mass of couples with women just outearning their spouses is larger among less educated couples. The estimated drop at 0.5 is 4.5% among college educated couples, and it is 17% among less educated ones (Table 3).

However, both among college and non-college educated couples, the discontinuity

is present only among co-working spouses, who constitute about 12% of all higher educated couples and 17% of the less educated ones (see Figure 10). Among couples that do not work together, there is no discontinuity at the 0.5 point, independently of spouses' educational level. In this case, the estimate is a precise zero (Table 3). The lack of a discontinuity among couples with lower education that do not work together seems at odds with the gender identity norm hypothesis.

4.3 Evolution over time

4.3.1 Relative earnings distribution at the beginning of the relationship

According to the gender identity norm hypothesis, the discontinuity may already be present at the time of couples' formation. Instead, the earnings convergence hypothesis predicts that the discontinuity arises over time as spouse start working together.

Bertrand et al. (2015) do not observe earnings at the time when couples were formed, but they observe earnings at the time of marriage and show that the discontinuity is already present among newlywed couples. We find a similar pattern in Finland. As in the U.S., the discontinuity and the excess mass at 0.5 are clearly visible the year individuals get married (Figure 11, panel a). According to the McCrary test, the drop is about 4.1% (Table 4).

An advantage of the Finnish data is the availability of information on couples' earnings at the time when they start to cohabit, something that on average happens 5 years before marriage. As shown in panel (b) of Figure 11, when we consider couples' earnings at the start of cohabitation, the distribution does not exhibit a discontinuity. The estimated drop is equal to 1.4%, with standard error 1.2 (see Table 4). We find a similar pattern when we consider separately cohabiting couples that eventually get married and those that never marry. Overall, there is no evidence supporting the hypothesis that the gender identity norm affects the formation of couples between prospective partners with very similar earnings. Instead, the discontinuity arises over time when couples have already been formed.

4.3.2 Separation and divorce

The gender identity norm may also affect the stability of couples. Couples where the wife earns slightly more may have a higher probability to separate, perhaps because they failed to anticipate the importance of the gender identity norm, or they only learned over time about the earnings of their partners. Instead, according to the earnings convergence hypothesis, whether the wife or the husband earns slightly more should not play a role for the stability of the couple.

Figure 12 shows how the probability that a couple separates varies depending on the initial distribution of earnings within the household. While couples with women outearning their partners are more likely to separate, there is no discontinuity in the probability of separation around the equal earnings point.

4.3.3 Evolution of earnings around the start of co-working of spouses

The results of the previous sections show that the discontinuity is observed only in the subsample of households where spouses work together, it arises when couples have already been formed, and it is not associated with a higher probability of divorce.

Potentially, this evidence may still be consistent with the existence of the gender identity norm if women outearning their husbands are not able to reduce their earnings unless they work in a relatively flexible environment such as a family business. In this case, we should observe a decline in the relative earnings of these women after they start co-working with their spouses. On the other hand, the earnings convergence hypothesis predicts that the distribution of earnings should converge to 0.5 when spouses start working together, leading to an increase in the share of couples where the husband slightly outearns his wife, the share of couples where the wife slightly outearns her husband, and a decrease in the share of couples with very unequal earnings.

In Figure 13, we explore the evolution of the relative earnings distribution for couples that at some point of their relationship work together. We consider for this analysis couples that are observed for at least 15 years, independently of their employment status. Consistently with our previous results, when individuals start cohabiting there is

no discontinuity in the distribution (panel a). On average, spouses start to work together about 9 years after the start of cohabitation. The year before the couple starts co-working, female participation in the labor market is lower than at the beginning of the relationship but the shape of the relative earnings distribution is generally similar to the initial one (panel b). The distribution of earnings changes radically when spouses become co-employed (panel c). There is a substantial increase in the share of couples where women earn between 30% and 55% of household earnings, there is a thinning of both left and right tails of the distribution and, in a fraction of couples, women start earning exactly as much as their husbands. Moreover, a discontinuity appears at the 0.5 point. The estimated drop is equal to 15%. Overall, earnings convergence seems to be mainly driven by an increase in the relative earnings of women who earned less than their husbands. The distribution remains stable for the next ten years (panel d).

This evidence is not consistent with the discontinuity being the result of the gender identity norm. The discontinuity seems to reflect the tendency of some couples to equalize earnings when they work together. There is an increase both in the share of couples where men slightly outearn their wives and in the share of couples where women slightly outearn their husbands, but the increase in the former group is larger and this creates a discontinuity. Moreover, given that women tend to earn initially less than their partners, on average co-working is associated with an increase in the relative earnings of women. This pattern contradicts the gender identity role hypothesis, which would predicts instead a decrease in the relative earnings of women.

We also provide additional evidence that women who start co-working with their spouses gain from this arrangement. We analyze whether co-working with spouses helps women to raise their earnings above their potential using as a control group couples who never worked together with similar observable predetermined characteristics. We estimate separately for men and for women the following set of equations:

$$Y_{i,k,t} = \beta_0^k + \mathbf{X}_i \beta_1^k + \mathbf{D}_t \beta_2^k + \epsilon_{i,k,t} \tag{1}$$

where $Y_{i,k,t}$ represents the earnings in year t of individual i who has cohabited with her

or his spouse for k years; X_i is a vector of predetermined characteristics measured the year before the start of cohabitation which includes previous earnings, level and type of education, age and region of residence. We use the estimates from this model for out-of-the-sample prediction of potential earnings of individuals who choose to co-work with their spouses at some point of their relationship.

Women and men who choose to co-work with their spouses are negatively selected: their actual earnings are below their estimated potential (Figure 14). However, already one year after the start of co-working with the spouse, the earnings of women rise above their estimated potential by about 6%. In the following years, women working together with their spouses maintain their relative advantage over similar women not working with their partners. At the same time, the earnings of men remain below their estimated potential both before and after the start of co-working with their spouses. This evidence suggests that women tend to benefit from working with their spouses in terms of their labor market outcomes.

4.4 Evidence from the Unites States

To the best of our knowledge, there is no dataset comparable to the Finnish registry data available for the U.S. including administrative information on earnings of spouses and their employment histories. Some sources, such as the American Community Survey (ACS), provide self-reported information on earnings and the type of employment but, as we show in Appendix A, rounding and measurement errors in self-reported income data may spuriously generate a discontinuity in the relative earnings distribution equivalent to the one generated by earnings convergence. This makes the use of survey data problematic for our analysis.

The SIPP administrative dataset used by Bertrand et al. (2015) does not include information on the firm where individuals work, whether they run a family business or are self-employed. We proxy whether spouses work together using the available information on individuals' industry and occupation. According to Hyatt (2015), the likelihood to have a shared workplace is particularly high among spouses working in

the same industry and occupation. He shows that, among couples working in the same narrowly defined Census industry and Census occupation, the proportion is 83%. The level of disaggregation available in SIPP data is much lower than in the LEHD data and Census data used by Hyatt (2015). In SIPP, industries are classified into four categories and occupations into three categories.[5] Nevertheless, it seems reasonable to expect that the share of co-working couples is substantially higher also among couples working in the same SIPP industry and occupation. Around 20% of all couples belong to this category. On the other hand, 60% of couples work in different industries. These couples are unlikely to work in the same firm, although the group may also include couples where both spouses are self-employed.

Figure 15 shows the distribution of the relative earnings in these two groups. The drop in the distribution at point 0.5 is significantly larger among spouses who work in the same industry and occupation. According to the McCrary test, the estimated drop at 0.5 is 14%, about twice as large as the drop observed in the overall population. This evidence suggests that the hypothesis of earnings convergence in co-working couples is also likely to play an important role in explaining the existence of a discontinuity in the U.S.

5 Conclusions

We study the underlying causes for the existence of a sharp drop at 0.5 in the distribution of households according to the share of total earnings earned by the woman. This discontinuity, which was originally observed by Bertrand et al. (2015) among U.S. households, has been attributed to the existence of the gender identity norm prescribing a bread-winner role to men. According to this hypothesis, couples where women even slightly outearn men are significantly less likely to be formed and, when couples are formed, women tend to reduce their labor supply to avoid outearning their spouses.

[5]Industries are classified into manufacturing; wholesale/retail trade; finance, insurance and real estate (FIRE), services, public administration, military; and agriculture, mining, construction, transportation, communications, and public utilities. Occupations are classified into managerial and professional specialty occupations; technical, sales, and administrative support occupations; and other. Information on industry and occupation is missing for 15% of couples.

We propose an alternative explanation. We argue that the discontinuity can emerge if some couples have a tendency for earnings equalization. We hypothesize that this may be the case of spouses who work together or are both self-employed. To test this hypothesis, we exploit the rich administrative data available in Finland.

We find overwhelming support in favor of the hypothesis that the discontinuity is caused by earnings equalization among co-working spouses. First, we show that the drop is not present among newly formed couples. Instead, it emerges over cohabitation tenure. Second, the discontinuity only arises among co-working couples, which account for 15% of the population. Third, the dynamics of their earnings distribution indicates that the discontinuity is not caused by a decrease in the share of couples where the wife slightly outearns the husband. On the contrary, when couples start working together there is a compression of the earnings distribution, with an increase both in the share of couples where men slightly outearn their wives and in the share of couples where women slightly outearn their husbands. Since the former group is larger, it creates a discontinuity. Finally, we also show that women co-working with their partners tend to have higher earnings than similar women in other couples. Overall, the evidence suggests that the observed discontinuity is not due to the existence of a social norm that limits the income of married women. Paradoxically, it is the result of a phenomenon, co-working couples, that helps women to have higher earnings.

While the discontinuity in the distribution of households according to the relative earnings of women should not be considered as evidence for the existence of the gender identity norm, this norm may still play an important role in the marriage market and in women's labor supply decisions. In fact, as Bertrand et al. (2015) show, in those marriage markets where a randomly chosen woman becomes more likely to earn more than a randomly chosen man, marriage rates decline. However, the absence of the discontinuity among the vast majority of couples where spouses do not work together may indicate that the norm only gradually gains importance with the increase in the relative earnings of women, and there is no sharp discontinuity or kink in the utility function immediately to the right of the point with equal earnings of spouses.

Due to data limitations, we are not able to provide comparable evidence for the U.S., but we observe that the discontinuity in the distribution of the relative earnings observed by Bertrand et al. (2015) is twice as large among households with spouses working in the same industry and occupation, and hence having a higher likelihood of being co-employed. Arguably, this fact supports the relevance of the hypothesis of earnings convergence in households with co-working spouses as an explanation for the existence of a discontinuity also in the U.S.. Nonetheless, a more comprehensive analysis using administrative data on individual earnings and employment histories needs to be conducted to confirm the importance of this hypothesis.

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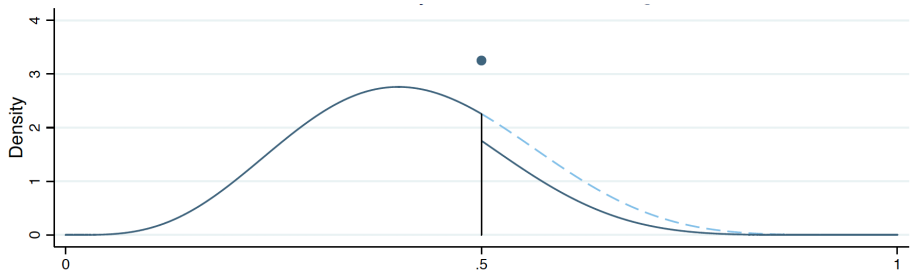
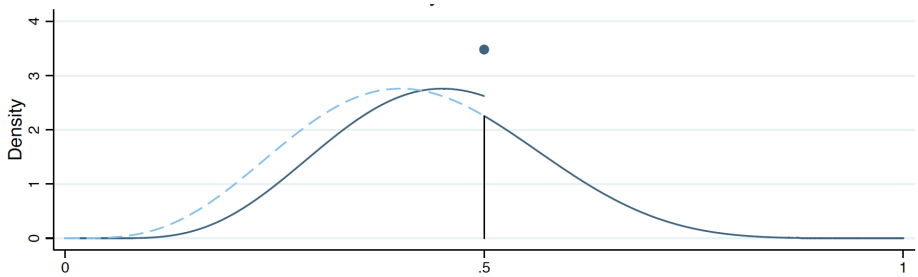
Figure 1: Relative earnings of women after labor supply adjustments

(a) Adjustment from the right



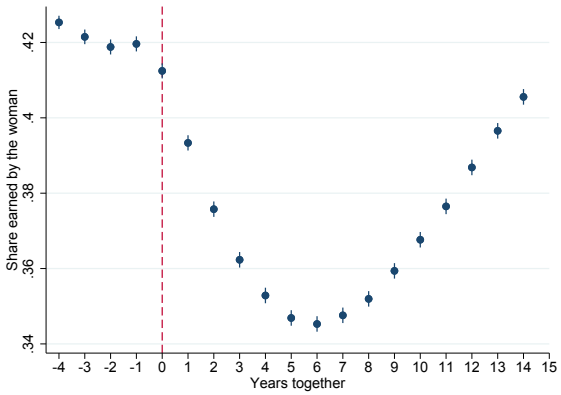
(b) Adjustment from the left



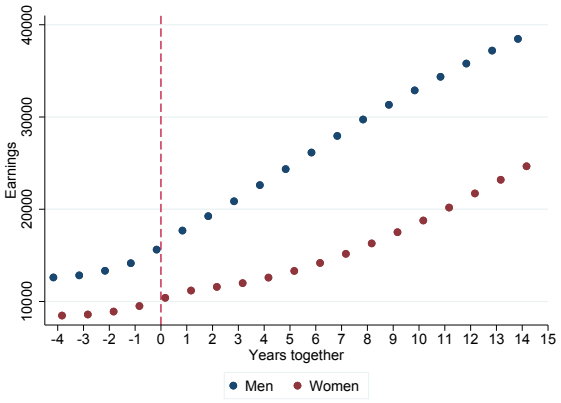
Notes: Panel (a) shows the distribution of couples according to the woman's share of earnings after women out-earning their partners adjust their relative earnings downwards. Panel (b) shows the distribution of the woman's share of earnings after women under-earning their partners adjust their relative earnings upwards. The dashed line shows the distribution before any adjustment.

Figure 2: Evolution of household earnings around the start of cohabitation

(a) Share earned by the woman

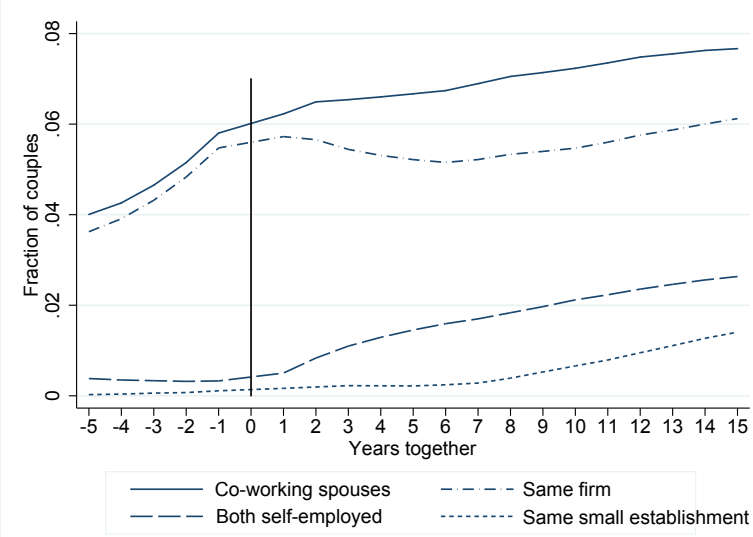


(b) Earnings



Notes: FLEED, 1988-2014. The sample includes couples that were initially identified as a couple based on their cohabitation status and observed for at least 15 years.

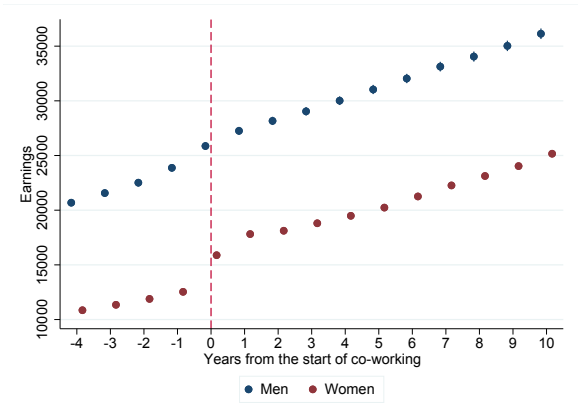
Figure 3: Households with co-working spouses, by years in the relationship



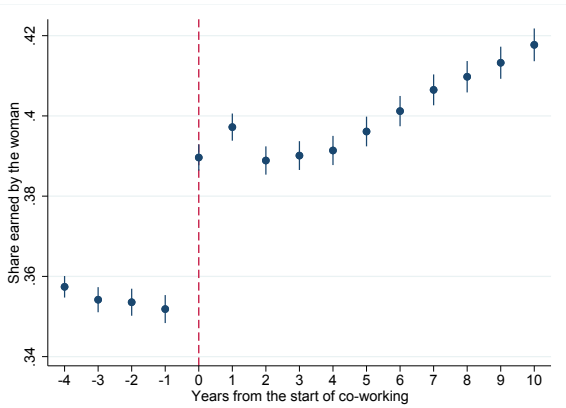
Notes: FLEED, 1988-2014. The sample includes couples that were initially identified as a couple based on their cohabitation status and observed for at least 15 years. *Small establishment* is an establishment with 1-4 employees.

Figure 4: Evolution of household earnings

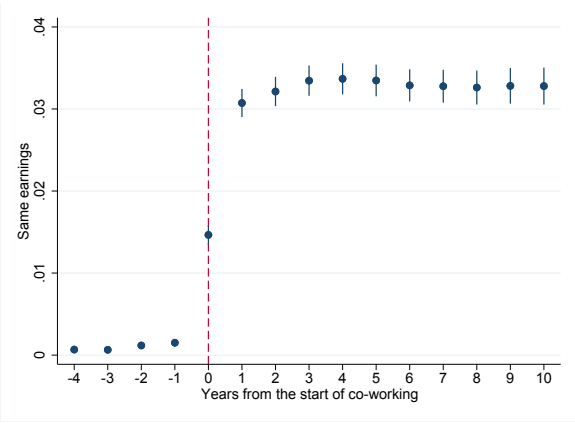
(a) Earnings, euros



(b) Share earned by the woman

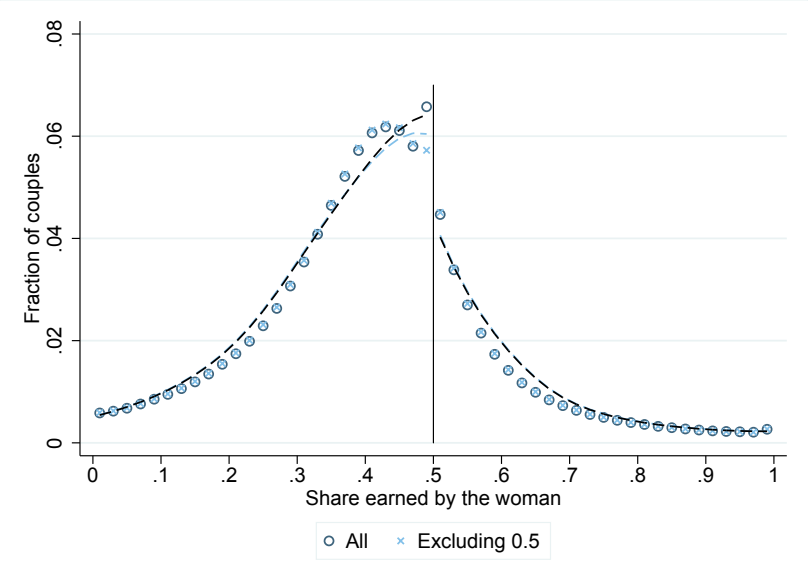


(c) Same earnings



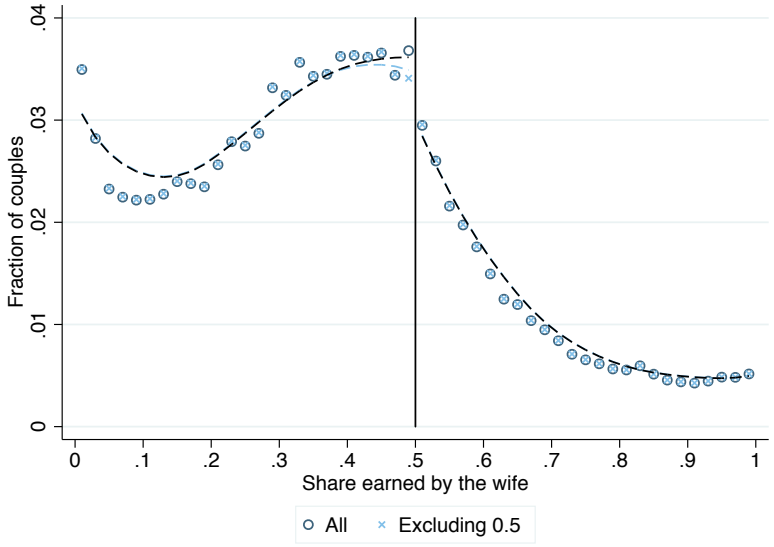
Notes: FLEED, 1988-2014. The sample includes couples that start co-working at some point during cohabitation; it is restricted to couples that were initially identified based on their cohabitation status and are observed for at least 15 years.

Figure 5: Relative earnings of women, Finland



Notes: FLEED, 1988-2014. The sample includes couples with both partners aged between 18 and 65 years, being employed and receiving positive earned income. Each dot indicates a fraction of couples in 2% relative income bin; bins are right-closed. The dashed line is the lowess smoother applied to the distribution allowing for a break at 0.5. The light-colored crosses and dashed line show the fraction of couples in each bin and the lowess smoother calculated after excluding households with exactly identical earnings of both spouses.

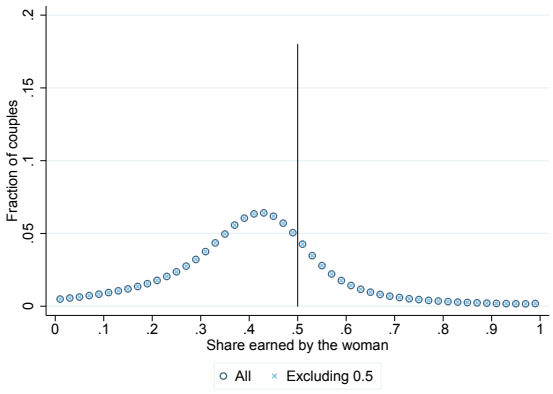
Figure 6: Relative earnings of women, U.S.



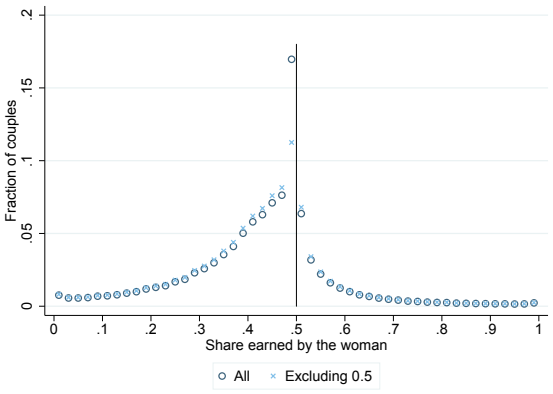
Notes: SIPP/SSA/IRS Complete Gold Standard files, 1990-2004. The sample includes married couples with both partners aged between 18 and 65 years, and receiving positive earned income. Each dot indicates a fraction of couples in 2% relative income bin; bins are right-closed. The dashed line is the lowess smoother applied to the distribution allowing for a break at 0.5. The light-colored crosses and dashed line show the fraction of couples in each bin and the lowess smoother calculated after excluding households with exactly identical earnings of both spouses.

Figure 7: Relative earnings of women, by co-working status

(a) Different firms, not self-employed



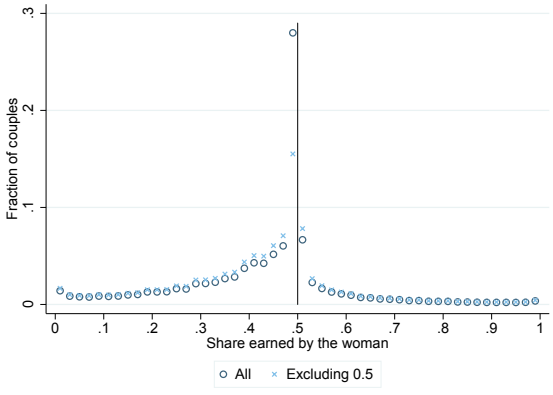
(b) Same firm or both self-employed



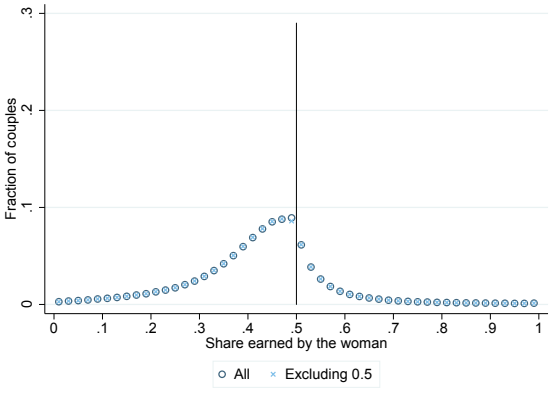
Notes: FLEED, 1988-2014. The sample is restricted to couples with both partners being employed and receiving positive earned income. Each dot is a fraction of couples in 2% relative income bin; bins are right-closed. The light-colored crosses show the fraction of couples in each bin after excluding households with exactly identical earnings of both spouses.

Figure 8: Relative earnings of women, co-working couples

(a) Both self-employed

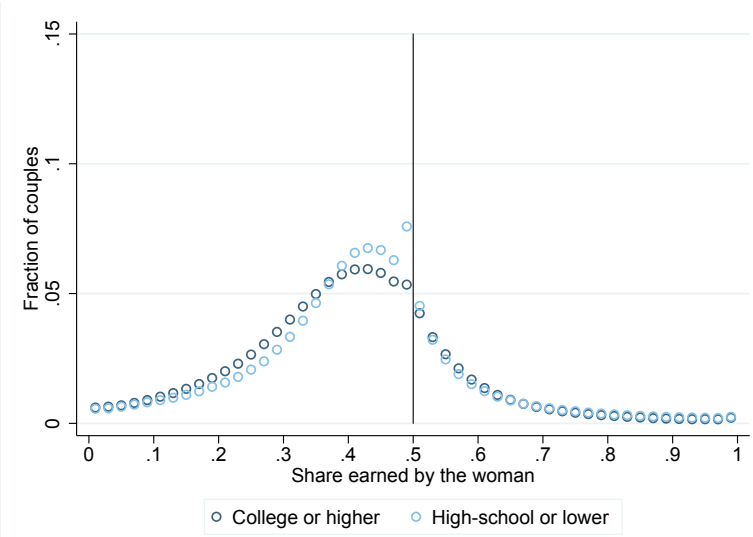


(b) Same firm



Notes: FLEED, 1988-2014. The sample is restricted to couples with both partners employed and receiving positive earned income. Each dot is a fraction of couples in 2% relative income bin; bins are right-closed. The light-colored crosses show the fraction of couples in each bin after excluding households with exactly identical earnings of both spouses.

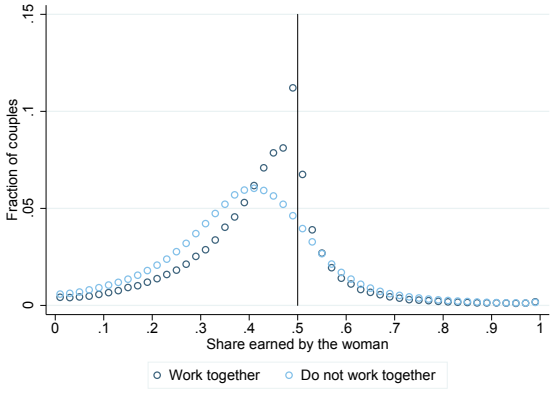
Figure 9: Relative earnings of women, by educational level



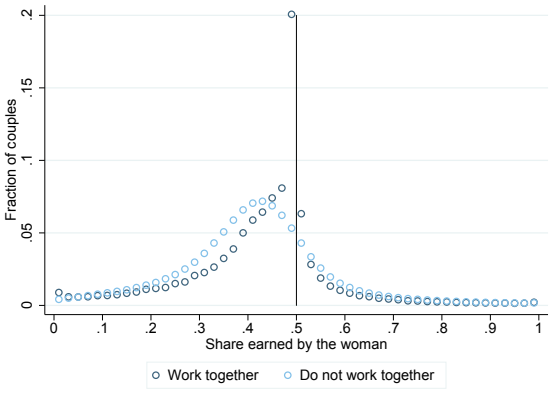
Notes: FLEED, 1988-2014. The sample includes couples with both partners being employed and receiving positive earned income at the year of marriage. Each dot is a fraction of couples in 2% relative income bin; bins are right-closed.

Figure 10: Relative earnings of women, by educational level and co-working status

(a) College or higher

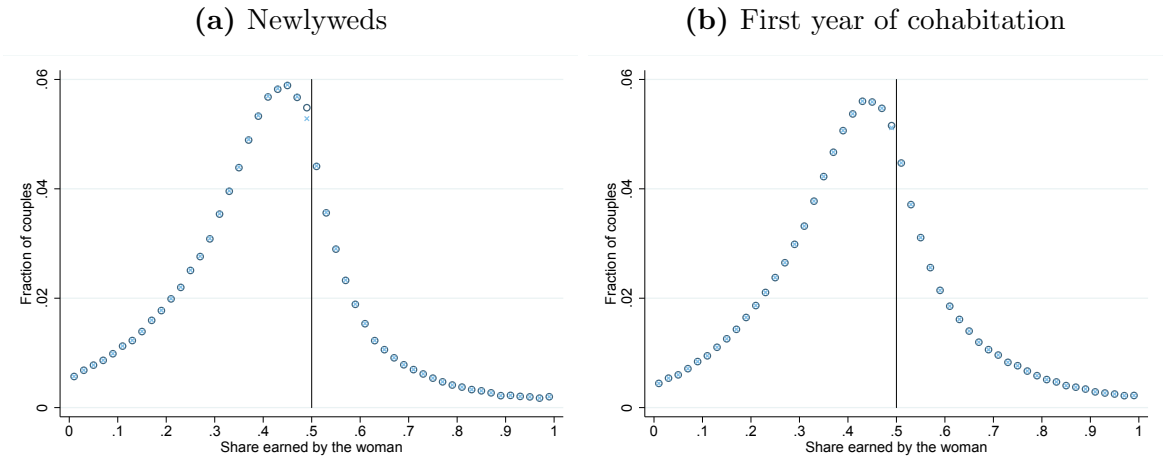


(b) High school of lower



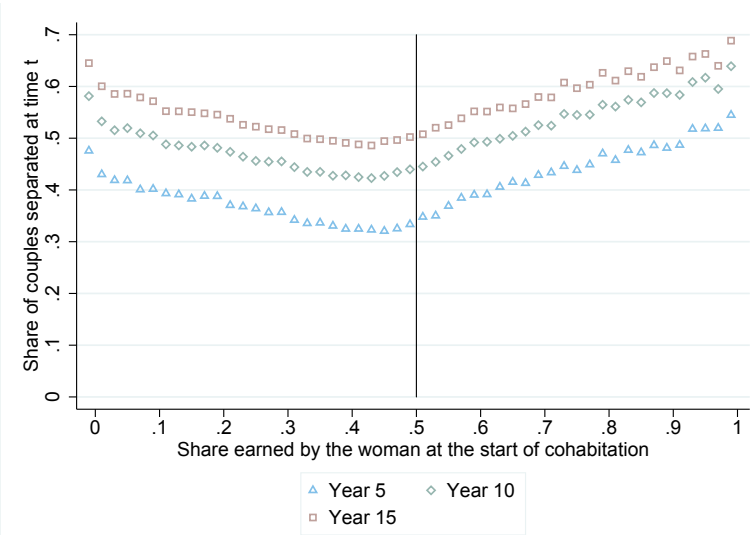
Notes: FLEED, 1988-2014. The sample includes couples with both partners being employed and receiving positive earned income at the year of marriage. Each dot is a fraction of couples in 2% relative income bin; bins are right-closed.

Figure 11: Relative earnings of women, newlyweds vs. start of cohabitation.



Notes: FLEED, 1988-2014. The sample includes couples with both partners being employed and receiving positive earned income. Each dot is a fraction of couples in 2% relative income bin; bins are right-closed. The light-colored crosses show the fraction of couples in each bin after excluding households with exactly identical earnings of both spouses.

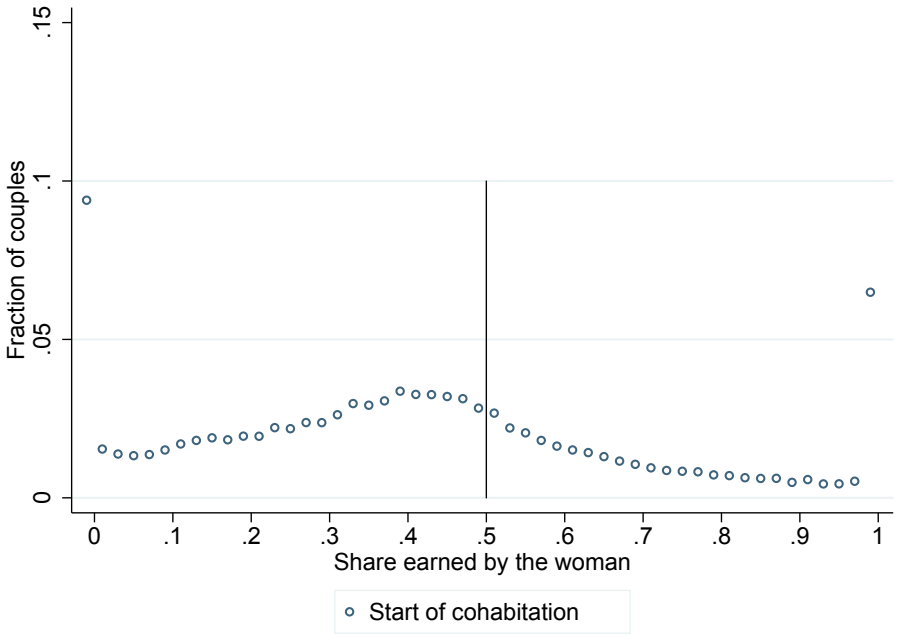
Figure 12: Probability of couple separation, by initial share of household earnings earned by the wife



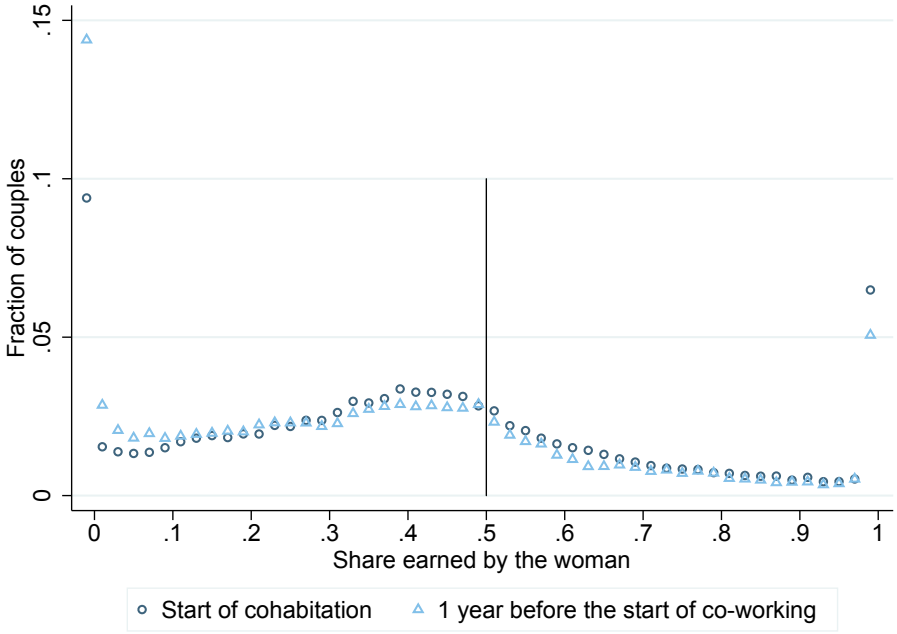
Notes: FLEED, 1988-2014. The sample includes couples that were initially identified as a couple based on their cohabitation status and observed for at least 15 years.

Figure 13: Evolution of the relative earnings of women

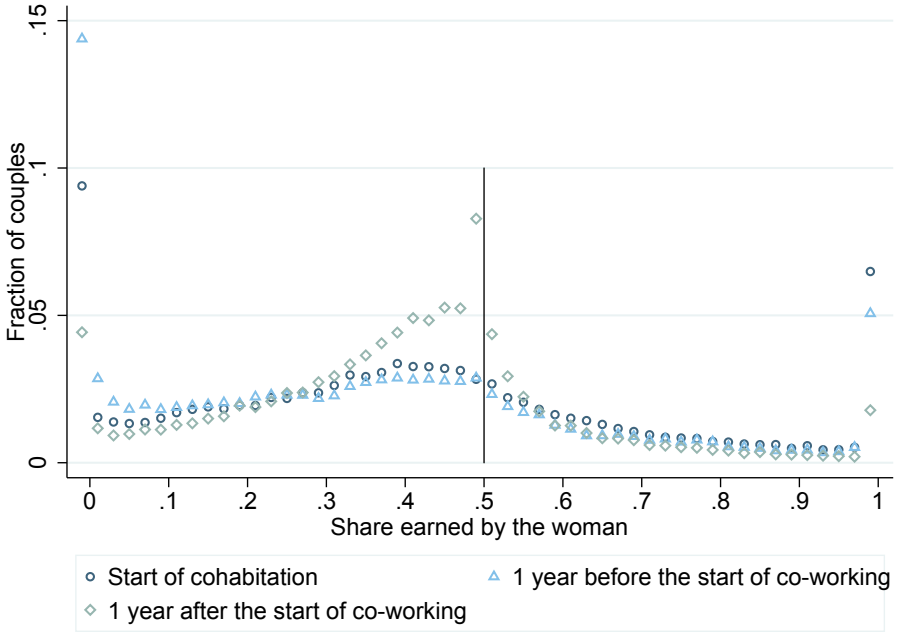
(a) Start of cohabitation



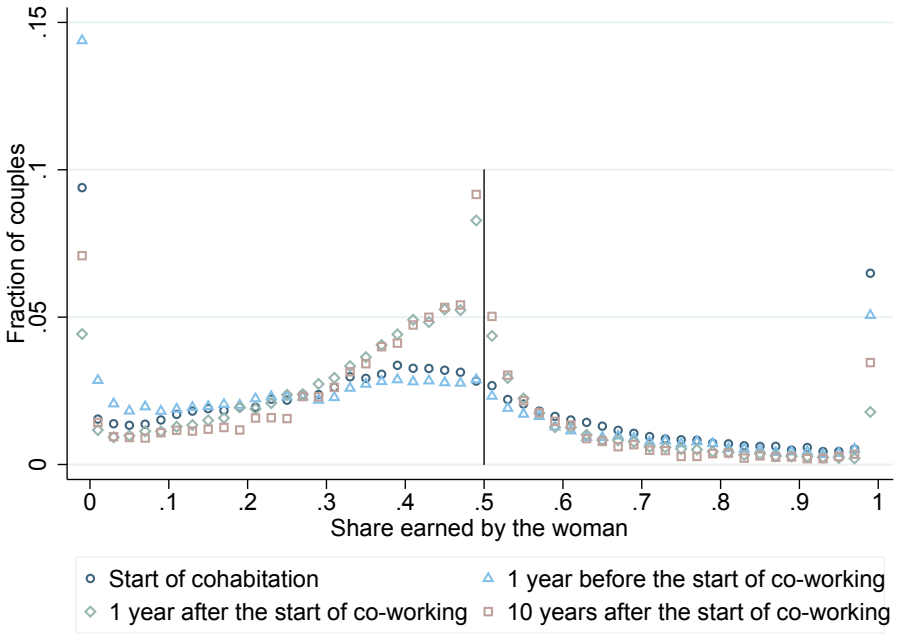
(b) A year before the start of co-working



(c) A year after the start of co-working



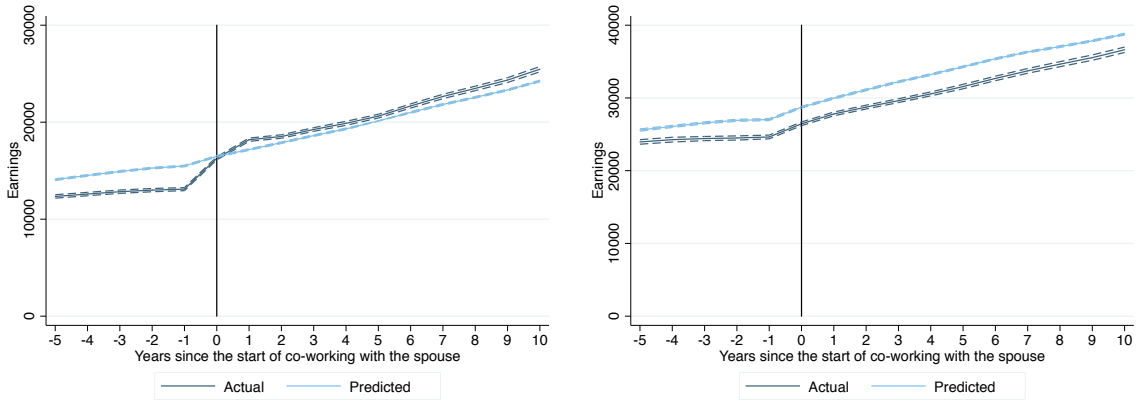
(d) 10 years after the start of co-working



Notes: FLEED, 1988-2014. The sample includes couples that start co-working at some point during cohabitation; it is restricted to couples that were initially identified as a couple based on their cohabitation status and are observed for at least 15 years. Each dot is a fraction of couples in 2% relative income bin; bins are right-closed.

Figure 14: Evolution of actual and predicted earnings

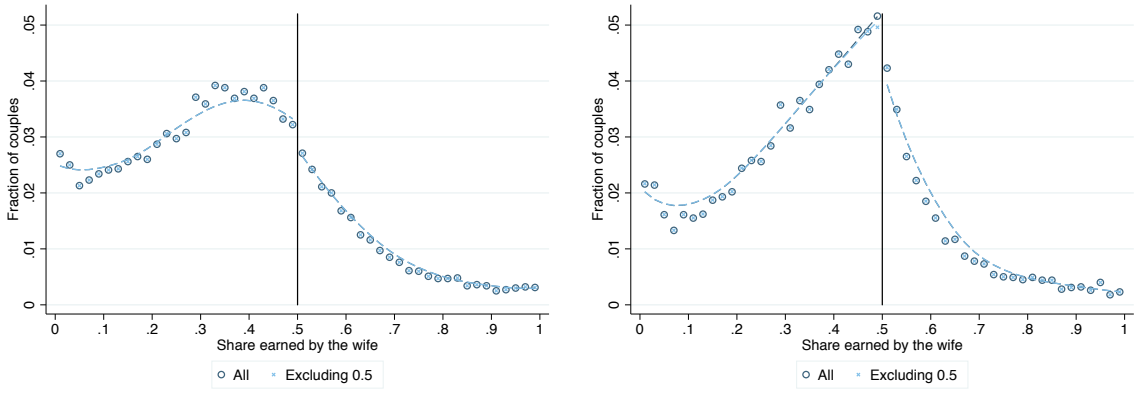
(a) Women **(b)** Men



Notes: FLEED, 1988-2014. Predicted earnings are obtained using out-of-the-sample prediction from a model estimated on a sample of individuals who never worked together with their spouses by regressing individual earnings in each particular year into the relationship on earnings, education type (5-gidit codes) and region of residence the year before the start of cohabitation, as well as on age and year dummies. Dashed lines indicate 95% confidence intervals.

Figure 15: Relative earnings of women, U.S. households

(a) Different industries **(b)** Same industry and occupation



Notes: SIPP/SSA/IRS Complete Gold Standard files, 1990-2004. The sample includes married couples with both partners aged between 18 and 65 years, and receiving positive earned income. Each dot indicates the fraction of couples in a 2% relative income bin; bins are right-closed. The dashed lines are the lowess smoothers applied to the distribution allowing for a break at 0.5.

Table 1: McCrary tests, by co-working status

	1	2	3
	Number of observations	% of all observations	Log Distance at the threshold
All employed couples	16 528 020	100	-0.113
			(0.003)
Different firms	12 971 520	78.5	-0.002
			(0.004)
Same firm or both self-employed	2 209 163	13.4	-0.405
			(0.004)
Both self-employed	905 050	5.5	-0.617
			(0.005)
Same firm	1 304 113	7.9	-0.094
			(0.007)
Same establishment	763 672	4.6	-0.160
			(0.008)
Different establishments	499 950	3.0	-0.021
			(0.012)
Missing establishment codes	40 491	0.2	-0.168
			(0.031)
Missing employer code	1 347 337	8.2	-0.022
			(0.009)
Same industry	25 795	0.2	-0.101
			(0.046)
Different industries	1 038 474	6.3	-0.013
			(0.010)
Missing info on industry	283 068	1.7	-0.064
			(0.018)

Note: FLEED, 1988-2014. Sample includes couples with both partners being employed and receiving positive earned income. Households in which partners have identical earnings are excluded. The group *missing employer code* includes employed spouses who are not self-employed and for whom there is no information about the identity of the employer. Industry is coded along 4-digit categories between 1988 and 1992 and along 5-digit categories between 1993 and 2014. Column 3 shows the estimates of the log-distance at the threshold using default bins and bandwidths; standard errors in parentheses.

Table 2: McCrary tests, co-working couples

	1	2	3	4
	Same establishment		Both self-employed	
	% of all observations	Log Distance at the threshold	% of all observations	Log Distance at the threshold
All	100	-0.160	100	-0.617
		(0.008)		(0.005)
Sector:				
Agriculture	1.8	-0.367	58.8	-0.710
		(0.040)		(0.006)
Wholesale, retail, repair of vehicles	6.0	-0.233	5.6	-0.325
		(0.030)		(0.025)
Manufacturing	32.8	-0.210	4.8	-0.471
		(0.014)		(0.025)
Education	8.7	-0.150	1.0	-0.366
		(0.022)		(0.047)
Other	50.5	-0.072	29.8	-0.408
		(0.009)		(0.010)
Legal form:				
Natural person	1.2	-0.438	28.0	-0.543
		(0.064)		(0.010)
Partnership	3.5	-0.420	1.8	-0.336
		(0.036)		(0.032)
Limited company	65.7	-0.165	5.4	-0.278
		(0.010)		(0.022)
Other	29.6	-0.156	64.9	-0.682
		(0.013)		(0.006)
Establishment size:				
1-4 employees	11.6	-0.217	60.8	-0.744
		(0.021)		(0.007)
5-49 employees	25.2	-0.231	2.4	-0.389
		(0.016)		(0.029)
$\geq$50 employees	40.3	-0.171	0.0	-
		(0.012)		
Missing info on size	22.9	-0.146	36.8	-0.501
		(0.014)		(0.007)

Note: FLEED, 1988-2014. Sample includes couples with both partners being employed and having positive earnings. Households in which partners have identical earnings are excluded. For self-employed couples, employment characteristics are identified based on the information provided for the male partner. Column 3 shows the estimates of the log-distance at the threshold using default bins and bandwidths; standard errors in parentheses.

Table 3: McCrary tests, by educational level and co-working status

	1	2	3
	Number of observations	% of observations	Log Distance at the threshold
Both college or higher	3 510 977	100	-0.045
			(0.006)
Different firms	2 913 900	83.0	-0.003
			(0.008)
Same firm or both self-employed	410 437	11.7	-0.200
			(0.010)
Missing employer code	186 640	5.3	-0.071
			(0.021)
Both high school or lower	8 409 970	100	-0.171
			(0.003)
Different firms	6 278 496	74.7	-0.002
			(0.005)
Same firm or both self-employed	1 327 781	15.8	-0.518
			(0.005)
Missing employer code	803 693	9.6	-0.039
			(0.011)

Note: FLEED, 1988-2014. The sample includes couples with both partners being employed and receiving positive earnings. Households in which partners have identical earnings are excluded. The group *missing employer code* includes employed spouses who are not self-employed and for whom there is no information about the identity of the employer. Column 3 shows the estimates of the log-distance at the threshold using default bins and bandwidths; standard errors in parentheses.

Table 4: McCrary tests, marriage versus start of cohabitation

	1	2
	Number of observations	Log Distance at the threshold
First year of marriage	414 753	-0.041
		(0.015)
First year of cohabitation	653 829	-0.014
		(0.012)
Couples that eventually marry	233 240	-0.016
		(0.019)
Couples that never marry	420 589	-0.023
		(0.014)

Note: FLEED, 1988-2014. Households in which partners have identical earnings are excluded. Column 2 shows the estimates of the log-distance at the threshold using default bins and bandwidths; standard errors are in parentheses.

Appendix A. The impact of rounding

Statistical offices often round information on individual income before releasing the datasets (e.g., American Community Survey data). Similarly, individuals may round when they report their own income. In this appendix we show that rounding and measurement errors in self-reported income data may lead to an artificial compression of the relative income distribution around 0.5 resulting in a discontinuity to the right of this point. To demonstrate how this effect works, we provide a simulation example.

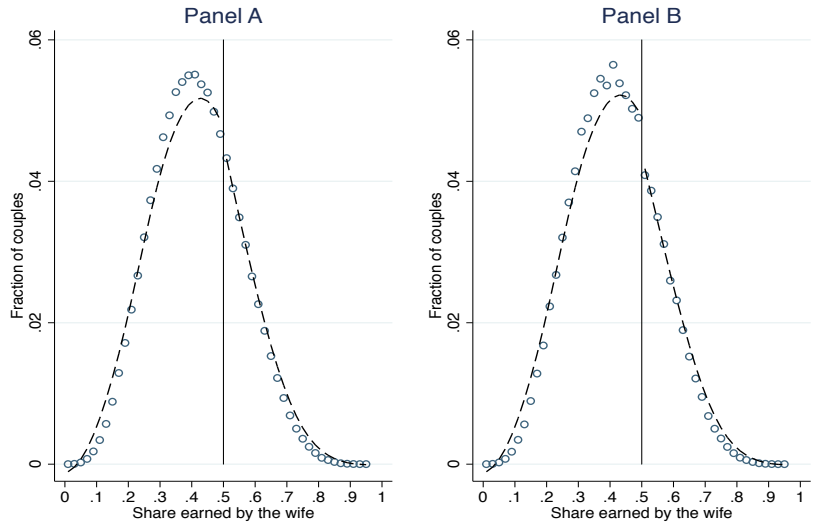
Male earnings are assumed to be distributed as $\Gamma(7, 5000)$ and female earnings are distributed as $\Gamma(5, 5000)$. These parameters imply that the average male earnings are 35000 and the average female earnings are 25000. For simplicity, we randomly match males and females who have their incomes drawn from the corresponding income distributions, such that the distribution of the wife's share of earnings is a $Beta(5, 7)$. Panel A of Figure A1 shows that this latter distribution is smooth around point 0.5. We then round individual earnings up to 1000 and compute the wife's share of earnings based on the rounded values. As we show in panel B of Figure A1, the distribution of households based on the rounded values of individual earnings exhibits a sharp discontinuity to the right of 0.5.

In principle, if the rounding rule is known, the problem may be solved by a proper de-rounding procedure (e.g. Bertrand et al. (2015) de-rounded ACS income data to uncover the original distribution of individual incomes). Yet, de-rounding has to rely on some distributional assumptions and, importantly, on the independency of spouses' earnings. If in the real data there is an excess mass of households with spouses having identical earnings, de-rounding may also blur out this important feature of the data.

Similarly to the problem of rounding, correlated measurements errors in self-reported earnings data may also generate discontinuity in the relative income distribution to the right of 0.5. This would occur if, for instance, each household head reports household members' incomes at a certain idiosyncratic level of precision. Furthermore, individuals' responses to survey may be themselves affected by the gender norm, creating an artificial discontinuity in the relative earnings distribution in self-reported data (see

Murray-Close and Heggeness 2018).

Figure A1: The effect of rounding on the distribution of the relative earnings of women



Notes: Panel A shows the distribution of couples according to the simulated wife's share of earnings where male earnings are distributed as $\Gamma(7, 5000)$ and female earnings are distributed as $\Gamma(5, 5000)$. Panel B displays the distribution after individual incomes are rounded up to 1000. Each point represents density in a 2% relative income bin. The dashed line is the lowess smoother applied to the distribution allowing for a break at 0.5.