The Effect of Spouses' Relative Education on Household Time Allocation

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Abstract

Does spouses' relative education explain their household's distribution of labor? This paper analyzes the effect of educational attainment on time allocated to housework and paid work. To address endogeneity concerns, I implement a novel identification strategy by exploiting changes in spouses' education relationship due to remarriage to identify its effects on their time allocation. I find that when an individual marries a spouse with higher relative education than their previous one, the individual's share of housework time increases while their share of paid work time decreases. I also find that the spouse's relative education reduces the probability of a stay-at-home spouse. The effects are stronger when a husband marries a more educated wife than his previous one. These findings show that relative human capital plays a role in household labor distribution and motivates a more gender-neutral division of labor within households.

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1 Introduction

Distribution of labor is important since specialization predicts gains in marriage (Becker (1965), Gronau (1973), Becker (1985)) and creates a disparity in nonpaid time allocation between spouses that can persist even when both participate in the labor market. Empirical evidence shows that employed women spend almost as much time working as employed men, but they spend considerably more time in nonpaid work (childcare, housework).[1] Moreover, the theoretical and empirical discussions of specialization and time allocation compare spouses' relative wages to measure their efficiency in the labor market. In addition, there is evidence that human capital matters for the household's distribution of labor (Polachek (1975)).[2]

In this paper, taking marriage as given, I analyze the role of spouses' relative education on the division of labor in housework and paid work.[3] I use relative education instead of spot wages because it alleviates concerns over the life cycle effect on the distribution of labor, since education serves as a measure of individuals' lifetime earnings potential. Moreover, because education measures labor market potential, spouses' relative education relates to their relative labor market efficiency, thus affecting their time allocation in the household. Furthermore, as the proportion of couples with a more educated wife (educational hypogamy) increases and become more stable (Chiappori *et al.* (2017), Schwartz & Han (2014), Van Bavel *et al.* (2018)), it is important to understand how education relationship changes will shape household's time allocation.

In terms of the empirical strategy, such an application needs to address relevant endogeneity concerns. Since spouses' education relationship is a consequence of marital decisions, cross-sectional results are likely endogenous. More precisely, an individual who decided to marry a more educated spouse might be more willing to cooperate more with housework. At the same time, spouses' education and time allocation correlate with their gender attitudes, with less gender-egalitarian individuals complying with a more traditional role in the household. As a result, the unobservables that affect the spouse's relative education will likely correlate with the individual's decision to do more nonpaid work (less paid work) than the spouse.

To alleviate these concerns, I exploit the Panel Study of Income Dynamic (PSID) database characteristics. I use fixed effects models to control the households' time-invariant unobservables and also track variation in spouses' relative education across marriages. Hence, the identifying variation comes from an individual marrying a spouse

[1] See Hersch & Stratton (2002), Hersch (2009), Kalenkoski *et al.* (2007), Kalenkoski *et al.* (2009), Bloemen *et al.* (2010), and Bloemen & Stancanelli (2014) for detailed empirical work.

[2] In terms of a framework, the theoretical model of Chiappori *et al.* (2017) predicts that when a wife's (husband's) relative human capital is higher, the husband's (wife's) household chores and childcare time increases (decreases).

[3] This paper examines different-sex couples and refers to the partner of a given individual as the "spouse." When referring to male and female partners, I use "husband" and "wife," respectively.

with different years of education than the previous one, holding the individual constant. The identification strategy relies on the differences between spouses' education across marriages being independent of time-varying unobservables that might affect time allocation.

The main findings show that when an individual's spouse has higher relative education than the previous one, the individual allocates relatively more time to housework and less time to paid work. More precisely, an increase in the spouse's education through remarriage increases the individual's share of housework hours per week by 0.38% and decreases their share of paid work hours per week by 0.68%. Therefore, the spouse's education influences the division of labor. The effect is stronger when looking at husbands only. Furthermore, I analyze the effect that the spouse's education has on the individual's decision to *stay-at-home*. This variable is the extreme case of specializing in housework. The results show that the spouse's education affects the extensive margin of housework: an increase in the spouse's education through remarriage decreases the spouse's probability to stay at home by 1.16%. These and the main results suggest that education plays a role in determining the household's distribution of labor.

As a robustness check, I analyze other relative education and time allocation measurements and find qualitatively similar results. I also address some potential concerns with the main results. First, the empirical strategy will fail if the individual's preference for labor division changes over time. I find no evidence that spouses' education changes (the spouse's education difference across marriages) relate to time allocation in the previous marriage. Second, I run a placebo test using the time allocation while single and find no correlation with the spouse's relative education. Third, to explore how representative those who remarry are, I compare the correlation between the spouse's relative education and time allocation in the first marriage for those who remarry and those who do not. The correlations for both groups show qualitatively similar results. Fourth, to alleviate concerns with measurement errors, I compare the OLS results using both the PSID and the American Time Use Survey (ATUS) data. The findings show qualitatively the same results, suggesting measurement errors are not a big concern.

I then explore a different setting by using the British Household Panel Survey (BHPS). This survey provides a comparable analysis in a different country with different educational attainment, marriage, and divorce characterizations than the United States. Moreover, the data helps alleviate further measurement error concerns since they have more precise time allocation variables. Using this sample, I find an increase in the share of housework time by 1.23% when the spouse's education level increases through remarriage. I find a nonsignificant effect for paid work but with the same sign as the PSID results. Therefore, the results are qualitatively comparable across different settings.

My empirical findings build on the research looking at the spouses' wage relationship effect on time allocation in a cross-sectional setting (e.g., Brines (1994), Greenstein (2000),

Bittman *et al.* (2003), Evertsson & Nermo (2004), Kalenkoski *et al.* (2009), Connelly & Kimmel (2009), Bloemen & Stancanelli (2014)). In terms of the literature on education's effect on time allocation, several papers find that more educated parents spend more time in childcare, both women (Craig (2006), Sayer *et al.* (2004), Guryan *et al.* (2008), Kalenkoski *et al.* (2005), England & Srivastava (2013), Salehi-Isfahani & Taghvatalab (2019)) and men (Kalenkoski *et al.* (2005), England & Srivastava (2013), Suzanne Bianchi, Philip Cohen, Sara Raley (2003)). In terms of time dedicated to paid work, as women's education level increases, the labor supply also increases (e.g., Bloemen *et al.* (2010), Salehi-Isfahani & Taghvatalab (2019)).

My findings also add to the literature on education assortative mating (Becker (1973)) and the distribution of labor. Bonke & Esping-Andersen (2011) use Danish data and find that parents' educational homogamy effect on childcare time depends on parents' education. Miller (2020) finds that men in an educational hypogamous marriage spend more time in childcare than men in other types of couples.[4] In the literature on cross-spouse education, Bloemen *et al.* (2010) use the Italian time diary survey and find that women's education increases men's time allocation to childcare. England & Srivastava (2013) use United States data and find that husbands' childcare increases with wives' education. Using Australian data, Craig (2006) classifies aggregate parents' education and finds that more educated couples spend more time on childcare. Sullivan & Gershuny (2016) use the BHPS to study the effect of human capital, measured through predicted income, on housework. They find that the wife's relative human capital increases the husband's housework. Evertsson & Nermo (2007) find evidence that changes in spouses' relative resources within a couple (measure as income dependency) affects housework using Swedish data: when the wife's economic dependency decreases, the wife's share of housework decreases.

I make several contributions to the literature. First, I analyze US couples in a panel data empirical setting. The use of longitudinal data relaxes endogeneity concerns, controlling for time-invariant unobservables. Moreover, I use a unique identification strategy where I isolate variations through changes in marriages, allowing me to identify the effect of education as a measurement of permanent income and to exclude variations from other sources as labor market characteristics. With the analysis of the spouses' education relationship, I supplement the literature on relative income while alleviating concerns of measurement and endogeneity of current earnings and the sensitivity of it to the individuals' life cycle and the state of the economy.

The rest of the paper is as follows. Section 2 presents the PSID data, introduces the empirical model and the results implemented with the data. In Section 3, I present the implementation using the BHPS dataset. Section 4 concludes with a brief discussion of

[4]Regarding spouses mismatch, Mansour & McKinnish (2014) discussed how spouses' age mismatch negatively relates to individuals' education, occupation, and earnings.

the results.

2 Empirical Application: The Panel Study of Income Dynamic

In this section, I first discuss the PSID data, followed by the model specification and the empirical findings of the effect of changes on the spouse's relative education on time allocation. I estimate various models using different variables that reflect households' division of labor. I also analyze possible concerns with the estimation results.

2.1 Data

I construct a database using the PSID sample from 1985 to 2017.[5] The PSID is a rich database that has followed individuals in a group of families since 1968. The survey includes the families' decedents and their households as they form their own families,[6] thus providing in-depth information on the families and variations of their characteristics across different periods. The sample is annual until 1997, when it becomes biennial, and it includes time allocation on housework and paid work hours per week for both the husband and wife.[7] Moreover, the PSID records variations in household composition and spouse's characteristics over time, which is the focus of this paper's identification strategy.

I use the family and individual files for 1985–2017 pooled together. I concentrate on different-sex couples that are either married or in cohabitation for a year or more.[8] Both spouses must be between 18 and 65 years old. Since the sample has both married and cohabiting couples, I use spouses for both types of partnership. When referring to male and female partners, I use "husband" and "wife," respectively.

The data is at the individual level, observing for each household both the husband and wife.[9] Thus, my sample has two observations per household-year. Hereafter, when I refer to the household level, I refer to the reference person (husband)'s observations.[10]

[5]Survey Research Center (2019)

[6]Since the PSID design aims to characterize families over time, following the children of the households as they move out of the house and form their own families is a key aspect of this survey.

[7]Precisely, it asks "About how much time do you (HEAD)/your wife ("WIFE") spend on housework in an average week? (e.g., time spent cooking, cleaning, and doing other work around the house.)." For paid work, it asks them to provide "Reference person's (spouse's/partner's) total weekly work hours previous year." For childcare, unfortunately, there is only data for the time allocated in 2017.

[8]Unfortunately, couples that have been living in cohabitation for less than a year do not have information regarding both partners' time allocation.

[9]One could also say that the sample is at the spouse's level since my sample only includes husbands and wives.

[10]From the documentation in the PSID, a cross-year family-level file, we must keep the heads for each year. See `https://psidonline.isr.umich.edu/Guide/FileStructure.pdf`.

At any given survey year, I identify the individual's spouse, $SpouseID_t$, which I use to construct marriage variations, defining a *"remarriage"* when there is a new spouse this period, compared with the previous one observed ($SpouseID_t \neq SpouseID_{t-1}$). The variable *remarriage* is then equal to one if there is a new spouse in the household ($SpouseID_t \neq SpouseID_{t-1}$ and I observed a previous spouse, i.e, $SpouseID_{t-1}$ is not missing) and zero otherwise.[11] Figure A.1 shows the trend of the percentage of remarriages. Given the survey change from annual to biennial in 1997, the graph presents a one-year change in marriage for 1985–1997 and two years after that. On average, there are 7,952 observations per year, a total of 2,231 *remarriages* in the sample, and an average of 101 remarriages per year from 1986–2017.[12]

Note that because the PSID follows a group of families, husbands and wives who are followed over time are part of different households. Their spouses enter (leave) the PSID when they get married (divorce). Therefore, except for cases in which both spouses are part of the PSID initial sample, either the husband or the wife in a given household remarry. Table A.1 shows the distribution of households by type of remarriage. Except for one household, remarry husbands and wives are in different households. The number of remarriages is split almost in the middle between husbands and wives remarrying.

Education refers to the highest grade of school completed.[13] Those who either completed high school or received their GED are considered to have completed the 12th grade. Hereafter, I refer to this variable as the highest year of education and years of education interchangeable. Note that the survey does not update the educational attainment information for most years.[14] To harmonize changes in education, I assign each individual the first educational attainment observed within the sample. This treatment ensures I treat the sample equally across survey years and isolate changes in education through a new spouse with a different education than the previous spouse.

Table 1 presents the main descriptive statistics. Column (1) shows the information for the complete sample. I then divide the sample regarding remarriage. Column (2) presents the characteristics of those with only one marriage in the sample. For those with at least two marriages, columns (3) and (4) show the summaries statistics for the first spouse and after a change in the household composition (new spouse). Column (4) includes all the years after a remarriage.

First, looking at the age gap between husbands and wives, on average, husbands are

[11] I only compare periods where the individuals are married. Gaps between survey waves observed represent periods in which individuals were single.

[12] Given the way that I define remarriage, there are no remarriages in 1985, so I exclude this year when calculating the average.

[13] The variable takes the values of 1 to 17. A value of 16 means the person completed at least 4 years of college. A value of 17 means they have completed 12 years of school and at least 5 years of college.

[14] Before 2013, the PSID updated education information for all the individuals only for the 1985 and 2009 surveys. From 2013 onward, the survey updates the educational attainment every year if the individual reports a higher completed degree than the previously reported one.

around two years older than their wives. In terms of education, both husbands and wives have obtained just above a high school degree. On average, wives have higher years of education than husbands. The wife's minus the husband's education is the largest when there is a new spouse.

Table 1: Summary Statistics

	(1)	(2)	(3)	(4)
			Remarriage	
	All	No Remarriage	First Spouse	New Spouse
W/ Children <18	0.63	0.63	0.76	0.60
	(0.48)	(0.48)	(0.43)	(0.49)
No. of Children	1.26	1.25	1.50	1.20
	(1.25)	(1.25)	(1.20)	(1.29)
Age of Youngest Child	4.10	4.11	3.70	4.32
	(5.05)	(5.07)	(4.34)	(5.29)
Husband Age	40.94	41.27	32.54	42.73
	(11.21)	(11.24)	(8.09)	(9.96)
Wife Age	38.73	39.07	30.39	40.44
	(10.89)	(10.91)	(7.59)	(9.90)
Husband Education	12.98	12.99	12.81	13.01
	(2.67)	(2.73)	(2.01)	(2.01)
Wife Education	13.02	13.03	12.80	13.06
	(2.48)	(2.53)	(1.93)	(2.00)
Husband Housework Hours	7.53	7.50	7.54	7.97
	(7.98)	(7.95)	(8.17)	(8.35)
Wife Housework Hours	20.06	20.23	20.19	16.94
	(14.54)	(14.62)	(14.72)	(12.45)
Husband Paid Work Hours	41.82	41.77	43.44	41.74
	(16.09)	(16.08)	(14.89)	(16.68)
Wife Paid Work Hours	29.68	29.53	29.67	31.48
	(18.28)	(18.31)	(17.48)	(18.19)
Own and Spouse Characteristics				
Own Education	13.00	13.02	12.83	12.85
	(2.58)	(2.64)	(1.98)	(1.97)
Spouse Education	13.00	13.00	12.78	13.22
	(2.58)	(2.63)	(1.96)	(2.03)
% Housework	0.50	0.50	0.51	0.54
	(0.30)	(0.31)	(0.31)	(0.29)
% Paid Work$_{t-1}$	0.50	0.50	0.52	0.50
	(0.26)	(0.26)	(0.25)	(0.25)
N	182,896	165,102	8,563	9,231

Note. The table shows sample means with standard deviations in parentheses of the husband, wife, and household characteristics on the PSID 1985–2017. The sample includes those with time allocation, either housework or paid work; the household total time allocation is positive, and education is available for both spouses. N is the number of observations.

Regarding time allocation, the wife does relatively less housework and more paid work in a new marriage. Precisely, dividing the wife's housework hours per week by the husband's housework hours per week, the relative ratio is around 2.66 for all, 2.70 for no remarriage, and 2.68 for the first spouse. This ratio decreases to 2.13 with a new spouse. In terms of paid work, the ratio of the wife's paid work to the husband's is 0.71, and it is the same for those who do not remarry. The ratio is 0.64 for those who remarry in their first spouse, and it increases to 0.75 with a new spouse. Thus, we can see that the husband increases housework, decreases paid work, and the wife's education increases in a new marriage.

Because the sample has both husbands' and wives' observations, it is helpful to consider the time allocation and education relationship between the individual and their spouse. In Table 1 under "Own and Spouse Characteristics," spouses of those who did not remarry (column 2) or remarry while in their first marriage (column 3) have less education than the individual. The spouse's education increases and surpasses the individual's own education when they remarry (new spouse, column 4). Moreover, the individual's share of total household hours per week spent on housework (% Housework) and paid work (% Paid Work$_{t-1}$) is calculated as

$$\%t_{it} = \frac{t_{it}^{own}}{t_{it}^{own} + t_{it}^{sp}}, \tag{1}$$

where t_{it}^{own} and t_{it}^{sp} represent the time allocation of the individual and the spouse, respectively. As we can see, % Housework increases while % Paid Work$_{t-1}$ stays somewhat the same with a new spouse. Thus, when the spouse's relative education increases, the share of the individual's housework increases.

At the household level, Figure A.2 presents the trend of households' housework and paid work. Figure A shows that housework hours per week decreases over time, driven by wives decreasing their time and husbands' time being relatively constant. This change increases the relative importance of husbands' housework over time. For paid work, Figure B shows a high variation in the total hours per week spent on paid work, especially during the Great Recession, which reduces husbands' time considerably more than their wives' time. In general, since wives' paid work has been increasing while husbands' paid work has stayed somewhat stable, the importance of husbands' paid work in terms of total paid work decreases.

2.2 Model Specification

I estimate a fixed effects model as follows:

$$\%t_{it} = \gamma EducRel_{it} + X_{it}^{'}\beta + \zeta_s + \psi_m + \alpha_t + \alpha_i + \epsilon_{it}, \tag{2}$$

where $\%t_{it}$ is the individual's share of the household's total hours per week as measured in (1). X_{it} are the household characteristics,[15] ζ_s are state fixed effects, and α_t are year fixed effects. ψ_m are the marriage number fixed effects. For example, if at time t the individual is in their first marriage, then the dummy for the first marriage, ψ_1, will be equal to one and higher marriages dummies will be equal to zero. α_i are the individual fixed effects, which allow me to exploit the panel data characteristics of the PSID database.

$EducRel_{it}$ is the variable of interest, representing the spouse's relative education. To measure this, I use two different methods. First, I use the spouse's excess years of education:

$$EducRel_{it} = E_{it}^{sp} - E_i^{own}, \tag{3}$$

where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}). Since education is constant, the coefficient in $EducRel_i$ identifies the effect of a change in the spouses' relative education due to a remarriage on the individual's share of time allocation. For husbands' observations, variations are therefore coming from changes in the wife's education. Similarly, variations are due to the husband's education for wives' observations. Thus, we could also rewrite this relationship as the spouse's years of education:

$$EducRel_{it} = E_{it}^{sp}.$$

For the second measurement, I use a dummy that is equal to one if the spouse is as or more educated:

$$SpouseAsEduc_{it} = 1\{E_{it}^{sp} - E_i^{own} \geq 0\}. \tag{4}$$

Figure A.3 presents the households' distribution of the differences in wives' education minus husbands' education. This distribution shows the expected relationship with a concentration at zero due to educational homogamy. It skews slightly to the right given the increase in couples with educational hypogamy (a more educated wife).

I run the model for each activity j = (Housework, Paid Work) separately. The latter is estimated for the 1994–2017 panel due to the data availability. The model is estimated only for those with data on time allocation; the total time allocation is positive, and education is available for both spouses.

[15] I include the following variables: a married dummy (equal to one if the head's couple status is that it has a wife); children dummy; number of children; age of the youngest child. I also include husband and wife characteristics: age; age^2; dummies for race/ethnicity (Hispanic and black).

2.3 Results

Table 2 shows the main results. Panel A shows the results for housework, and Panel B shows the results for paid work. Columns (1) and (4) present the results for the complete sample, and columns (2) and (5) present the results when including only husbands. Finally, columns (3) and (6) show the result for wives' only. Hereafter, the *main results* are those in columns (1) and (4).

Main Results. Column (1) of Panel A shows that if the new spouse has one more year of education than the individual's previous spouse, the individual's share of housework increases by 0.38% (significant at the 10% level), while their share of paid work decreases by –0.68%. This effect represents 0.76% and –1.36% of the average housework and paid work, respectively. When using *SpouseAsEduc* in column (4), if the new spouse is as or more educated than the individual, the share of the individual's housework increases 2.26% and their share of paid work decreases by –2.51% (significant at the 10% level). Respectively, the effects represent 4.52% and –5.02% of the average.[16]

Effect for Husbands and Wives. As Table 1 shows, the distribution of labor has a gender component, with the average husband doing just 27% of the total housework and 58% of the total paid work. Given this traditional gender distribution of labor, it is of interest to see the effect of spouses' relative education for husbands and wives separately. These results are in columns (2) and (5) for husbands and columns (3) and (6) for wives.

The results are quantitatively larger across all the estimations when looking at husbands. Holding the husband constant, when the new wife has one more year of education than the previous one, the husband's share of housework increases by 0.70% (2.74% when using *SpouseAsEduc*). Compared with the main result, this effect is 0.32 (0.48) percentage points larger. Regarding paid work, the effect is –1.05% (not significant when using *SpouseAsEduc*), which is 0.37 percentage points more negative than the results for all. The results are not statistically significant when looking at wives.

The results for husbands and wives separately suggest that labor distribution responds more to wives' education changes. One possible explanation is that since wives do the bulk (least) of the housework (paid work), an increase in their education is more likely to tilt the household's distribution of labor. A wife who remarries a more educated man might not further increase (decrease) her share of housework (paid work). Importantly, the results suggest that the change in the spouses' relative education lessens the wife's responsibility of household's nonpaid work.

[16]Similar to the education, the spouses' age relationship could capture spouses' relative negotiation power. One might ask if estimating (2), where the variable of interest is the spouse's relative age, $Age^{sp} - Age^{own}$, gives similar results to the main findings. If the spouse's relative age increases by one, the individual's share of housework decreases by –0.12% (with 0.006 standard error), while the rest of the coefficients are nonsignificant.

Table 2: Effect of Changes in Spouse's Relative Education on Own Share of Time Allocation

	(1) All	(2) Husbands	(3) Wives	(4) All	(5) Husbands	(6) Wives
Panel A: Housework Hours per Week						
$E^{sp} - E^{own}$	0.0038*	0.0070**	-0.0000			
	(0.0023)	(0.0030)	(0.0032)			
SpouseAsEduc				0.0226**	0.0274**	0.0149
				(0.0100)	(0.0133)	(0.0137)
N	181,030	90,515	90,515	181,030	90,515	90,515
I	26,476	13,304	13,172	26,476	13,304	13,172
R^2	0.001	0.019	0.015	0.001	0.019	0.015
Panel B: Paid Work Hours per Week						
$E^{sp} - E^{own}$	-0.0068**	-0.0105**	0.0013			
	(0.0032)	(0.0044)	(0.0047)			
SpouseAsEduc				-0.0251*	-0.0303	-0.0064
				(0.0137)	(0.0194)	(0.0191)
N	104,498	52,249	52,249	104,498	52,249	52,249
I	19,567	9,819	9,748	19,567	9,819	9,748
R^2	0.001	0.040	0.037	0.001	0.040	0.037

Note. Effect of the spouse's relative education on the individual's share of time allocation estimated by equation (2). Panel A presents the results for housework, while Panel B presents the results for paid work. Columns (1) and (4) present the results for all; columns (2) and (5) (columns (3) and (6)) present the results for husbands (wives). The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if the head's couple status is that it has a wife); children dummy; number of children; age of the youngest child; marriage number, year and state fixed effects. I also include husband and wife characteristics: age; age^2; dummies for race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess years of education, where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}); *SpouseAsEduc* is a dummy equal to one if the spouse's highest year of education is as or higher than of the individual ($E^{sp}_{it} - E^{own}_{i} \geq 0$). The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation; I is the number of unique individuals. R^2 is the within estimation R-square. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

Hours per Week. To further understand the effect, I check the individual's and spouse's hours per week separately in Table A.2. The effect is significant because the spouse is doing less housework (–0.22 hours per week) and more paid work (0.53 hours per week). The results when using the *SpouseAsEduc* dummy are qualitatively similar. For the individual's own time allocation, the results are not significant, and the sign for his or her own housework varies with the variable used. Nevertheless, column (1) signs shows the individual doing more housework and less paid work, which is what

I expect with substitution on housework and paid work time allocation across spouses. Furthermore, as expected, the results are stronger when looking at husbands alone.

One possible interpretation of the effect being more significant for the spouse is that marrying a more educated spouse would mean the individual accepts living with a spouse that does less housework. Alternatively, it could also be that a more educated spouse is more efficient, doing more housework per hour and freeing time to spend on paid work.[17]

OLS Regression. Table A.3 presents the corresponding OLS results for Table 2 and Table A.2. Panels A and D correspond to Panels A and B of Table 2, respectively, and Panels B–C (E–F) correspond to Panels A–B (C–D) of Table A.2. The results in Table A.3 are qualitatively similar to the main result.

It is helpful to compare the coefficients to explore the direction of endogeneity. When comparing the share of time allocation in Panels A and D of Table A.3 with Panels A and B of Table 2, the OLS estimates suggest that unobservables underestimate the increase in the individual's share of housework and slightly overestimate the decrease in the share of paid work. Compared with Table A.2, the OLS estimates for the hours per week variables in Panels B–C and E–F overestimate the individual's increase in housework and decrease in paid work, and they underestimate the spouse's decrease in housework and increase in paid work. Thus, the effect of endogeneity on the results seems to vary.

Regarding the sources of endogeneity concerns, first, those who decide to marry a more educated spouse might be more willing to cooperate more with housework, decreasing paid work hours, which overestimates the increase in housework and the decrease in paid work. The opposite is true for the spouse. This source of endogeneity overestimates the effect of the spouse's relative education. At the same time, because gender norms might motivate more traditional gender roles in the household, wives may do more housework and less paid work, while husbands may do the opposite. Therefore, this second source of endogeneity has the opposite endogeneity sign for husbands and wives. Thus, the OLS overestimating or underestimating the main results will depend on which effect dominates and the reason why the direction of endogeneity in Table A.3 varies. Note that the gap between the OLS estimates and the fixed effects results for the share of time allocation is larger for housework than for paid work. This difference is in line with gender norms having a stronger effect regarding housework. While wives' work hours are not that different from husbands' work hours, housework strongly persists as a wife's task.

In general, the results suggest that spouses' education relationship plays a role in the household distribution of labor. This effect benefits the new spouse with higher education than the previous one since the other partner, the individual, does a higher share of the housework. Because the effect is stronger when holding husbands constant, the increase in spouses' education motivates a more gender-neutral distribution of labor, benefiting

[17] I thank one of the reviewers for suggesting this alternative explanation.

women who traditionally bear most of the responsibility of housework and other nonpaid work.

2.3.1 Heterogeneity Across Spouses' Relative Education Distribution

I further explore if the effect varies across the distribution of the spouse's relative education. To do so, I construct three dummy variables. First, I create a dummy equal to one if the spouse's relative education is more than four years ($E^{sp} - E^{own} > 4$). That is, the spouse's highest year of education is more than four years than that of the individual. Homologous to this, I also create a dummy equal to one if the spouse is relatively more educated ($E^{sp} - E^{own} > 0$). Finally, I create a dummy equal to one if the spouse's relative education is less than four years ($E^{sp} - E^{own} < -4$).[18] Using these dummies as the variable of interest, I estimate the model in equation (2).

Table A.4 presents the results. Columns (1)–(3) show the estimation for housework, and columns (4)–(6) show the estimation for paid work. Columns (1) and (4) present the results for the complete sample, while the results for husbands (wives) are in columns (2) and (3) (columns (5) and (6)). Each panel presents the result for each of the three variables discussed above. Regarding the expected signs of the results, if the new spouse is relatively more educated than the individual's previous one, the individual should do relatively more housework and less paid work. Thus, the dummies in Panels A–B should have these expected signs, and the opposite should be true in Panel C.

Looking at the complete sample in columns (1) and (4), although not significant,[19] the results qualitatively support this pattern, especially for housework. As before, the results are stronger when looking at the husbands only. Moreover, the strongest effect is in columns (2) and (5) at the bottom of the distribution. Precisely, when the new wife has four years less education than the husband's, the husband's share of housework decreases by 8.81% and his share of paid work increases by 18.78%.

Furthermore, to determine if the results are symmetric when the spouse is less and more educated, I compare Panel B with the effect of having a less educated spouse, which in practice is the *SpouseAsEduc* coefficients with the opposite sign. From the results in Table 2, the effect of having a less educated spouse on the share of housework is –2.26% and the effect is 2.51% for paid work (significant at the 10% level). Compared with the results of having a more educated spouse (Table A.4, Panel B), both results are within the same confidence interval. Thus, the results for the spouse being less and more educated are qualitatively the same. Nevertheless, the coefficients are quantitatively larger and statistically more significant when looking at the effect of the spouse being less educated.

Overall, the results in Table A.4 show the expected signs, especially for housework.

[18] $E^{sp} - E^{own} < -4$ and $E^{sp} - E^{own} > 4$ are the 5th and 95th percentile of the spouse's relative education distribution.

[19] The result in Panel B, column (4) is significant at the 10% level.

The effect is nonlinear and stronger at the bottom of the spouse's relative education distribution. Thus, remarrying a relatively less educated spouse motivates a more traditional gender distribution of labor in the household.

2.4 Stay-at-Home Spouses

At the extreme, spouses might decide to leave the labor market to dedicate themselves to maintaining the household full time. More precisely, in the PSID, those who stay-at-home refer to their employment status as "keeping house," measuring the extensive margin of housework when husbands and wives decide to stay at home altogether. Table 3 shows the summary statistics of stay-at-home individuals. Column (1) shows the complete sample, and the information regarding stay-at-home husbands and wives are in columns (2) and (3), respectively. In the sample, 11% of the individuals stay at home, with 0.5% stay-at-home husbands and 22% stay-at-home wives.

As shown in Figure A.4, at the household level, husbands staying at home has significantly increased over time. The percentage of stay-at-home husbands increases from 0.1% in 1985 to 1.1% in 2017. In contrast, the percentage of stay-at-home wives decreases from 31% in 1985 to 17% in 2017.

Table 3: Summary Statistics: Stay-at-Home Status

	(1) Stay-at-Home	(2) Stay-at-Home Husband	(3) Stay-at-Home Wife
	0.113	0.005	0.222
	(0.317)	(0.068)	(0.415)
N	180,194	180,194	180,194

Note. This table contains sample means with standard deviations in parentheses of reporting keeping the house as their employment status on the PSID 1985–2017. The sample includes those that reported an employment status. N is the number of observations.

To shed light on whether the spouse's relative education affects the housework extensive margin, I analyze how spouses' decision to stay at home is affected by *EducRel*. Empirically, this entails implementing a linear probability model (LPM) version of equation (2). The dependent variable is *stay-at-home*, a dummy equal to one if the individual/spouse keeps the house and zero otherwise. Suppose the increase in the spouse's relative education relatively increases their value outside of the house due to a higher wage rate. In that case, the effect should be positive for the individual's *stay-at-home* and negative for the spouse's.

Table 4 provides the results, with columns (1)–(3) presenting the results for the individual's *stay-at-home* and (4)–(6) presenting the results for the spouse's. The results

show no effect on staying at home for the individual, but the spouse is less likely to stay at home. Precisely, when an individual's new spouse has one more year of education than their previous spouse, the probability of the spouse staying at home decreases by 1.16%. This effect represents 10% of the mean in Table 3. Similar results arise when using *SpouseAsEduc* (–4.84%, a 43% of the mean).

Table 4: Effect of Changes in Spouse's Relative Education on Stay-at-Home Status

	(1)	(2)	(3)	(4)	(5)	(6)
		Own			**Spouse**	
	All	Husband	Wife	All	Husband	Wife
Panel A: Spouse Relative Education						
$E^{sp} - E^{own}$	-0.0002	-0.0007	0.0001	-0.0116***	-0.0225***	-0.0015**
	(0.0027)	(0.0006)	(0.0049)	(0.0027)	(0.0053)	(0.0007)
Panel B: Spouse As Educated						
SpouseAsEduc	0.0012	0.0022	-0.0014	-0.0484***	-0.0961***	-0.0073*
	(0.0125)	(0.0033)	(0.0220)	(0.0116)	(0.0233)	(0.0042)
N	180,194	90,097	90,097	180,194	90,097	90,097
I	26,388	13,263	13,125	26,388	13,263	13,125
R^2	0.021	0.004	0.044	0.022	0.045	0.004

Note. Effect of the spouse's relative education on stay-at-home decision estimated by equation (2). Columns (1)–(3) presenting the results for the individual's and (4)–(6) presenting the results for the spouse's; columns (1) and (4) present the results for all; columns (2) and (5) (columns (3) and (6)) present the results for husbands (wives). The following covariates are included in the regression but excluded from the table for brevity: dummy of married; dummy of children; the number of children; the age of the youngest child; marriage number, year and state fixed effects. I also include Husband and wife characteristics: age; age^2; dummies for the race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess years of education, where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}); *SpouseAsEduc* is a dummy equal to one if the spouse's highest year of education is as or higher than of the individual ($E^{sp}_{it} - E^{own}_{i} \geq 0$). The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation; I is the number of unique individuals. R^2 is the within estimation R-square. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

Because wives tend to stay at home at a higher rate, it is important to see the effect when holding the husband and wife separately. In that case, if the increase in the spouse's relative education motivates a more gender-neutral distribution of labor, the effect should be stronger when analyzing the husband only. The results in columns (5)–(6) align with this expectation. The effect is stronger when holding husbands constant, at –2.25%. The effect is also significant when holding wives constant at –0.15%, which is smaller due to only 0.5% of the husbands staying at home.

While the main findings concentrate on spouses' relative education role in the distribution of hours allocated to paid and nonpaid work, Table 4's findings show that it

also impacts employment decisions at the extensive margin. The spouses' relative education reduces the probability of the spouse staying at home and thus changes employment decisions.

2.5 Robustness Check

I further analyze the results to address some possible concerns. First, I explore different specifications of the model estimated in Table 2. Second, I address possible concerns with the model's assumption that the differences between spouses' education across remarriages are independent of time-varying unobservables that might affect time allocation. Next, I implement a placebo test, exploiting observations when the individual is single. I then look at how comparable are for those who remarry to those who do not (married once), and I analyze a subsample to understand possible measurement error concerns related to educational attainment. Finally, I analyze measurement error concerns in the time allocation variables.

2.5.1 Alternative Specifications

In this section, I change the measure of both the dependent and explanatory variables, which allows me to then compare the results with the main results to understand the possible concerns regarding the model specification.

Mean Education Wage. An alternative way to measure the variable of interest is to calculate the mean education wage (MEW) for years of education (E) and gender ($s = (f, m)$):

$$MEW(E) = \frac{1}{n} \sum_{i=1}^{N} LogWage(E, s).$$

Each year, wages are CPI corrected to 2017 US dollars before being aggregated. I assign this value to each husband and wife, depending on their years of education. Using this value, I calculate the spouse's excess of $MEW(E)$:

$$DMEW_i = MEW(E_{it}^{sp}, s) - MEW(E_i^{own}, s). \tag{5}$$

The idea here is to use the average of the distribution of wages as the potential earnings to create the relative relationship of interest. Moreover, equation (5) is a version of equation (3) that allows me to capture variations in the spouse's excess of education across different education levels. For example, using differences in the highest year of education completed means that the difference between a high school graduate and a high school

dropout is equal to the difference between a college graduate and an advanced degree graduate. However, the difference in permanent income at these two different points might be different. By looking at the average wage associated with a given education level and gender, I can account for nonlinearity in the relative education effect on time allocation.

Figure A.5 presents the households' distribution of the differences in wives' MEW minus husbands' MEW. Compared to Figure A.3, as expected, MEW captures more variation due to nonlinearity. It also shows the concentration below zero given wages differences across gender.

Table A.5 shows the results of estimating (2) using $DMEW$ as the variable of interest. Columns (1)–(3) present the results for housework hours per week, and columns (4)–(6) present the results for paid work hours per week. The results are qualitatively similar to the main findings, showing that the findings are not sensitive to the nonlinearity effect of education.

Education Level. Instead of using education measured in years, I can use relevant educational attainment instead. I define the education level as 1 = "less than a high school degree," 2 = "high school degree," 3 = "more than high school," 4 = "college degree," and 5 = "more than college degree." Using this variable, I build a new version of (3) and (4). I estimate equation (2) and present the results in Table A.6. These results are qualitatively similar to the main results in Table 2.

Time Allocation. As an alternative for the outcome variable, I create a dummy variable equal to one if the hours per week spent is above average and zero otherwise. I use the average from Table 1, column (1) for each time allocation variable. Table A.7 shows the summary statistics of those variables, and Table A.8 shows the results of regressing equation (2) using these dummy variables as the dependent variable. Columns (1) and (4) show the results for the complete sample, columns (2) and (5) hold husbands constant, and columns (3) and (6) hold wives constant. The results in column (1) show that the probability of doing above-average housework increases when the new spouse is more educated than the previous one. The effect for the spouse's housework and the individual and spouse's paid work are not significant, but the signs are in line with the spouse decreasing housework and increasing paid work. The results using $SpouseAsEduc$ (column (4)) are qualitatively similar. Thus, the results are qualitatively similar to the main findings.

2.5.2 Endogeneity Concerns

The estimation assumption is that using fixed effects controls for time-invariant unobservables. There might be concerns with my findings if this assumption does not hold.

If the preference for the division of labor and the spouse's education changes as time passes, then fixed effects will not control for it and endogeneity concerns will persist. More precisely, if the individual chooses the spouse's education differences depending on their time allocation preferences, time-variant unobservables affecting labor distribution will correlate with the change in the spouse's education.

To alleviate this concern, I analyze how the previous marriage's division of labor, holding the individual constant, might explain the spouse's education changes across different marriages. If the individual chooses the change in relative education, then the time allocation trend with the previous marriage's distribution of labor will be correlated with the change in education.

For those who remarry, I run the following two regressions:

1. For each individual's marriage, regress the individual's share of time allocation on a time trend:

$$\%t_{imt} = \alpha_{im} + \beta_{im} Time_{imt} + \epsilon_{imt}. \tag{6}$$

2. For the first year in a new marriage m, regress the variables measuring the change in education across marriages, $E_{sp,m} - E_{sp,m-1}$, on the estimated coefficient for the time trend of the previous marriage, $\widehat{\beta_{i,m-1}}$:

$$E_{sp,m} - E_{sp,m-1} = \gamma_0 + \gamma_1 \widehat{\beta_{i,m-1}} + \mu_{imt}. \tag{7}$$

Table A.9 presents the equation (7)'s estimated coefficient $\widehat{\gamma_1}$. Column (1) presents the results for housework, while column (2) presents the results for paid work. The result is not statistically significant for housework and is significant at the 10% level for paid work, but the sign points toward the opposite direction than the main result. Note that these results must be used with caution, as the previous spouse's data might be limited given the database's characteristics. Moreover, the small sample could be at fault for not finding significance. Nonetheless, these results help to alleviate endogeneity concerns with the main results.

2.5.3 Placebo Test: Time Allocation While Single

To further explore endogeneity concerns, I use the PSID to create a subsample of observations in which the individual is single.[20] I create the variable $AvgTimeSingle_i$ which is the average hours per week that the individual allocates to housework and paid work while single. I then use $AvgTimeSingle_i$ as the dependent variable and estimate

[20] I select the periods if there is no partner in the household.

the OLS version of equation (2). In the spirit of a placebo test, the spouse's relative education should not correlate with $AvgTimeSingle_i$; otherwise unobservable characteristics correlate with both time allocation and the spouse's relative education.

Table A.10 shows the results. Column (1) presents the results for housework, and column (2) presents the results for paid work. Panel A presents the results using the spouse's excess years of education (equation (3)), and Panel B presents the results using $SpouseAsEduc$ (equation (4)). All the coefficients are not statistically significant, suggesting no correlation between the spouse's relative education and the average time allocated by the individual while single. Moreover, the coefficients have a negative sign for housework, thus pointing to the opposite direction than the main results. Therefore, these findings further ease concerns regarding endogeneity in the main findings.

2.5.4 How Representative are Those Who Remarry?

Since the identification strategy relies on changes in the spouse's education due to remarriage, a possible concern is that those who have had multiple marriages might be intrinsically different from those who only marry once. If so, the results will not apply to married individuals as a whole. To explore this concern, I estimate the OLS version of equation (2) for the individuals with only one marriage in the sample, "No Remarriage," and for those who remarry and are in their first marriage, "Remarriage – First Spouse." If the latter are comparable to other married individuals, the correlation between spouses' relative education and time allocation should be qualitatively the same for both samples.

The OLS results are in Table A.11. Panel A and Panel B present the results for housework and paid work, respectively. Columns (1)–(2) presents the correlation for the two samples, while column (3) presents the p-Value resulting from testing the null hypothesis that these two coefficients are equal. The results show that we cannot reject the null hypothesis that the correlation between spouses' relative education and time allocation in the first marriage is qualitatively similar across remarriage status. Thus, the results alleviate concerns regarding selection into remarriage.

2.5.5 Measurement Error in Education

As discussed in Section 2.1, to isolate the changes in relative education across remarriage, I assign each individual the first educational attainment I observe within the sample. Because I observe the individuals in possibly different moments of their lives, which could raise concerns of educational attainment impact in labor distribution, I perform the main analysis in Table 2 for the subsample in which I observe both the husband's and wife's education at age 25 or older.

Table A.12 shows the results. The housework results in Panel A strengthen in terms of point estimation, and the paid work results become not statistically significant, but

their confidence intervals include the main outcomes. Thus, qualitatively, the results are similar to the main results.

2.5.6 Measurement Error in Time Allocation

There are two main concerns in terms of time allocation measurement errors. First, the data could suffer from *recalling bias* since PSID uses stylized time allocation questions (average values per week), which could affect the results. Because of these questions, individuals might not precisely remember how much time they spend on each activity. The second concern is that since the head of the household responds to the time allocation questions for himself and his wife, secondhand reporting might introduce errors. Bryant *et al.* (2003) compare PSID time allocation answers by the wife versus the husband to analyze the measurement error concerns. They suggest that, on average, the error between the wife's time measurement and the husband's estimation of the wife's time is close to zero. However, there might be differences of error in specific subsets of women.

To understand the possible effect, I use the ATUS, a cross-sectional time use survey based on a subsample of households that completed the last month in the Current Population Survey (CPS) every year since 2003 (I use the pooled sample from 2003 to 2018). ATUS interviews one person per household and collects time allocation using a time diary method, meaning it records very detailed data concerning respondents' activities 24 hours before the interview (Section A.3 provides more detail on the data).

Because of the time diary's short-term measurement, recollection bias is less of a concern with ATUS. Moreover, the time allocation data is self-reported, alleviating measurement bias by secondhand reports. However, a limitation of using ATUS is that I cannot compare it with the main results since it is a cross-sectional sample. Additionally, the time diary is only available for one adult in the household. Nevertheless, I can compare the ATUS results with the PSID OLS results for the individual time allocation in Table A.3. This comparison is a good indicator of what the correlations will look like if we were to have a more precise time allocation measure in the PSID.

Table A.16 presents the OLS estimation of the spouse's relative education using the ATUS, where the dependent variables are the minutes per week allocated to housework, paid work, and childcare. Panels A and B present the correlation between spouses' relative education and housework and paid work minutes per day, respectively. Column (1) presents the results for husbands and wives, while columns (2) and (3) show the results for them separately. The correlation between housework and paid work with the spouse's relative education is positive and negative, respectively. The signs align with the PSID correlations in Table A.3, Panels B and E, column (1). Moreover, looking at the results for husbands and wives, in columns (2) and (3), the results are quantitatively stronger for wives, which align with the PSID results. Converting the ATUS coefficients

to hours per week, the correlation is 0.13 and –0.40 hours per week for housework and paid work. These coefficients are qualitatively comparable to the OLS results using the PSID.

The ATUS findings point to measurement errors in time allocation not being a concern. Nevertheless, the results are only in terms of the OLS results. The following section replicates the main results in Table 2 using the BHPS. Because the BHPS allows me to estimate fixed effects with more precise time allocation measures, it would further ease measurement error concerns.

3 Empirical Application: The British Household Panel Survey

Taking advantage of a similar setting in the United Kingdom, I recreate the main analysis using the BHPS. This dataset has the advantage of being very similar to the PSID data with enough length to look at remarriages. It also has information on housework and paid work time for both husbands and wives. Moreover, the report of the time allocation is by each individual, which alleviates measurement error concerns with the PSID.

3.1 Data

The BHPS is a panel that follows the same British households from 1991 to 2008, for 18 waves. I use the sample from 1992 to 2008 since the relevant question referring to housework was not in the first survey year. This survey interviews all adults in the selected household and collects data on work and other household characteristics. Following the same approach as in Section 2.1, I include different-sex couples with both spouses aged 18–65. I keep those households in which I have the two spouses of a given couple, and the observation is at the individual level.[21] Moreover, I measure education using the highest academic qualification, following the British educational system. Using these, I define the following education levels: 1 = "CSE qualification", 2 = "O level", 3 = "A level", 4 = "highers qualifications", 5 = "1st degree (bachelor's degree)", and 6 = "higher degree".[22] Since I must compare education levels, both spouses must have information regarding their academic qualifications for the couple to be included.[23] As before, the education level is held fix for each person to the first time I observe them.

[21]Out of all the observations, only 300 come from households with more than one couple that satisfied all the requirements.

[22]More details on the education levels are available at https://www.gov.uk/what-different-qualification-levels-mean/list-of-qualification-levels.

[23]Those who said that "none of these," "don't know," "missing or wild," "inapplicable," "proxy and/or phone," or "refused" were excluded due to a lack of clear data about their qualifications.

Table 5: Summary Statistics: BHPS

	(1)	(2)	(3)	(4)
			Remarriage	
	All	No Remarriage	First Spouse	New Spouse
W/ Children <18	0.55	0.55	0.58	0.51
	(0.50)	(0.50)	(0.49)	(0.50)
No. of Children	0.96	0.96	1.02	0.86
	(1.04)	(1.04)	(1.07)	(1.03)
Age of Youngest Child	2.78	2.86	2.03	1.45
	(4.25)	(4.31)	(3.27)	(3.14)
Husband Age	39.95	40.26	32.44	37.54
	(10.46)	(10.50)	(7.96)	(8.46)
Wife Age	37.99	38.34	29.81	35.14
	(10.31)	(10.34)	(7.65)	(8.37)
Husband Education	3.11	3.12	2.75	3.02
	(1.32)	(1.33)	(1.17)	(1.28)
Wife Education	2.94	2.95	2.58	2.81
	(1.32)	(1.32)	(1.16)	(1.28)
Husband Housework Hours	5.35	5.34	5.47	5.70
	(5.01)	(4.99)	(5.74)	(4.83)
Wife Housework Hours	15.84	15.91	16.50	13.57
	(10.68)	(10.63)	(13.21)	(9.49)
Husband Paid Work Hours	38.92	38.87	39.46	39.78
	(9.02)	(9.07)	(8.79)	(7.94)
Wife Paid Work Hours	29.28	29.17	29.93	31.72
	(10.99)	(11.01)	(10.98)	(10.31)
Own and Spouse Characteristics				
Own Education	3.02	3.05	2.67	2.75
	(1.32)	(1.33)	(1.17)	(1.26)
Spouse Education	3.02	3.03	2.65	3.08
	(1.32)	(1.33)	(1.17)	(1.28)
% Housework	0.50	0.50	0.49	0.51
	(0.31)	(0.31)	(0.30)	(0.28)
% Paid Work$_{t-1}$	0.50	0.50	0.51	0.50
	(0.15)	(0.15)	(0.15)	(0.13)
N	66,540	62,265	1,726	2,549

Note. The table shows sample means with standard deviations in parentheses of the husband, wife, and household characteristics on the BHPS 1992–2008. The sample includes those with time allocation, either housework or paid work; the household total time allocation is positive, and education (highest academic qualification) is available for both spouses. N is the number of observations.

Table 5 presents the BHPS summary statistics. Column (1) shows the complete sample, column (2) for those with no remarriages in the sample, and columns (3) and (4) show the data for those who remarry, with the first and new spouse, respectively. In these households, around 55% have children and there is an average of one child, with the

youngest around 2.78 years old. The average couple has a husband who is just under two years older than his wife, and the age gap increases to 2.4 when there is a new spouse.

Table 6: Effect of Changes in Spouse's Relative Education on Time Allocation: BHPS

	(1) Own	(2) Spouse	(3) %Own	(4) Own	(5) Spouse	(6) %Own
	Panel A: Housework Hours per Week					
$E^{sp} - E^{own}$	-0.0031	-0.6831**	0.0123*			
	(0.2934)	(0.2997)	(0.0073)			
$SpouseAsEduc$				-0.4075	-0.4796	0.0071
				(0.6818)	(0.9140)	(0.0211)
N	64,210	64,210	64,210	64,210	64,210	64,210
I	9,167	9,167	9,167	9,167	9,167	9,167
R^2	0.035	0.039	0.001	0.035	0.039	0.001
	Panel A: Paid Work Hours per Week					
$E^{sp} - E^{own}$	0.2468	0.7721	-0.0066			
	(0.3758)	(0.5196)	(0.0056)			
$SpouseAsEduc$				-0.4508	1.5208	-0.0193
				(0.9597)	(1.5826)	(0.0177)
N	39,694	39,694	39,694	39,694	39,694	39,694
I	7,019	7,019	7,019	7,019	7,019	7,019
R^2	0.035	0.038	0.001	0.035	0.038	0.001

Note. Effect of the spouse's relative education on time allocation estimated by equation (2). Panel A presents the results for husbands, while Panel B presents the results for wives. Columns (1) and (4) (columns (2) and (5)) present the results for the individual's (spouse's) hours per week; columns (3) and (6) present the results for the individual's share of time allocation. The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if marital status is married); age of the youngest child; number of children age 0–2, 3–4, 5–11, 12–15, 16–18; marriage number, year and region fixed effects. I also include husband and wife characteristics: age; age^2. The sample includes the period of 1992–2008. N is the number of observations in each estimation; I is the number of unique individuals.R^2 is the within estimation R-square. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

In terms of education, husbands have, on average, just above an *A level* qualification, and wives are just below this qualification. Compared to the US data, UK women have a lower qualification than men, on average. This relationship is similar across subsamples. When looking at an individual's education and their spouse's education, a similar pattern to the PSID appear, where the spouse's relative education increases with a new spouse. In terms of time allocation, the pattern is similar to the US. The ratio of the wife's to husband's housework is 2.96, decreasing to 2.38 when there is a new spouse. This ratio

for paid work is 0.75 and 0.80. Furthermore, looking at the share of housework and paid work, we see a slight increase and decrease, respectively, when there is a new spouse. Section A.2 provides figures describing the data that are qualitatively similar to ones based on the PSID sample.

These summary statistics show that although the British and the US data are different, they show a similar pattern of an increase in a individual's share of housework time (decreases paid work time) accompanying an increase in their spouse's relative education through remarriage.

3.2 Results

I estimate equation (2) for the main dependent variable and the hours per week variables using the BHPS data. Since the education level is not the same, these results are not precisely comparable with the US results. However, they provide a good sense of the validity of the results since they are qualitatively comparable.

Table 6 show the results. Columns (1) and (4) present the effect on an individual's own time, columns (2) and (5) present the effect on the spouse's time, and columns (3) and (6) present the results for the individual's share of time allocation. Panel A shows the housework results, where column (3) shows the individual's share of housework increases by 1.23% (significant at the 10%) when the new spouse's education level increases by one degree compared with the previous spouse. The results of the hours per week variables in columns (1) and (2) suggest that this increase is due to the new spouse doing less housework (–0.68 hours per week) than the previous one. The results are not significant when using *SpouseAsEduc* and in Panel B for paid work.

When comparing the share of time allocation results in column (3) with the main findings in Table 2, the results are qualitatively the same. Both the sign and significance are comparable across both samples. The conclusion is the same when comparing the hours per week variables with the PSID ones in Table A.2.

Effect for Husbands and Wives. As with the PSID, I also look at the results holding the husbands and wives separately. The results are in Table A.14. Panel A presents the husbands' results, while Panel B presents that of the wives. As with the PSID, the effect is stronger when analyzing the husbands only.

In general, although I use a different country with a different setting, the results suggest the same conclusion as with the PSID. This comparison strengthens the conclusion that when the new spouse has a relatively higher education than the previous one, it motivates relatively higher cooperation on housework. More so, because the effect is stronger for the husbands, it suggests a more gender-neutral distribution of labor when the wife is relatively more educated.

4 Conclusion

This paper empirically analyzes how spouses' education relationship affects household decisions on time allocation distribution. To alleviate endogeneity concerns, I identify changes in spouses' education relationships using remarriage as the source of variation. Holding the individual constant, I analyze what happens to the household's labor distribution when the new spouse's education is different from the previous one.

Using the PSID, I find that an individual's housework share increases and their share of paid work decreases when they remarry a more educated spouse than the previous one. The findings are stronger when analyzing husbands only. I further analyze the education relationship impact on the decision to be stay-at-home husbands and wives. When an individual marries a more educated spouse than their previous one, the spouse is less likely to stay at home. I extend the analysis by using the BHPS, a British database comparable to the PSID. The findings are qualitatively the same, suggesting they are robust to using a different country.

It is important to note some aspects of this analysis. First, since it takes marriage as given, the analysis does not alleviate selection into marriage concerns. Moreover, there could be concerns regarding remarriage, which is key to my identification strategy. Even though I present evidence on how comparable are those who remarry to those who do not (because not all married individuals divorce and even less remarry), there might be further concerns regarding selection into remarriage. An ideal exercise would be to account, in some way, for selection into marriage by estimating a selection equation. However, this estimation needs an exclusion restriction, and such a variable likely does not exist. Therefore, when interpreting the results in this paper, it is important to do so as conditional on these limitations.

Traditionally, wives have tended to be the heavy lifter regarding time spent on housework and other nonpaid work, even when holding a full-time paid job. As this paper shows, spouses' education plays a role in achieving a more gender-neutral distribution of labor, improving women's opportunities in the labor market and easing their risk of exiting the labor force if any change in the household increases nonpaid work. Thus, the results in this paper have implications regarding women's participation in the labor force, the gender wage gap, and the policies aiming to improve gender equality in the labor market. The impact of policies that strive to improve women's position in the labor force, such as family-related policies like paid family leave and gender affirmative-action policies, strengthened when women's nonpaid work burden is alleviated within the family.

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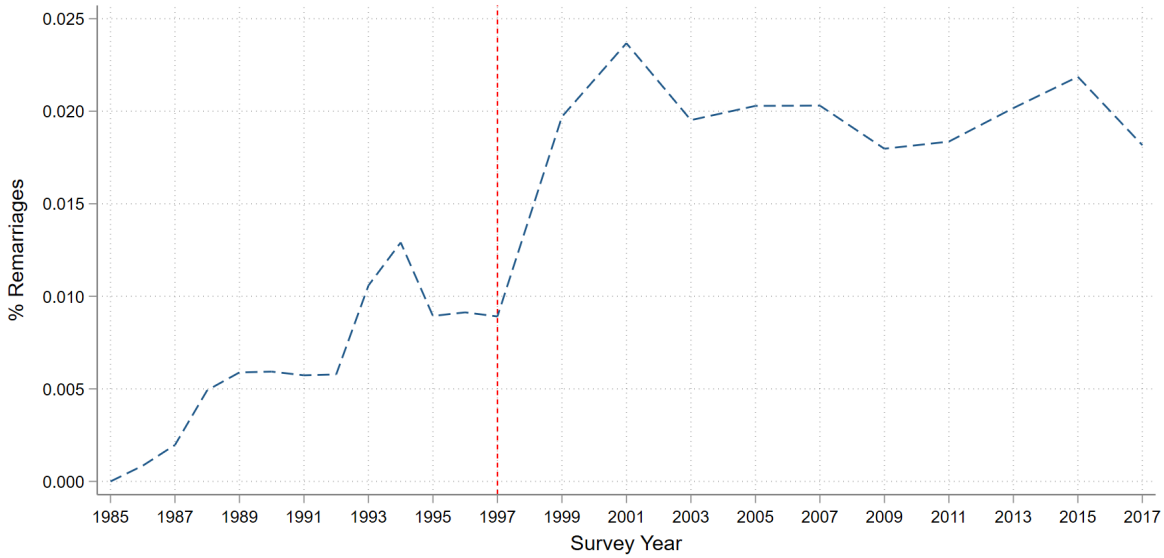
Appendix

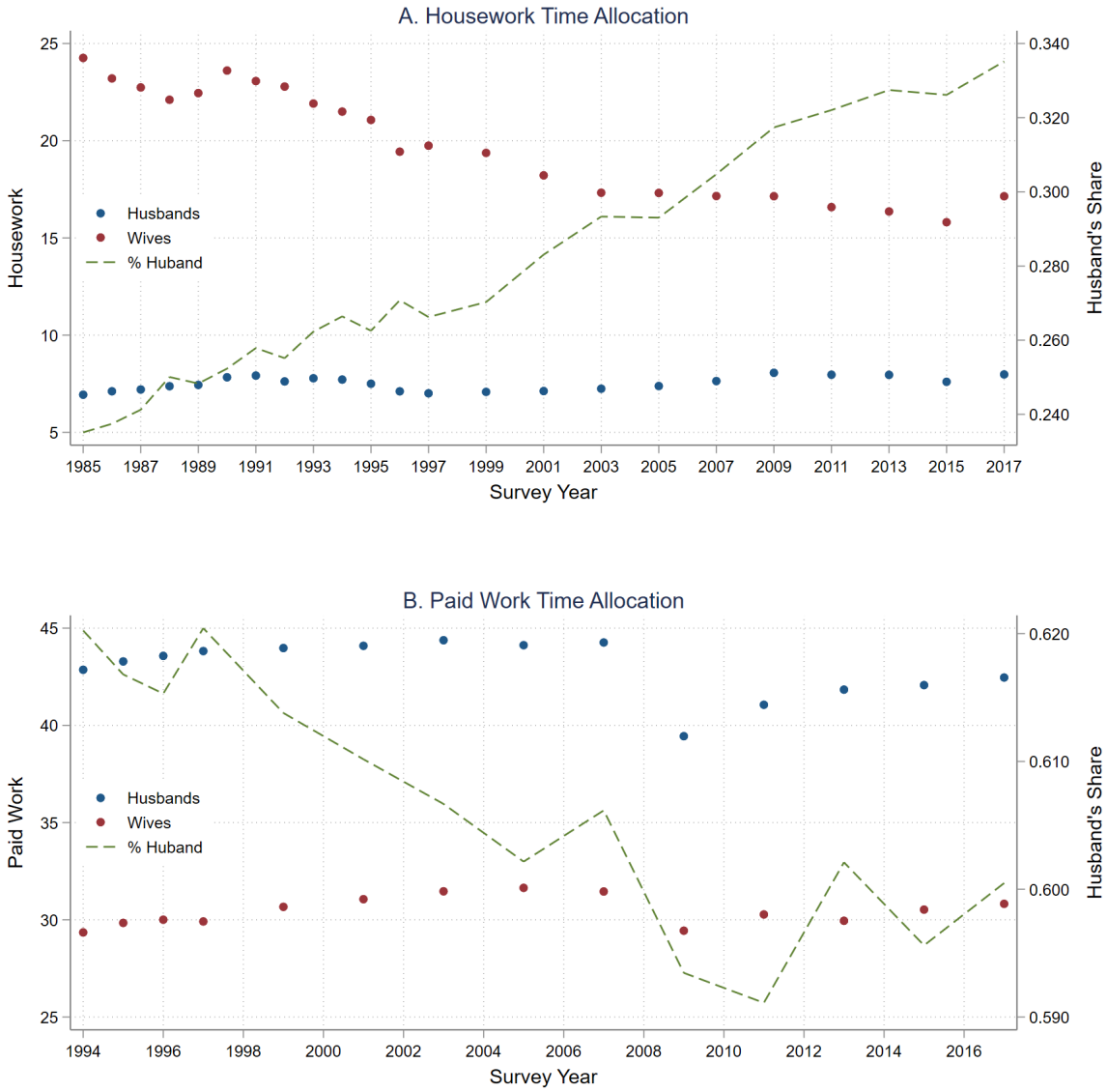
A.1 PSID

Figure A.1: Percentage of Remarriages by Year



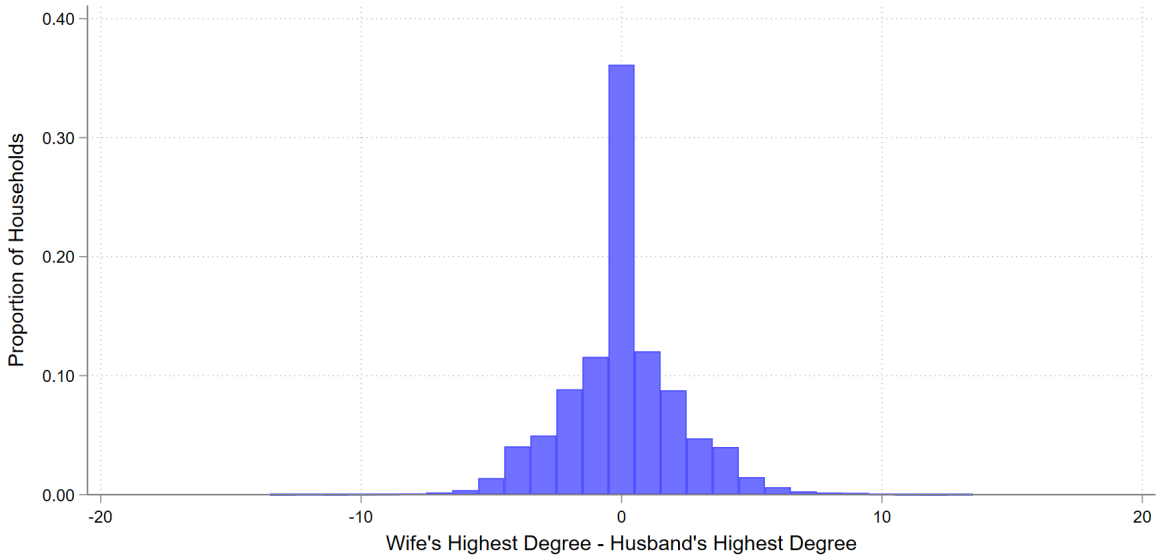
Note. This graph presents the percentage of remarriage, defined as when the individual has a new spouse in a given period compared with the previous one observed. The sample corresponds to the husbands and wives in the PSID. Since the sample is annually from 1985–1997 and biennial after, the percentage of remarriages represents the change in spouses per year until 1997 (highlighted with a red line), and a two year period after that. Since the data start at 1985, there are no remarriages that year; observations: N=(7,054; 7,086; 7,104; 7,102; 7,132; 9,104; 9,072; 9,338; 9,258; 9,762; 9,508; 7,884; 6,620; 6,750; 7,222; 7,428; 7,738; 7,978; 8,178; 8,062; 7,932; 7,548; 8,036)

Figure A.2: Households Housework and Paid Work Time Allocation by Year



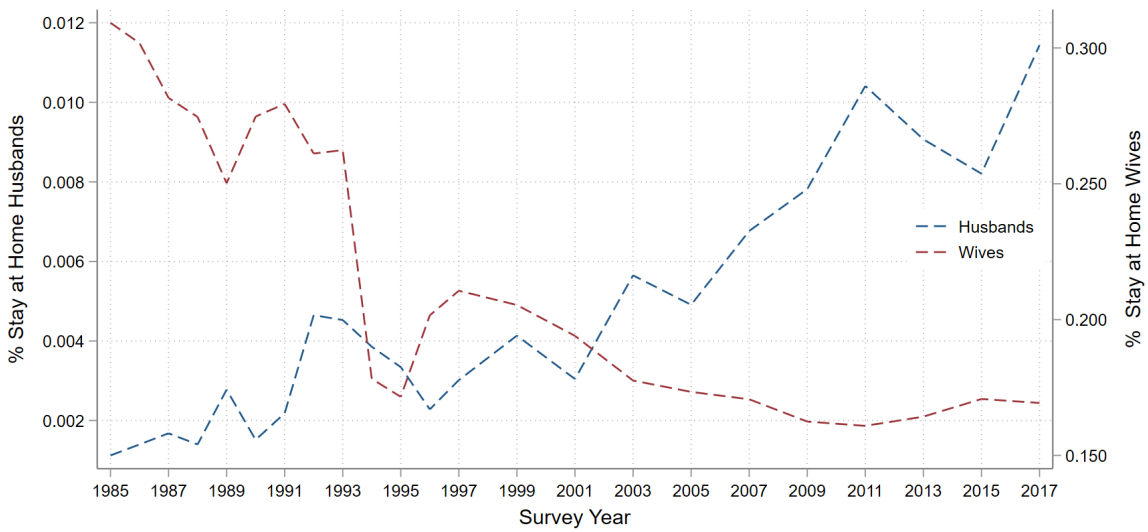
Note. These graphs presents average hours per week allocated to housework and paid work by husband and wife at the household level. I include only households in which time allocation is available for both spouses. The sample corresponds to the households in the PSID, annually from 1985–1997 and biennial after that. *Figure A* shows the average hours per week allocated to housework, for the 1985–2017 period; observations: N=(3,527; 3,543; 3,552; 3,551; 3,566; 4,552; 4,536; 4,669; 4,629; 4,836; 4,716; 3,923; 3,273; 3,075; 3,518; 3,651; 3,814; 3,936; 4,045; 3,987; 3,923; 3,734; 3,981). *Figure B* shows average hours per week allocated to paid work, for the 1994–2017 period; observations: N=(3,855; 3,838; 3,850; 3,247; 3,322; 3,544; 3,636; 3,787; 3,898; 3,999; 3,895; 3,847; 3,653; 3,878)

Figure A.3: Distribution of Households by the Wife's Excess of Years of Education



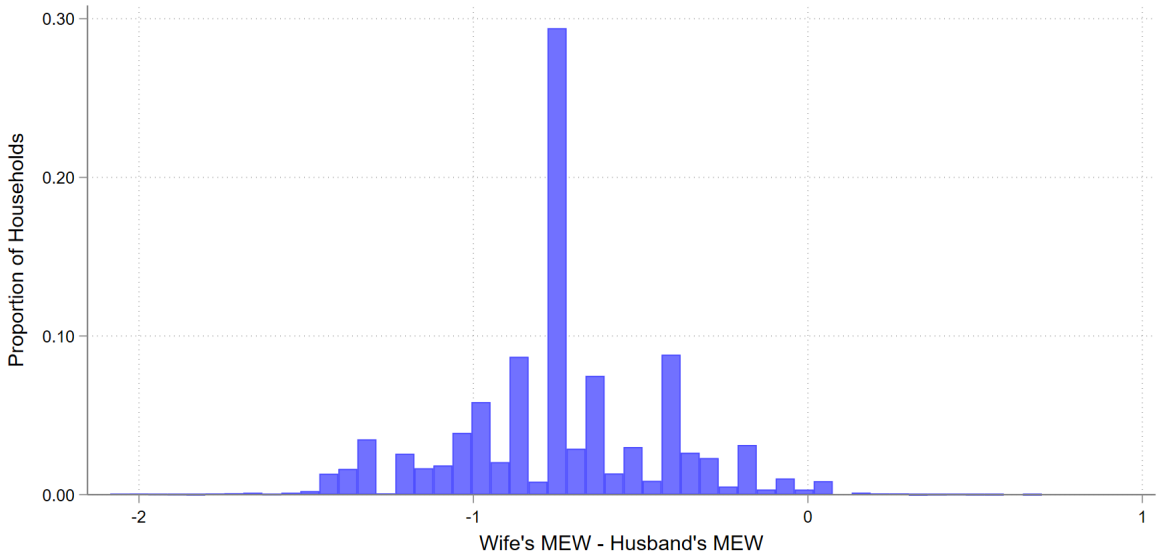
Note. This graph present distribution of the households by the wife's relative education, measured as the wife's years of education minus the husband's years of education. The sample corresponds to the households in the PSID for the 1985–2017 period, annually from 1985–1997 and biennial after that. Observations: N= 91,448.

Figure A.4: Percentage of staying at home Husbands and Wives by Year



Note. This graph presents the percentage of households with *stay-at-home* husbands and wives. The sample corresponds to the households in the PSID for the 1985–2017 period, annually from 1985–1997 and biennial after that. Observations: N=(3,560; 3,572; 3,572; 3,576; 3,601; 4,615; 4,581; 4,733; 4,638; 4,927; 4,785; 3,944; 3,314; 3,384; 3,613; 3,717; 3,870; 3,990; 4,093; 4,034; 3,969; 3,777; 4,022).

Figure A.5: Households Distribution of the Wife's Excess of MEW



Note. This graph presents the distribution of the households by the wife's excess of MEW, measured as the wife's MEW minus the husband's MEW. MEW is the average wages (in logarithm) for a given education level (years of education) and gender. The sample corresponds to the households from the PSID for the 1985–2017 period, annually from 1985–1997 and biennial after that. Observations: N= 91,448.

Table A.1: Distribution of Households by Type of Remarriage

		Wife's Remarriage		
		No	Yes	Total
Husband's Remarriage	No	$89,218$	$1,180$	$90,398$
	Yes	$1,049$	1	$1,050$
	N	$90,267$	$1,181$	$91,448$

Note. This table presents the distribution of households categorize based on the type, wife or husband, of remarriage. The sample corresponds to the households in the period of 1985–2017. The sample includes those with time allocation, either housework or paid work; the household total time allocation is positive, and education is available for both spouses. N is the number of observations by column.

Table A.2: Effect of Changes in Spouse's Relative Education on Time Allocation: Hours per Week Variables

	(1) All	(2) Husbands	(3) Wives	(4) All	(5) Husbands	(6) Wives
Panel A: Own's Housework Hours per Week						
$E^{sp} - E^{own}$	0.0456	0.1131	-0.0182			
	(0.1049)	(0.0953)	(0.1665)			
$SpouseAsEduc$				-0.0148	0.3950	-0.4299
				(0.4338)	(0.4242)	(0.6525)
Panel B: Spouse's Housework Hours per Week						
$E^{sp} - E^{own}$	-0.2230**	-0.4605***	0.0011			
	(0.1040)	(0.1677)	(0.1143)			
$SpouseAsEduc$				-1.2696***	-1.9244***	-0.6474
				(0.4449)	(0.7285)	(0.4890)
N	181,030	90,515	90,515	181,030	90,515	90,515
I	26,476	13,304	13,172	26,476	13,304	13,172
Panel C: Own's Paid Work Hours per Week						
$E^{sp} - E^{own}$	-0.1305	0.0415	-0.1093			
	(0.2060)	(0.2753)	(0.3100)			
$SpouseAsEduc$				-0.9955	0.2130	-1.3502
				(0.8315)	(1.0873)	(1.2114)
Panel D: Spouse's Paid Work Hours per Week						
$E^{sp} - E^{own}$	0.5264**	0.9581***	-0.1236			
	(0.2375)	(0.3519)	(0.3053)			
$SpouseAsEduc$				1.8670*	3.0886*	-0.0237
				(1.0145)	(1.6519)	(1.2316)
N	104,498	52,249	52,249	104,498	52,249	52,249
I	19,567	9,819	9,748	19,567	9,819	9,748

Note. Effect of the spouse's relative education on the hours per week allocated to housework and paid work by the individual and their spouse, estimated by equation (2). Panel A (Panel B) presents the results for the individual's (spouse's) housework hours per week, while Panel C (Panel D) presents the results for the individual's (spouse's) paid work hours per week. Columns (1) and (4) present the results for all; columns (2) and (5) (columns (3) and (6)) present the results for husbands (wives). The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if the head's couple status is that it has a wife); children dummy; number of children; age of the youngest child; marriage number, year and state fixed effects. I also include husband and wife characteristics: age; age^2; dummies for race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess years of education, where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}); $SpouseAsEduc$ is a dummy equal to one if the spouse's highest year of education is as or higher than of the individual ($E^{sp}_{it} - E^{own}_{i} \geq 0$). The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation; I is the number of unique individuals. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

Table A.3: Effect of Changes in Spouse's Relative Education on Time Allocation: OLS Results

	(1) All	(2) Husbands	(3) Wives	(4) All	(5) Husbands	(6) Wives
Panel A: % Housework						
$E^{sp} - E^{own}$	0.0010	0.0017**	0.0018***			
	(0.0010)	(0.0007)	(0.0007)			
SpouseAsEduc				0.0100**	0.0054	0.0103***
				(0.0046)	(0.0034)	(0.0034)
Panel B: Own Housework Hours per Week						
$E^{sp} - E^{own}$	0.1230***	0.0032	0.2303***			
	(0.0351)	(0.0244)	(0.0437)			
SpouseAsEduc				0.8336***	0.1121	1.1740***
				(0.1620)	(0.1182)	(0.2042)
Panel C: Spouse Housework Hours per Week						
$E^{sp} - E^{own}$	-0.1213***	-0.2229***	-0.0066			
	(0.0351)	(0.0437)	(0.0245)			
SpouseAsEduc				-0.5245***	-0.6378***	-0.0356
				(0.1691)	(0.2171)	(0.1190)
N	181,030	90,515	90,515	181,030	90,515	90,515
Panel D: % Paid Work						
$E^{sp} - E^{own}$	-0.0079***	-0.0100***	-0.0101***			
	(0.0009)	(0.0010)	(0.0010)			
SpouseAsEduc				-0.0302***	-0.0386***	-0.0375***
				(0.0039)	(0.0047)	(0.0043)
Panel E: Own Paid Work Hours per Week						
$E^{sp} - E^{own}$	-0.3627***	-0.2889***	-0.6920***			
	(0.0544)	(0.0587)	(0.0743)			
SpouseAsEduc				-1.4122***	-1.2098***	-2.5028***
				(0.2436)	(0.2607)	(0.3267)
Panel F: Spouse Paid Work Hours per Week						
$E^{sp} - E^{own}$	0.3547***	0.6780***	0.2859***			
	(0.0543)	(0.0742)	(0.0585)			
SpouseAsEduc				1.4156***	2.6721***	1.1411***
				(0.2558)	(0.3644)	(0.2505)
N	104,498	52,249	52,249	104,498	52,249	52,249

Note. The spouse's relative education association with time allocation, estimated by the OLS version of equation (2). Panel A (Panel D) presents the results for individual's share of housework (paid work). Panel B (Panel C) presents the results for the individual's (spouse's) housework hours per week, while Panel E (Panel F) presents the results for the individual's (spouse's) paid work hours per week. Columns (1) and (4) present the results for all; columns (2) and (5) (columns (3) and (6)) present the results for husbands (wives). The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if the head's couple status is that it has a wife); children dummy; number of children; age of the youngest child; marriage number, year and state fixed effects. I also include husband and wife characteristics: age; age^2; dummies for race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess years of education, where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}); *SpouseAsEduc* is a dummy equal to one if the spouse's highest year of education is as or higher than of the individual ($E^{sp}_{it} - E^{own}_{i} \geq 0$). The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

Table A.4: Effect of Changes in Spouse's Relative Education on Own Share of Time Allocation: Relative Education Dummies

	(1)	(2)	(3)	(4)	(5)	(6)
	Housework Hours per Week			**Paid Work Hours per Week**		
	All	Husbands	Wives	All	Husbands	Wives
Panel A: Four Year More Educated Spouse						
$1\{E^{sp} - E^{own} > 4\}$	0.0364	0.0744*	0.0178	0.0163	0.0175	-0.0008
	(0.0290)	(0.0422)	(0.0376)	(0.0358)	(0.0534)	(0.0533)
Panel B: More Educated Spouse						
$1\{E^{sp} - E^{own} > 0\}$	0.0060	0.0195	-0.0094	-0.0243*	-0.0306*	-0.0092
	(0.0092)	(0.0124)	(0.0126)	(0.0133)	(0.0185)	(0.0197)
Panel C: Four Year Less Educated Spouse						
$1\{E^{sp} - E^{own} < -4\}$	-0.0154	-0.0881***	0.0578	0.0549	0.1878***	-0.0272
	(0.0301)	(0.0290)	(0.0398)	(0.0409)	(0.0551)	(0.0424)
N	181,030	90,515	90,515	104,498	52,249	52,249
I	26,476	13,304	13,172	19,567	9,819	9,748

Note. Effect of the spouse's relative education on the individual's share of time allocation estimated by equation (2). Columns (1)–(3) presenting the results for the individual's share of housework and (4)–(6) presenting the results for the individual's share of paid work; columns (1) and (4) present the results for all; columns (2) and (5) (columns (3) and (6)) present the results for husbands (wives). The following covariates are included in the regression but excluded from the table for brevity: dummy of married; dummy of children; the number of children; the age of the youngest child; marriage number, year and state fixed effects. I also include Husband and wife characteristics: age; age^2; dummies for the race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess years of education, where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}); $1\{E^{sp} - E^{own} > 4\}$ is a dummy equal to one if the spouse's relative education is more than four years; $1\{E^{sp} - E^{own} > 0\}$ is a dummy equal to one if the spouse is relatively more educated; $1\{E^{sp} - E^{own} < -4\}$ is a dummy equal to one if the spouse's relative education is less than four years. The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation; I is the number of unique individuals. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

Table A.5: Effect of Changes in Spouse's Relative Education on Own Share of Time Allocation: Mean Education Wage

	(1)	(2)	(3)	(4)	(5)	(6)
	Housework Hours per Week			**Paid Work Hours per Week**		
	All	Husbands	Wives	All	Husbands	Wives
$DMEW$	0.0296*	0.0441**	-0.0024	-0.0580***	-0.0823***	0.0127
	(0.0152)	(0.0183)	(0.0239)	(0.0217)	(0.0279)	(0.0346)
N	181,030	90,515	90,515	104,498	52,249	52,249
I	26,476	13,304	13,172	19,567	9,819	9,748

Note. Effect of the spouse's relative education on the individual's share of time allocation estimated by equation (2). Columns (1)–(3) presenting the results for the individual's share of housework and (4)–(6) presenting the results for the individual's share of paid work; columns (1) and (4) present the results for all; columns (2) and (5) (columns (3) and (6)) present the results for husbands (wives). The following covariates are included in the regression but excluded from the table for brevity: dummy of married; dummy of children; the number of children; the age of the youngest child; marriage number, year and state fixed effects. I also include Husband and wife characteristics: age; age^2; dummies for the race/ethnicity (Hispanic and black). $DMEW = MEW(E_{it}^{sp}, f) - MEW(E_i^{own}, m)$ is the spouse's excess of $MEW(E)$, where MEW represents the average log of wage for a given years of education and gender. The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation; I is the number of unique individuals. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

Table A.6: Effect of Changes in Spouse's Relative Education on Own Share of Time Allocation: Education Level

	(1) All	(2) Husbands	(3) Wives	(4) All	(5) Husbands	(6) Wives
Panel A: Housework Hours per Week						
$E^{sp} - E^{own}$	0.00833*	0.0138**	0.000730			
	(0.00453)	(0.00579)	(0.00648)			
$SpouseAsEduc$				0.0228**	0.0275*	0.0173
				(0.0107)	(0.0147)	(0.0146)
N	181,030	90,515	90,515	181,030	90,515	90,515
I	26,476	13,304	13,172	26,476	13,304	13,172
Panel B: Paid Work Hours per Week						
$E^{sp} - E^{own}$	-0.0125*	-0.0175*	0.000254			
	(0.00652)	(0.00906)	(0.00943)			
$SpouseAsEduc$				-0.0185	-0.0160	-0.00524
				(0.0142)	(0.0197)	(0.0192)
N	104,498	52,249	52,249	104,498	52,249	52,249
I	19,567	9,819	9,748	19,567	9,819	9,748

Note. Effect of the spouse's relative education on the individual's share of time allocation estimated by equation (2). Panel A presents the results for housework, while Panel B presents the results for paid work. Columns (1) and (4) present the results for all; columns (2) and (5) (columns (3) and (6)) present the results for husbands (wives). The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if the head's couple status is that it has a wife); children dummy; number of children; age of the youngest child; marriage number, year and state fixed effects. I also include husband and wife characteristics: age; age^2; dummies for race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess education, where E represents the educational attainment/education level achieved by the individual (E^{own}) and their spouse (E^{sp}); $SpouseAsEduc$ is a dummy equal to one if the spouse's educational attainment is as or higher than of the individual ($E^{sp}_{it} - E^{own}_{i} \geq 0$). The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation; I is the number of unique individuals. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

Table A.7: Summary Statistics: Above Mean Time Allocation

	Above Mean Time Allocation		
	(1)	(2)	(3)
	All	Husband	Wife
Housework Hours per Week	0.36	0.39	0.34
	(0.48)	(0.49)	(0.47)
N	181,030	181,030	181,030
Paid Work Hours per Week	0.57	0.47	0.67
	(0.49)	(0.50)	(0.47)
N	104,498	104,498	104,498

Note. This table contains sample means with standard deviations in parentheses of doing above mean time allocation. The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. The sample includes those with time allocation, either housework or paid work; the household total time allocation is positive, and education is available for both spouses. N is the number observations.

Table A.8: Effect of Changes in Spouse's Relative Education on Above Mean Time Allocation

	(1) All	(2) Husbands	(3) Wives	(4) All	(5) Husbands	(6) Wives
Panel A: Own Above Mean Housework Hours per Week						
$E^{sp} - E^{own}$	0.0083**	0.0132**	0.0032			
	(0.0042)	(0.0063)	(0.0054)			
SpouseAsEduc				0.0137	0.0246	0.0001
				(0.0191)	(0.0301)	(0.0227)
Panel B: Spouse Above Mean Housework Hours per Week						
$E^{sp} - E^{own}$	-0.0053	-0.0101*	-0.0001			
	(0.0046)	(0.0060)	(0.0065)			
SpouseAsEduc				-0.0540***	-0.0428*	-0.0578**
				(0.0191)	(0.0245)	(0.0275)
N	181,030	90,515	90,515	181,030	90,515	90,515
I	26,476	13,304	13,172	26,476	13,304	13,172
Panel C: Own Above Mean Paid Work Hours per Week						
$E^{sp} - E^{own}$	-0.0046	0.0015	-0.0067			
	(0.0057)	(0.0081)	(0.0075)			
SpouseAsEduc				-0.0438*	-0.0193	-0.0493*
				(0.0225)	(0.0330)	(0.0296)
Panel D: Spouse Above Mean Paid Work Hours per Week						
$E^{sp} - E^{own}$	0.0084	0.0186**	-0.0062			
	(0.0065)	(0.0093)	(0.0088)			
SpouseAsEduc				0.0500*	0.0660	0.0210
				(0.0288)	(0.0412)	(0.0390)
N	104,498	52,249	52249	104,498	52,249	52,249
I	19,567	9,819	9,748	19,567	9,819	9,748

Note. Effect of the spouse's relative education on the probability of above mean time allocation estimated by equation (2). Panel A (Panel B) presents the results for the individual's (spouse's) housework hours per week, while Panel C (Panel D) presents the results for the individual's (spouse's) paid work hours per week. Columns (1) and (4) present the results for all; columns (2) and (5) (columns (3) and (6)) present the results for husbands (wives). The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if the head's couple status is that it has a wife); children dummy; number of children; age of the youngest child; marriage number, year and state fixed effects. I also include husband and wife characteristics: age; age^2; dummies for race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess years of education, where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}); *SpouseAsEduc* is a dummy equal to one if the spouse's highest year of education is as or higher than of the individual ($E_{it}^{sp} - E_{i}^{own} \geq 0$). The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation; I is the number of unique individuals. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

Table A.9: Spouses' Education Difference Association with Previous Marriage Share of Time Allocation's Time Trend

	$E_{w,m} - E_{w,m-1}$	
	(1)	(2)
	Housework Hours per Week	**Paid Work Hours per Week**
$\widehat{\beta_{i,m-1}}$	0.2603	1.3198*
	(0.6241)	(0.7709)
N	1,577	894

Note. Association between the spouses' education difference and the previous marriage's time trend coefficient. The coefficients are estimated based on equation (7). Column (1) presents the results for the individual's share of housework, while column (2) presents the results for the individual's share of paid work. $\widehat{\beta_{i,m-1}}$ is the time trend coefficient of previous marriage estimated in as in equation (6). No other covariates are included. Bootstrapped standard errors are replicated 1,000 times. *p<0.10, **p<0.05, ***p<0.010.

Table A.10: OLS Estimation of the Effect of the Spouse's Relative Education on Own Average Time Allocation While Single

	(1)	(2)
	Housework Hours per Week	**Paid Work Hours per Week**
Panel A: Spouse's Education		
$E^{sp} - E^{own}$	-0.0280	-0.1314
	(0.0553)	(0.1168)
Panel B: Spouse As or More Educated		
$SpouseAsEduc$	-0.1420	-0.0362
	(0.2463)	(0.5112)
N	49,230	37,916

Note. The spouse's relative education association with individual's average time allocation when single, estimated by the OLS version of equation (2). Column (1) presents the results for the individual's average of housework hours per week, while column (2) presents the results for the individual's average of paid work hours per week. The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if the head's couple status is that it has a wife); children dummy; number of children; age of the youngest child; marriage number, year and state fixed effects. I also include husband and wife characteristics: age; age^2; dummies for race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess years of education, where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}); $SpouseAsEduc$ is a dummy equal to one if the spouse's highest year of education is as or higher than of the individual ($E^{sp}_{it} - E^{own}_{i} \geq 0$). The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

Table A.11: OLS Estimation of the Effect of the Spouse's Relative Education on Own Share of Time Allocation: No Remarry and Remarry with First Spouse

	(1)	(2)	(3)
	No Remarriage	Remarriage – First Spouse	p-Value
Panel A: Housework Hours per Week			
1. Spouse's Education			
$E^{sp} - E^{own}$	0.0009	0.0043	0.4221
	(0.0010)	(0.0041)	
2. Spouse As or More Educated			
SpouseAsEduc	0.0110**	0.0143	0.8600
	(0.0049)	(0.0181)	
N	163,644	8,422	
Panel B: Paid Work Hours per Week			
1. Spouse's Education			
$E^{sp} - E^{own}$	-0.0082***	-0.0070**	0.7442
	(0.0009)	(0.0035)	
2. Spouse As or More Educated			
SpouseAsEduc	-0.0314***	-0.0320**	0.9693
	(0.0041)	(0.0158)	
N	96,682	3,782	

Note. The spouse's relative education association with individual's share time allocation, estimated by the OLS version of equation (2). Panel A presents the results for housework, while Panel B presents the results for paid work. Columns (1)–(2) presents the correlation for the two samples, while column (3) presents the p-value resulting from testing the null hypothesis that these two coefficients are equal. The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if the head's couple status is that it has a wife); children dummy; number of children; age of the youngest child; marriage number, year and state fixed effects. I also include husband and wife characteristics: age; age^2; dummies for race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess years of education, where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}); *SpouseAsEduc* is a dummy equal to one if the spouse's highest year of education is as or higher than of the individual ($E^{sp}_{it} - E^{own}_{i} \geq 0$). The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

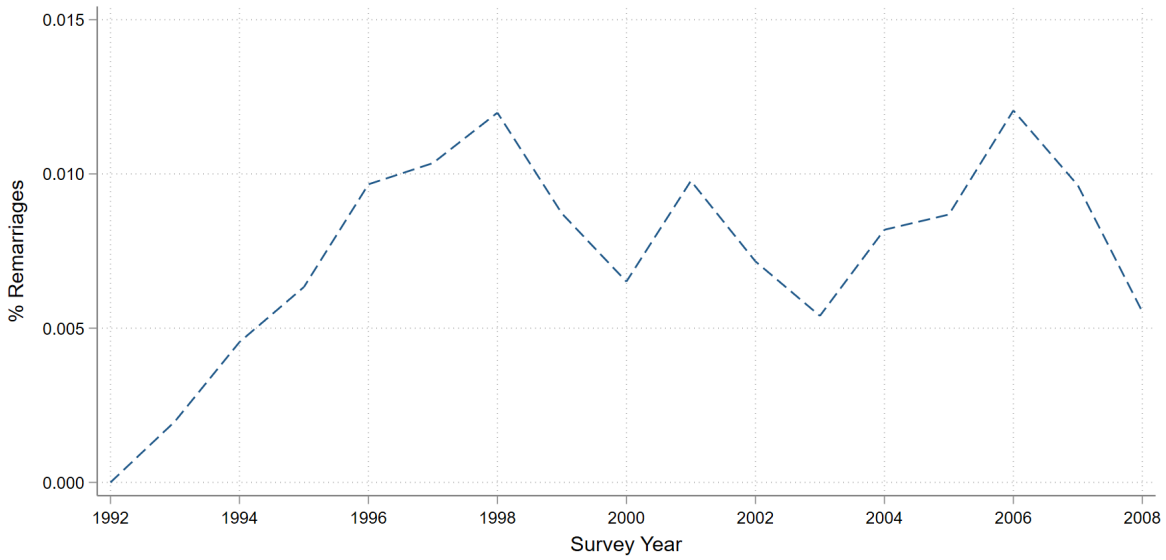
Table A.12: Effect of Changes in Spouse's Relative Education on Own Share of Time Allocation: Robustness Check Sample

	(1) All	(2) Husbands	(3) Wives	(4) All	(5) Husbands	(6) Wives
Panel A: Housework Hours per Week						
$E^{sp} - E^{own}$	0.0079**	0.0115***	0.0018			
	(0.0032)	(0.0039)	(0.0048)			
$SpouseMoreEduc$				0.0275*	0.0297	0.0162
				(0.0155)	(0.0187)	(0.0233)
N	130,908	65,454	65,454	130,908	65,454	65,454
I	18,191	9,081	9,110	18,191	9,081	9,110
Panel B: Paid Work Hours per Week						
$E^{sp} - E^{own}$	0.0001	0.0007	0.0015			
	(0.0047)	(0.0058)	(0.0080)			
$SpouseMoreEduc$				0.0076	0.0096	0.0100
				(0.0237)	(0.0317)	(0.0367)
N	69,024	34,512	34,512	69,024	34,512	34,512
I	12,780	6,375	6,405	12,780	6,375	6,405

Note. Effect of the spouse's relative education on the individual's share of time allocation estimated by equation (2). Panel A presents the results for housework, while Panel B presents the results for paid work. Columns (1) and (4) present the results for all; columns (2) and (5) (columns (3) and (6)) present the results for husbands (wives). The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if the head's couple status is that it has a wife); children dummy; number of children; age of the youngest child; marriage number, year and state fixed effects. I also include husband and wife characteristics: age; age^2; dummies for race/ethnicity (Hispanic and black). $E^{sp} - E^{own}$ is the spouse's excess years of education, where E represents the highest year of education achieved by the individual (E^{own}) and their spouse (E^{sp}); $SpouseAsEduc$ is a dummy equal to one if the spouse's highest year of education is as or higher than of the individual ($E^{sp}_{it} - E^{own}_{i} \geq 0$). The sample includes the period of 1985–2017 for housework and 1994–2017 for paid work. N is the number of observations in each estimation; I is the number of unique individuals. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

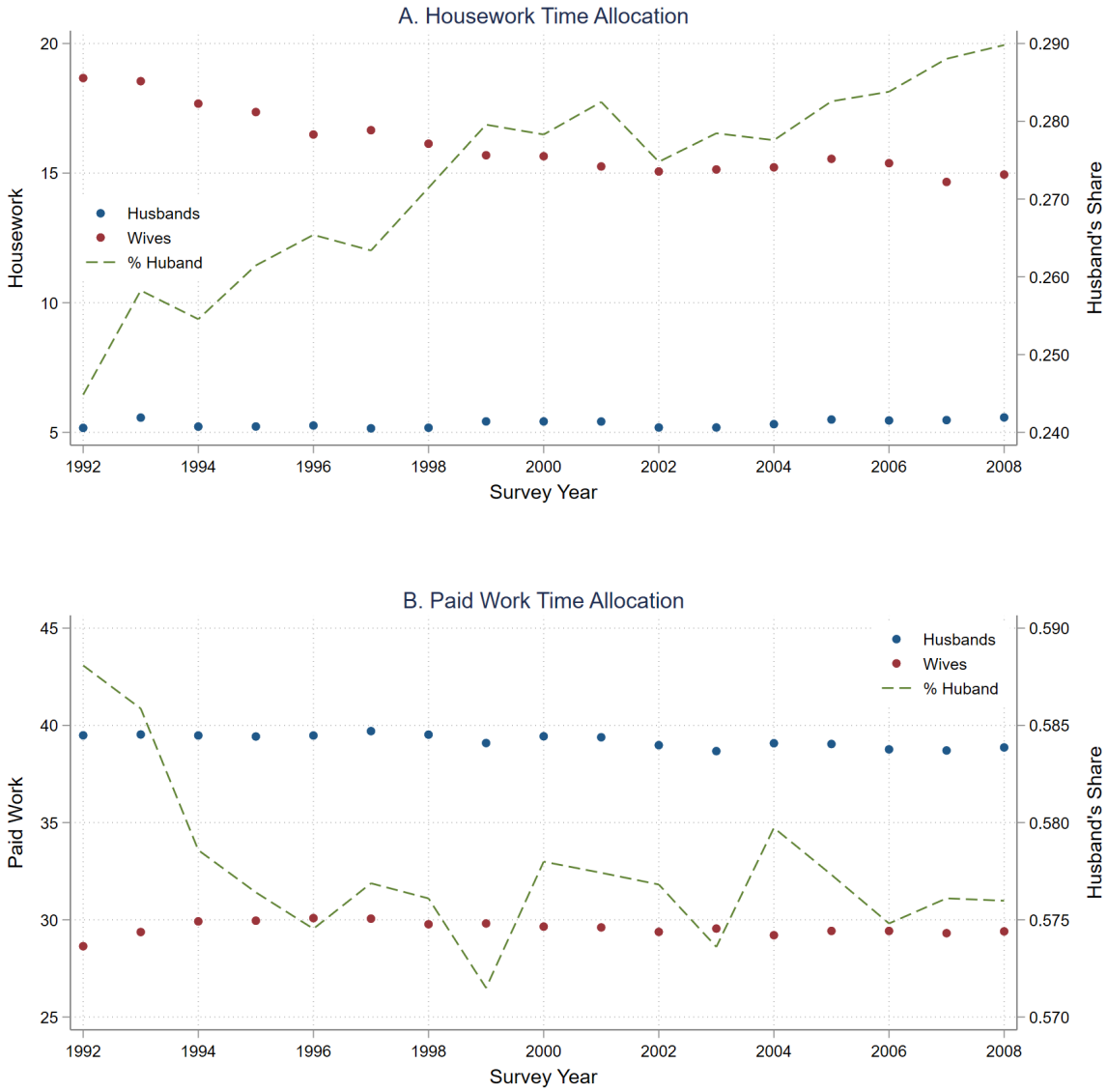
A.2 BHPS

Figure A.6: Percentage of Remarriages by Year



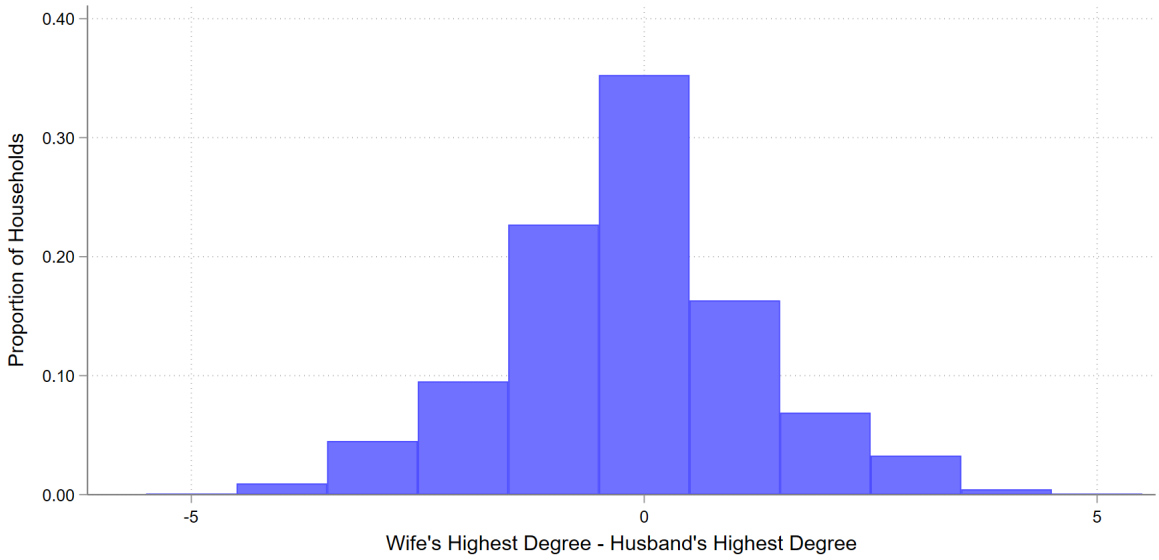
Note. This graph presents the percentage of remarriage, defined as when the individual has a new spouse in a given period compared with the previous one observed. The sample corresponds to the husbands and wives in the BHPS for 1992–2008. Since the data start at 1992, there are no remarriages that year; observations: N=(2,504; 2,526; 2,638; 2,684; 2,794; 3,188; 3,254; 4,474; 4,608; 5,320; 4,884; 4,816; 4,762; 4,722; 4,562; 4,466; 4,338)

Figure A.7: Households Housework and Paid Work Time Allocation by Year



Note. These graphs presents average hours per week allocated to housework and paid work by husband and wife at the household level. I include only households in which time allocation is available for both spouses. The sample corresponds to the households in the BHPS for 1992–2008. *Figure A* shows the average hours per week allocated to housework, for the 1985–2017 period; observations: N=(1,217; 1,230; 1,282; 1,300; 1,358; 1,548; 1,596; 2,176; 2,257; 2,576; 2,358; 2,319; 2,273; 2,314; 2,243; 2,200; 2,132). *Figure B* shows average hours per week allocated to paid work, for the 1994–2017 period; observations: N=(692; 709; 741; 783; 819; 953; 995; 1,364; 1,375; 1,644; 1,523; 1,491; 1,474; 1,430; 1,370; 1,371; 1,297)

Figure A.8: Distribution of Households by the Wife's Excess of Academic Qualification



Note. This graph present distribution of the households by the wife's relative education, measured as the measured as the wife's highest academic qualification minus the husband's highest academic qualification. The sample corresponds to the households in the BHPS for the 1992–2008 period. Observations: N= 33,270.

Table A.13: Distribution of Households by Type of Remarriage

		Wife's Remarriage		
		No	Yes	Total
Husband's Remarriage	No	32,753	248	33,001
	Yes	269	0	269
	N	33,022	248	33,270

Note. This table presents the distribution of households categorize based on the type, wife or husband, of remarriage. The sample corresponds to the households in BHPS for the period of 1992–2008. The sample includes those with time allocation, either housework or paid work; the household total time allocation is positive, and education is available for both spouses. N is the number of observations by column.

Table A.14: Effect of Changes in Spouse's Relative Education on Time Allocation for Husbands ans Wives: BHPS

	(1) Own	(2) Spouse	(3) %Own	(4) Own	(5) Spouse	(6) %Own
Panel A. Husbands						
1. Housework Hours per Week						
$E^{sp} - E^{own}$	0.0899	-1.3124***	0.0200**			
	(0.2594)	(0.5038)	(0.0097)			
$SpouseAsEduc$				-0.3835	-0.9118	0.0039
				(0.6993)	(1.4878)	(0.0277)
N	32,105	32,105	32,105	32,105	32,105	32,105
I	4,572	4,572	4,572	4,572	4,572	4,572
2. Paid Work Hours per Week						
$E^{sp} - E^{own}$	0.4563	1.5358**	-0.0095			
	(0.3615)	(0.7278)	(0.0078)			
$SpouseAsEduc$				0.2472	3.1723	-0.0309
				(0.6992)	(2.0024)	(0.0200)
N	19,847	19,847	19,847	19,847	19,847	19,847
I	3,507	3,507	3,507	3,507	3,507	3,507
Panel B. Wives						
1. Housework Hours per Week						
$E^{sp} - E^{own}$	-0.1543	-0.0507	0.0026			
	(0.4702)	(0.2438)	(0.0098)			
$SpouseAsEduc$				0.0209	-0.3950	0.0177
				(1.0992)	(0.7383)	(0.0301)
N	32,105	32,105	32,105	32,105	32,105	32,105
I	4,595	4,595	4,595	4,595	4,595	4,595
2. Paid Work Hours per Week						
$E^{sp} - E^{own}$	0.5896	-0.6430	0.0053			
	(0.5728)	(0.6549)	(0.0073)			
$SpouseAsEduc$				0.3036	-2.5141	0.0235
				(1.8743)	(2.2283)	(0.0253)
N	19,847	19,847	19,847	19,847	19,847	19,847
I	3,512	3,512	3,512	3,512	3,512	3,512

Note. Effect of the spouse's relative education on time allocation estimated by equation (2). Panel A presents the results for husbands, while Panel B presents the results for wives. Columns (1) and (4) (columns (2) and (5)) present the results for the individual's (spouse's) hours per week; columns (3) and (6) present the results for the individual's share of time allocation. The following covariates are included in the regression but excluded from the table for brevity: a married dummy (equal to one if marital status is married); age of the youngest child; number of children age 0–2, 3–4, 5–11, 12–15, 16–18; marriage number, year and region fixed effects. I also include husband and wife characteristics: age; age^2. The sample includes the period of 1992–2008. N is the number of observations in each estimation; I is the number of unique individuals. Robust standard errors clustered at the individual level are in parentheses. *p<0.10, **p<0.05, ***p<0.010.

A.3 ATUS

The ATUS is a yearly cross-sectional time use survey since 2003. The sample take as a base the households that completed their last month in the CPS. Since the ATUS aims to estimates at the national level, it decreases the sample from oversample states in the CPS. Then, based on demographics, a subsample of it is then chosen. From each household in this subsample, ATUS chooses one person (age 15 or older) from the household at random and collects data using a time diary method, meaning it records very detailed data concerning respondents' activities 24 hours before the interview.

I use the pooled ATUS[24] cross-sectional sample from 2003–2018, limited to couples where both the respondent and spouses/partners were between the ages of 18–65 and where the partners are of different sex. The couple can be either married or live in cohabitation. I also use the highest level of school completed to create a variable with the highest year of education, starting from zero.[25]

The empirical application using ATUS consists of estimating time allocated t_{ij} by household i for each activity j = (Household Activities, Paid Work, and Childcare).[26] In the sample, I includes the interviews both weekdays and weekends.[27]

Formally, I estimate

$$t_{ij} = \gamma_j EducRel_i + \beta_j^{'} X_i + \alpha_t + \alpha_r + \alpha_s + \epsilon_{ij}, \tag{8}$$

where X_i is the matrix of covariates on the household demographics: a dummy of cohabitation, data of children less than 18 years old and the number of children, age of the youngest child dummies, a dummy for metropolitan area, if they are of black or Hispanic origin, age and age square for both spouses, and if the time use diary was on a weekend or holiday. Year (α_t) and state (α_s) fixed effects are also included. The variable of interest, $EducRel$, is measured as in equation (3).

The estimation is computed by a simultaneous seemingly unrelated equations model (SUR) for working, housework, and childcare time allocation equations. I estimate the

[24]Hofferth *et al.* (2018)

[25]Precisely, the years of education are 0 = "less than 1st grade"; 4 = "1st, 2nd, 3rd, or 4th grade"; 6 = "5th or 6th grade"; 8 = "7th or 8th grade"; 9 = "9th grade"; 10 = "10th grade"; 11 = "11th grade"; 12 = ("12th grade, no diploma", "High school graduate, GED", "High school graduate, diploma") 13 = "some college but no degree,"14 = ("associate's degree, occupational vocational", "associate's degree, academic program"); 16 = "bachelor's degree (BA, AB, BS, etc.)"; 17 =("master's degree (MA, MS, MEng, MEd, MSW, etc.)", "professional school degree (MD, DDS, DVM, etc.)", "doctoral degree (PhD, EdD, etc.)").

[26]Childcare activities include the following: physical care, reading, playing (including sports), arts and crafts, talking/listening, helping/teaching, organizing and planning, supervising, attending events, waiting, picking up or dropping off, and travel-related to caring for or helping children. Household activities include the following: maintaining the household, like housecleaning, cooking, yard care, pet care, vehicle maintenance, and repair and home repair and renovation.

[27]Stewart (2013) discusses that if it is better to estimate weekday and weekends separately and make a case for these two subgroups to be related enough, separation is not necessary.

sample for both husbands and wives, as well as estimating separately.

Table A.15: Summary Statistics: ATUS

	(1) All	(2) Husbands	(3) Wives
Age	42.85	44.10	41.72
	(10.76)	(10.77)	(10.62)
Age of Spouse	42.94	41.97	43.81
	(10.76)	(10.67)	(10.76)
Household with Children < 18	0.68	0.67	0.68
	(0.47)	(0.47)	(0.46)
Number of Children < 18	1.32	1.31	1.33
	(1.20)	(1.20)	(1.19)
Age of Youngest Child	4.39	4.38	4.40
	(5.11)	(5.13)	(5.10)
Diary on a Weekend or Holiday	0.51	0.51	0.51
	(0.50)	(0.50)	(0.50)
Education	13.88	13.84	13.92
	(2.51)	(2.55)	(2.47)
Spouse Education	13.83	13.91	13.75
	(2.54)	(2.50)	(2.57)
$E^{sp} - E^{own}$	-0.06	0.07	-0.18
	2.09	2.10	2.08
Time Allocation (including zeros)			
Paid Work	197.43	250.04	149.68
	(256.52)	(276.30)	(226.81)
Household Activities	131.21	98.66	160.76
	(143.68)	(134.37)	(145.46)
Primary Childcare	56.60	39.51	72.12
	(100.69)	(82.52)	(112.49)
N	87,305	41,541	45,764

Note. This table presents the sample means with standard deviations in parentheses of the subsample are based on ATUS 2003–2018. N is the number of observations for the different samples.

Table A.16: Association of the Spouse's Relative Education with Time Allocation: ATUS

	(1) All	(2) Husbands	(3) Wives
Panel A: Housework Minutes per Day			
$E^{sp} - E^{own}$	1.139***	1.170***	2.538***
	(0.233)	(0.310)	(0.329)
Panel B: Paid Work Minutes per Day			
$E^{sp} - E^{own}$	-3.470***	-2.455***	-7.271***
	(0.366)	(0.552)	(0.456)
Panel C: Child Care Minutes per Day			
$E^{sp} - E^{own}$	-0.250*	0.143	0.638***
	(0.134)	(0.169)	(0.196)
N	87,305	41,541	45,764

Note. This table contains the main results of the SUR model estimation of the three variables using the ATUS database. The SUR model assumes normally distributed errors. The following covariates are included in the regression but excluded from the table for brevity: a dummy for cohabitation; dummy for children; number of children; dummies for children aged under 1, 1–2, 3–5, 6–12, and 13–17 years; dummy if they live in a metropolitan area; dummy for survey being on a weekend/holiday; dummy for season of survey; and year and state fixed effects. I also include Husband and wife characteristics: age; age^2; dummies for the race/ethnicity and ethnicity (Hispanic and black). N is the number of observations in each estimation. Standard errors are in parentheses. *p<0.10, **p<0.05, ***p<0.010.