Wealth Effects, Leisure Complementarity, and Spousal Labor Supply

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Abstract

In this paper, we document a novel empirical fact for earnings of married men and women: upon marriage, both men and women see a persistent decline in earnings, a pattern independent of childbirth as our primary analysis is restricted to couples with no children or those who have children later in marriage. The changes in earnings trends are attributable to a decrease in work hours and an increase in leisure activities post-marriage. Heterogeneous analyses on pre-marriage wealth groups suggest that leisure take-up is increasing in pre-marital wealth. We use a collective labor supply structural model to understand the importance of wealth effects of marriage and the complementarity of spouses' leisure hours in determining spousal joint labor supply decisions. Our model estimates suggest strong positive complementarity between spouses' leisure hours for both genders. Model exercises indicate that wealth effects play a key role in labor supply decisions at the extensive margin and complementarities in leisure lead to coordination of spouses' work hours. Our counterfactual analyses further suggest that differences in marriage rates could affect how aggregate shocks propagate to household labor supply behavior.

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1 Introduction

Marriage is a major life event that reshapes household decision-making, yet its implications for labor supply remain underexplored. While the literature has extensively studied joint labor supply choices within married households, less attention has been given to the transition itself: how individuals adjust their work and leisure as they move from being single to married. This transition matters because marriage not only redefines household status but also alters access to resources, perceptions of wealth, and the externalities of individual actions, such as how one spouse's choices affect the other. With marriage rates declining steadily across developed economies, understanding how marriage reshapes labor supply decisions has important implications for aggregate labor supply, consumption, and the effectiveness of policies such as tax incentives, subsidies, and transfers.

In this paper, we study how labor supply responds to marriages due to changes in household wealth and preferences for joint leisure. We document persistent earnings declines for both men and women after marriage, alongside reductions in work hours and increases in leisure. These findings cannot be explained by childbirth, as we see a stronger labor supply response to marriage for individuals who never have children or have children later on in life. To interpret these patterns, we develop and estimate a structural collective labor supply model in which marriage generates wealth effects and spouses exhibit preferences for coordinating leisure. Estimating the model on time-use survey data, we recover preference parameters for men and women and show that wealth effects alone cannot explain the labor supply responses to marriage, and that leisure complementarity is an important driver of post-marriage labor supply adjustments. Counterfactual analyses highlight that policies such as fiscal transfers or different compositions of household types (i.e. single versus married) affect aggregate labor supply in ways that depend critically on the presence of spousal leisure complementarities.

The paper proceeds in three steps: we first provide strong empirical evidence of earnings decline of married couples using administrative tax data. We compare earnings trajectories of couples who marry earlier versus later and estimate earnings dynamics around the marriage event. We find that relative to the later married group, both men and women experience a sharp decline in earnings trends immediately after marriage, and these declines persist for at least five years. We further find a sizable increase in the likelihood of reporting zero labor earnings for both men and women post-marriage. A decomposition of household earnings reductions reveals that while most couples experience a decline for only one spouse, about 11 percent of households see earnings fall for both partners. These findings are consistent with

both wealth effects, as resource pooling lowers the marginal returns to work, and leisure complementarity, as spouses may prefer cutting back work hours to spend time with one another. Furthermore, our heterogeneous analysis suggests that leisure take-up is increasing in pre-marriage wealth; wealthier individuals experience the largest labor supply and earnings response upon the marriage event. These results are not driven by childbirth: while we see earnings changes for men and women with children, such changes remain when restricting to couples who never have children or who have them much later in marriage. In separate exercises, we also examined earnings dynamics of married couples who have no children or have children later in the U.S. and in Korea using the National Longitudinal Surveys of Youth 1997 (NLSY97) and the Korean survey organized by Kim, Tertilt, and Yum (2024) and find similar patterns. This suggests that labor supply and earnings responses to marriage extends beyond a specific cultural context.

Next, we use time-use survey data to understand how work hours respond to marriage. We estimate leisure hours from self-reported work and chore hours. Using a difference-in-differences framework comparing earlier and later married individuals, we find that leisure rises significantly after marriage, particularly for men. Heterogeneity analysis again suggests that individuals with higher pre-marriage earnings experience the largest post-marriage declines in work hours and the largest increase in leisure hours, consistent with our finding using earnings data. On average, women see an increase in chore hours post-marriage, while men see an increase in estimated leisure hours. Together, these findings suggest two important conclusions: (i) on average, spouses decrease their labor supply following marriage, both extensively and intensively, which contributes to the decline in earnings we observe, and (ii) spouses coordinate on the number of work hours post-marriage, which indicate preferences for joint leisure.

Lastly, to interpret these empirical findings, we build a collective labor supply model. In the model, individuals choose work hours from a discrete set when single. After marriage, spouses jointly choose a combination of labor supply choices, accounting for both economies of scale in consumption and leisure complementarities. Before marriage, utility depends on one's own consumption and leisure; afterward, leisure utility becomes a function of the spouse's leisure hours and the differences in the two spouses' leisure levels. This allows for coordination of number of work hours (and thus non-work hours) between partners. We estimate the model using maximum likelihood on the time-use data, recovering gender-specific preference parameters and household utility weights. The structural estimates confirm that both wealth effects and leisure complementarities play a central role in post-marriage labor supply choices. Using the model, we conduct counterfactual exercises to examine policy and aggregate implications. We show that unconditional fiscal transfers, such as rebates or con-

sumption vouchers, reduce household labor supply, but more so for single than for married households, as lump-sum transfers contribute to a smaller increase consumption utility for married couples. We also show that low marriage rates in an economy correspond to larger decline in labor supply when faced with negative aggregate shocks. These results highlight the importance of modeling spousal coordination in labor supply for understanding aggregate labor market dynamics.

Our findings from the administrative tax data on earnings, survey-based time-use analysis, and structural estimation consistently point to the same story: marriage reshapes household labor supply through wealth effects and a strong preference for shared leisure. These dynamics matter both for understanding individual labor supply behavior, as well as for evaluating policies and effects of aggregate shocks that interact with household structure.

Literature and Contribution. Most existing work on work and family emphasizes the "child penalty" or the "mommy penalty."[1] By contrast, fewer studies examine marriage itself. Bertrand, Kamenica, and Pan (2015) finds that married couples exhibit an aversion to the wife out-earning the husband, likely due to gender identity norms. Consistent with their work, in concurrent work, Herold and Wallossek (2025) document a widening earnings gap between couples upon marriage and such a gap exists even after accounting for children effects. We show persistent post-marriage earnings *declines for both genders* relative to later married individuals using Taiwanese administrative data and NLSY97. To the best of our knowledge, this is the first paper to document these effects for both genders. Further, we are the first to explore the mechanisms through which earnings and labor supply respond to marriage through a simple collective labor supply framework.

Our framework builds on collective labor supply models such as Blundell et al. (2007), who model discrete choices with hours censoring and non-participation, and Michaud and Vermeulen (2011), who estimate Pareto weights using panel data on couples and widow(er)s. Both papers show that leisure complementarities matter in spousal labor supply. While these earlier structural models have considered spousal leisure complementarity, we are the first to disentangle the roles of consumption and leisure preferences in shaping couples' joint labor supply decisions in the context of individuals transitioning into marriages. On average, individuals marry before their earnings peak, and hence the sharp break in earnings trends we document points to behavioral responses to marriage rather than life-cycle dynamics. Our findings also speak to those of Calvo, Lindenlaub, and Reynoso (2024), where the authors find that spouses' home hours are complements.

[1] See, e.g., Kleven, Landais, and Søgaard (2021), Andresen and Nix (2022), Casarico and Lattanzio (2023), Cortés and Pan (2023), Kleven, Landais, and Leite-Mariante (2025).

This work also relates to the literature on time allocation. We document that, post-marriage, individuals reduce work hours, increase chore hours, and increase leisure. Aguiar and Hurst (2016) show that market hours decline later in life and that leisure rises after age 50, based on ATUS and CPS data. In contrast, we find that men and women in their prime age cut work hours immediately after marriage, suggesting again a behavioral shift linked to the marriage event rather than aging or life-cycle trends. A further strand of research highlights growing inequality in leisure across groups. Aguiar and Hurst (2007) show that between 1965 and 2003, U.S. men gained 6 to 9 weekly leisure hours and women 4 to 8, with rising dispersion across individuals. Attanasio, Hurst, and Pistaferri (2015) and Boppart and Ngai (2021) show that higher-income or higher-educated households experience smaller leisure increases, while Aguiar, Bils, et al. (2021) find that new leisure technologies reduce work for young men in particular. We add to this literature by showing that leisure take-up after marriage is increasing in pre-marriage wealth. High-wealth individuals reduce work hours most, while gender differences emerge: men gain leisure, while women experience little change in leisure but more chore hours.

Finally, our work connects to the literature on marital status and labor supply. Classic theories, such as Becker (1981), emphasize specialization of home and market production by comparative advantage of spouses. We find that in about 11% of households both spouses reduce labor supply after marriage, suggesting forces beyond specialization. Goldin and Katz (2011) and Goldin (2014) find that temporal flexibility, social and gender norms, and childbearing itself are key to explaining female labor supply choices post marriage and the gender pay gap we still observe today. Earlier sociology studies (e.g., Waite (1995), Pollmann-Schult (2011)) even found positive marriage effects for men. Our results differ in that we find earnings declines for both men and women, even without children, consistent with couples jointly making household decisions and adjusting labor supply.

Our findings matter for how policymakers design labor market and family policies. Marriage, even in the absence of children, generates sizable reductions in earnings and market production, suggesting that tax incentives, transfer programs, and subsidies may interact with household types and generate different aggregate effects with different household compositions in the economy. Policies aimed at supporting households or incentivizing certain household behaviors must consider how marriage itself reshapes work and leisure incentives, or risk misunderstanding the effects and efficiencies of interventions.

The rest of this paper is constructed as follows: In Section 2, we describe the labor market characteristics, cultural and gender norms of Taiwan, as well as the dataset used for analyses. Section 3 contains our empirical analysis setup, followed by results from our event

study framework. We also report results from heterogeneity analyses and robustness checks. Section 4 discusses potential mechanisms through which marriage reshapes labor supply decisions. Section 5 contains a model of collective labor supply, followed by the estimation of preference parameters of households. We then discuss the implications of the model, as well as perform counterfactual exercises using the model. Section 6 concludes.

2 Institutional Background and Datasets

2.1 Labor Market Participation in Taiwan

To contextualize our analysis of marriage and labor supply, it is useful to first describe key features of the Taiwanese labor market. Figure 1 plots labor force participation rates by gender between 1980 and 2024.[2] Over this period, women's participation has steadily increased while men's has gradually declined. Among never-married individuals, both genders show similar trends, but married men exhibit a more pronounced decline. These patterns mirror those observed in many developed economies.

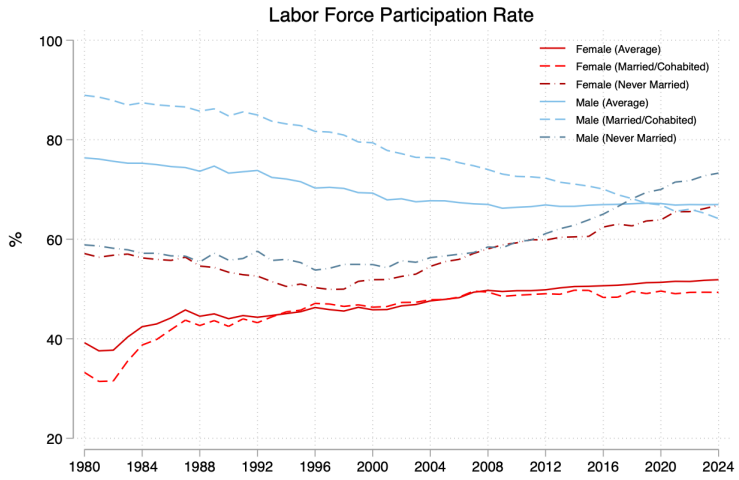


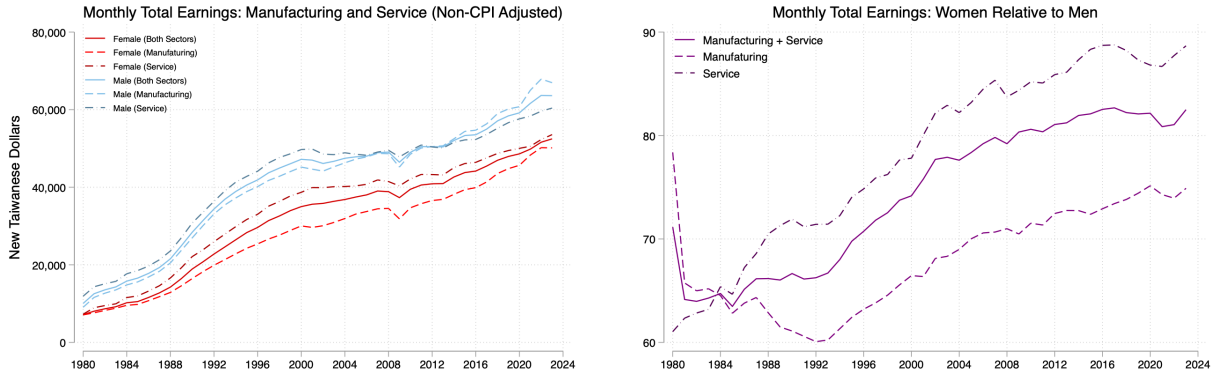
Figure 1: Labor Force Participation Rate (1980-2024)

Figures 2(a) and 2(b) present average monthly earnings by year, gender, and sector, and women's earnings as a share of men's earnings, respectively[3] Women's relative earn-

[2]Data source: National Statistics of Taiwan (https://eng.stat.gov.tw/cp.aspx?n=2435). The official definitions are standard and described in Appendix A.

[3]Data source: National Statistics of Taiwan (https://eng.stat.gov.tw/Point.aspx?sid=t.4&n=4203&sms=11713).

ings have risen consistently over time, with similar improvements across the service and the manufacturing sectors, suggesting narrowing gender pay gaps. Complementing these patterns, Taiwan ranks among the most gender-equal countries globally: according to the 2021 United Nations Development Programme (UNDP) Gender Inequality Index, Taiwan ranked 7th worldwide and 1st in Asia, outperforming several advanced economies such as Iceland and Germany. These conditions make Taiwan a relevant setting for studying marriage and labor supply, with insights that may be generalize to other developed economies with similar institutional and cultural contexts.



(a) Earnings by Sectors

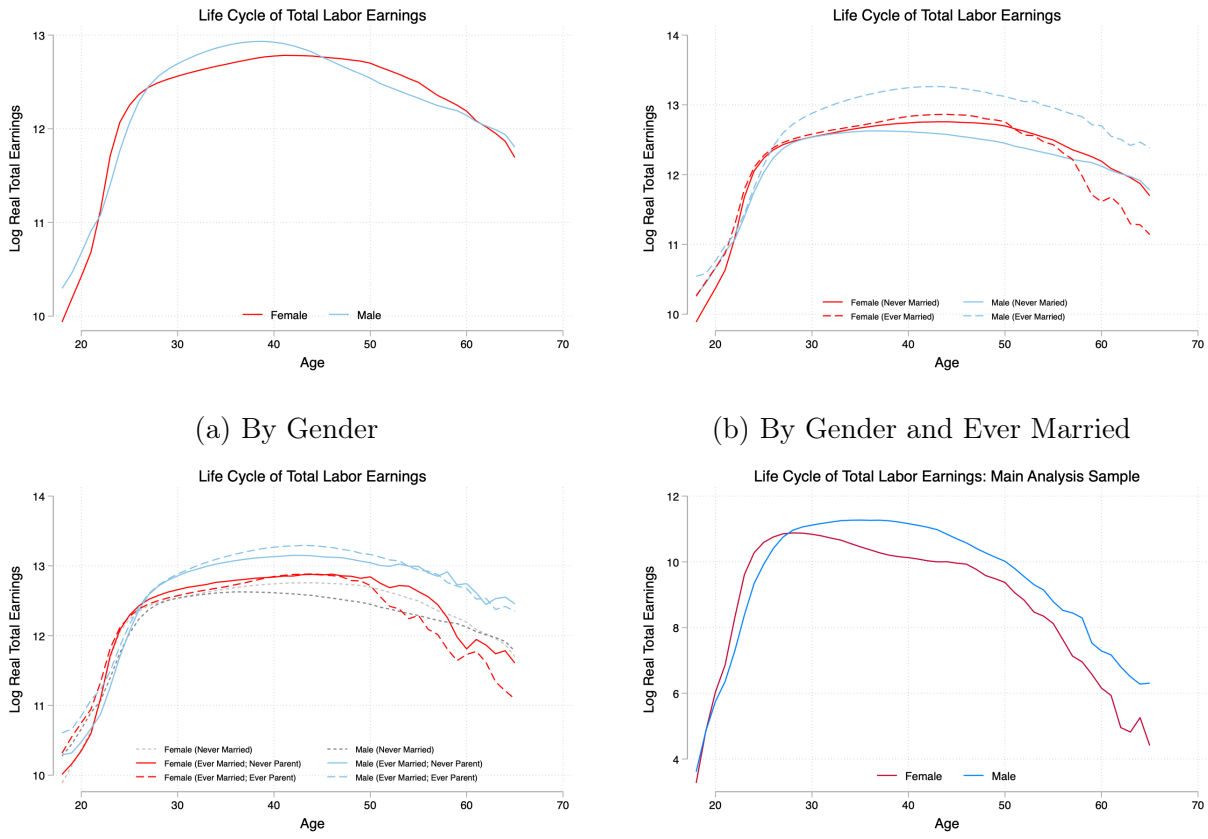
(b) Women's Earnings as a Fraction of Men's

Figure 2: Average Monthly Earnings (1980-2024)

Understanding earnings dynamics over the life cycle is also important for interpreting changes around marriage. As shown in Figure 3(a), both men and women reach peak labor earnings around age 40. When we separate individuals by marital status (Figure 3(b)), married individuals reach their earnings peaks slightly later than unmarried ones. Figure 3(c) shows that among married individuals, those without children have similar life-cycle earnings profiles as those with children, though levels differ. Our analytic sample focuses on individuals who never have children or have children at least four years after marriage (Figure 3(d)). On average, these individuals marry around age 30. Given that marriage typically occurs before the peak of the earnings life cycle, observed declines in earnings after marriage are unlikely to reflect age-related changes in productivity, suggesting that marriage itself alters household labor supply decisions.

2.2 Datasets from the Fiscal Information Agency of Taiwan

Our main empirical analysis uses administrative data from the Fiscal Information Agency (FIA) of Taiwan's Ministry of Finance. The data combines two primary sources: (1) registra-



(a) By Gender

(b) By Gender and Ever Married

(c) By Gender, Ever Married, and Ever Parent

(d) Main Sample, By Gender

Figure 3: Total Labor Earnings Life Cycle

tion records containing demographic information such as birth dates, marriage and divorce dates, and spouse identifiers; and (2) individual income tax filings, which report detailed income components including labor earnings, business income, and capital income. We focus on total annual labor earnings in our main analysis and consider other income sources in robustness checks.

We construct a panel spanning 2008–2020. The sample includes individuals who married between 2008 and 2017, were married only once, and never divorced. With these restrictions, we obtain a balanced panel with roughly 1.7 million individuals per year (around 860,000 couples). To understand how household labor supply responds to marriage without the confounding effects of children, following previous studies, we focus on couples who don't have children prior to the four year after their marriage. This sample includes couples who never have children and couples who have children later in their marriage. This leads us to around 22.2% of the panel (roughly 178,900 couples), of which around half are those who never have children.

The richness of the data from FIA allows us to push our analyses further. In addition to the individual level data, we also accessed firm-level tax records. We link individuals to their main employers, defined as the employer providing the highest pay in a given year, to construct a matched employer-employee panel. This allows us to analyze whether post-marriage labor supply adjustments differ by pre-marriage employer characteristics, such as industry, firm size, and firm quality.

2.3 Panel Study of Family Dynamics

While the FIA data provides complete coverage of income and demographic records, they lack information on time use. To study changes in work, chores, and leisure directly, we complement the administrative data with the Panel Study of Family Dynamics (PSFD), a nationally representative longitudinal survey conducted by Academia Sinica since 1999. The PSFD collects detailed information on respondents' employment, family structure, and time allocation. Surveys were conducted annually through 2012 and biennially thereafter.

For comparability with the administrative sample, we restrict attention to respondents married between 2008 and 2017 who were married once and never divorced. We construct event time relative to the reported marriage year. Owing to the differences in the set of questions in the survey between earlier and later waves, we limit analysis to waves conducted from 2008 onward to have important demographic characteristics and information on time use included in our analysis. In our regression analyses, we focus on the main respondent (rather than their spouse) to trace pre- and post-marriage changes consistently, since spouse information is only included post-marriage. Table 1 summarizes the number of respondents by survey year and marriage cohort.

We use the PSFD to analyze changes in self-reported work hours and chore hours. We estimate leisure hours by equating that to the residual of total weekly hours (168 less 8 hours of sleep per day) subtracted by weekly work and chore hours. A subsample of respondents, including those not working in certain years, for whom we impute latent wages, is used in our structural model estimation to recover preferences over consumption and leisure. Details of this subsample and the imputation process are provided in Section 5.2.1.

Survey	# Observation		
Year	Male	Female	Total
2008	18	32	50
2009	74	106	180
2010	66	100	166
2011	57	98	155
2012	69	103	172
2014	65	96	161
2016	69	100	169
2018	92	121	213
2020	80	99	179
Total	590	855	1,445

(a) Observations by Survey Year

Marriage	# Observation		
Year	Male	Female	Total
2008	51	40	91
2009	32	76	108
2010	27	89	116
2011	110	74	184
2012	46	38	84
2013	61	127	188
2014	61	93	154
2015	37	124	161
2016	74	85	159
2017	121	166	287
Total	590	855	1,445

(b) Observations by Marriage Year

Table 1: Number of Households by Respondent Gender

3 Empirical Analysis and Results

3.1 Earnings Profiles Against Marriage Time

3.1.1 Earnings Trends

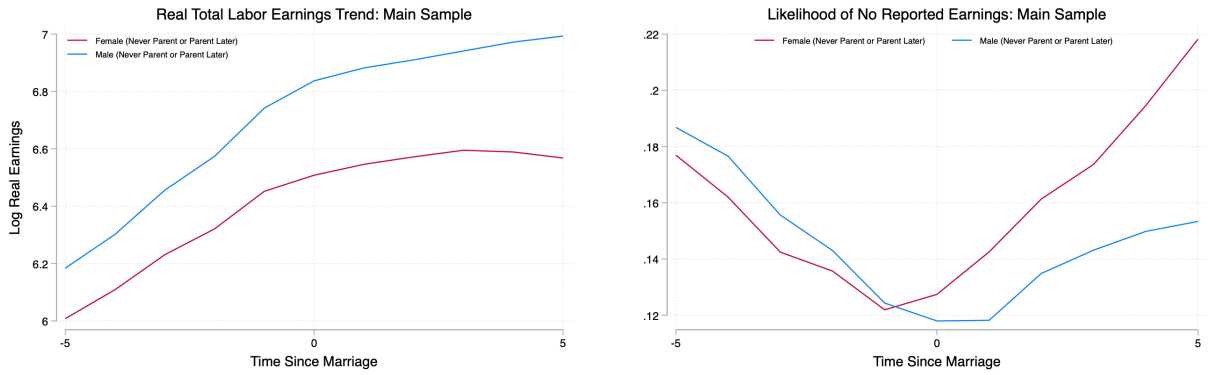
We begin by examining earnings trajectories around marriage, separately for men and women. The sample includes individuals who married between 2008 and 2017 and either (1) never had children or (2) had children only after the fourth year of marriage.[4] Figure 4(a) plots the raw trends of log of real earnings against years since marriage, and Figure 4(b) shows similarly for the probability of reporting zero labor earnings.

Panel 4(a) reveals a distinct break in log earnings at the year of marriage for both genders, with a sharper change for women, conditional on being employed. These raw trends suggest that (1) changes in earnings trends happen at the timing of marriage, and (2) such changes

[4]To see earnings trends for all married individual, and by whether couples have children, see additional empirical results in Appendix A.5. For married couples with children before $t+3$, we see earnings trend changes for both gender, though the magnitude is smaller than our main sample. This ensures us that couples with no children prior to $t+3$ do not behave drastically different from those who have children earlier.

are persistent over time. Comparing men and women to their pre-marriage trends, earnings growth rate for men pre-marriage is roughly 60% between $t-5$ and $t-1$, while women have around a 45% growth over the same horizon. Post-marriage, men sees a much smaller growth, averaging to about 16% between t and $t+5$. Women see a increase of around 6% post-marriage.

Because individuals with very low or no labor earnings do not file income taxes, these cases are recorded as zeros in the administrative data. Figure 4(b) shows that the likelihood of having no reported labor earnings increases for both men and women after marriage, suggesting that reduced participation at the extensive margin contribute to the observed earnings changes. Leading up to the marriage year, we observe a clear decline in the likelihood of exits for both men and women. These declining trends change post-marriage; both men and women see an increasing likelihood of exits post marriage; five years post-marriage, compared to their likelihood of exiting at year t, men and women are roughly 9% and 4% more likely to exit the labor market.



(a) Real Total Labor Earnings

(b) Likelihood of No Reported Earnings

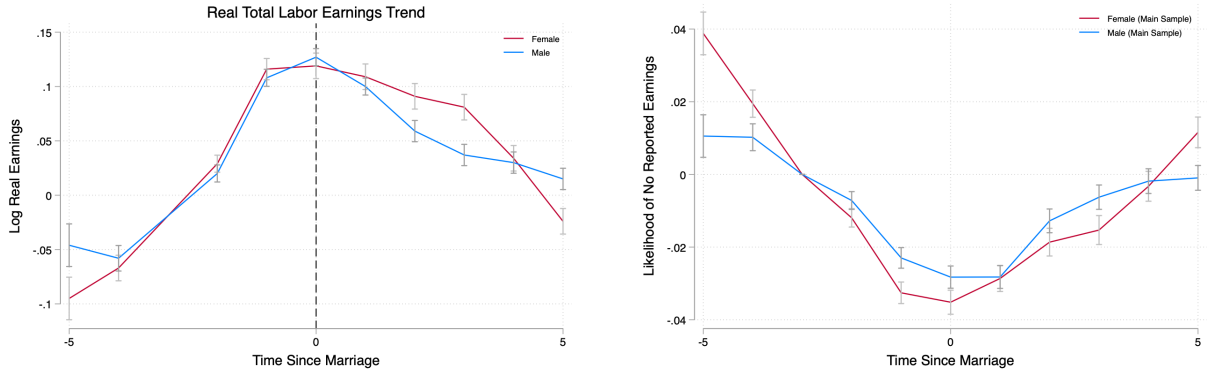
Figure 4: Earnings Paths & Likelihood of No Reported Earnings

To rule out confounding effects of age or individual unobserved heterogeneity, Figures 5(a) and 5(b) present results controlling for age and individual fixed effects by estimating the following regression:

$$Y_i^s = \alpha_i^s + \text{Age}_i^s + \sum_{k=-5}^{5} \gamma_k^s + \epsilon_i^s \tag{1}$$

where Y is log of real earnings (conditioning on employment) or the likelihood of reporting no labor earnings. The superscript $s \in \{f, m\}$ indicates the sex of the individuals, subscript

i indicates individual, and subscript t indicates time. We use $t-3$ as the base year and hence all coefficients are relative to the $t-3$ level. We run this regression separately for women and men. α_i^s is the individual fixed effect, and Age_i indicate age fixed effect. k $= 0$ denotes the marriage year; we plot γ_k^s coefficients in Figure 5. The patterns remain robust, indicating that the discontinuities in earnings are not driven by age or individual time-invariant unobserved characteristics. Different from the raw trends without accounting for age and individual effects, in Figure 5(a), one can see that post-marriage, both men and women now sees a persistent *decline* in earnings.



(a) Real Total Labor Earnings (b) Likelihood of No Reported Labor Earnings

Figure 5: Earnings Paths & Likelihood of No Reported Labor Earnings

3.1.2 Event Studies with Comparison Groups

Because marriage is an endogenous choice, estimating its causal effect on earnings is challenging. Individuals who marry may differ systematically from those who remain always single. To get a better understanding of labor supply response to marriage, we construct comparison groups of later-treated individuals, i.e. those within the same analysis sample who marry four or more years after the focal marriage year. We also perform robustness checks using propensity score–matched samples (discussed in Section 3.4) and explore pre-marital heterogeneity in Section 3.3.

We set up an event study analysis framework, using similar notation to Equation 1, to understand how earnings change surrounding the year of marriage. For each given event year (marriage year) t, we use individuals who are in our ever-married sample, but married in years *after* $t+3$ as the comparison group, where $t=0$ is the marriage year[5]. We stack all

[5]In a robustness exercise, we use *both* early-treated (individuals married before $t-3$) and later-treated individuals as the comparison group. The results show similar patterns to our main analysis.

"treatment" and comparison samples of each marriage year to run the event study regressions. The event study regression can be formally written as the following:

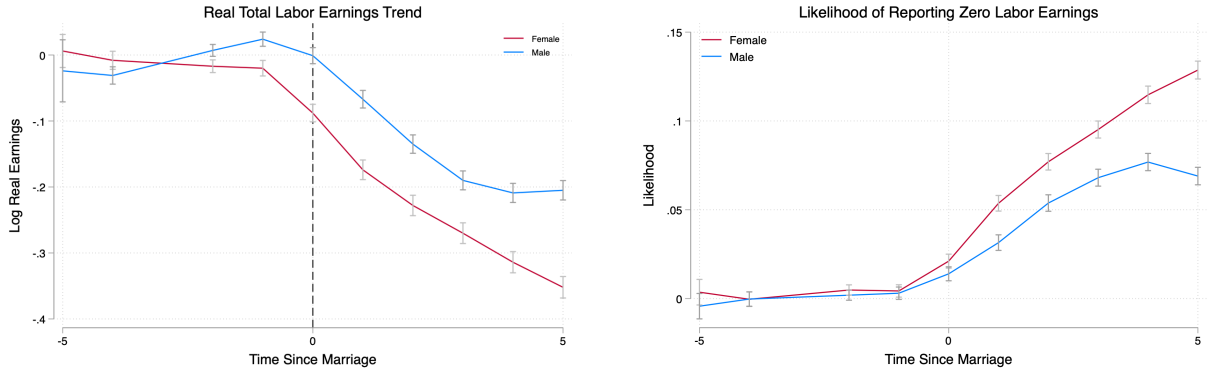
$$Y_i^s = \alpha_i^s + \text{Age}_i^s + \sum_{k=-5}^{5} \gamma_k^s + \sum_{k=-5}^{5} \delta_k^s D_i^k + \epsilon_i^s \tag{2}$$

where Y again indicates the outcome variables log of real earnings conditional on employed and the likelihood of reporting zero labor earnings. Superscript $s \in \{f, m\}$ again indicates the sex of the individuals, subscript i indicates individual, and subscript t indicates time. The D_i^k are dummy variables equal to 1 in the individual's kth year before or after their marriage year, and zero otherwise, where k = 0 denotes the marriage year. As an example, if the individual is married in 2010, D_i^5 would equal to 1 for $t = 2015$ and zero for all other years. α_i^s is again the individual fixed effect, and Age_i the age fixed effect. Note that by construction, the comparison group for each marriage-year regression have the D_i^k set to zero for all t.

γ_k^s are "placebo" marriage years for not-yet-treated individuals. Conceptually, for each marriage year cohort j, we assign all individuals married after $j+3$ a "placebo" marriage year j, and include them in the event study regression with all D_i^k set to zero. This design help us control for the main effects in event time, which help address problematic comparisons discussed in the recent literature in staggered adoption of treatment settings (e.g. Sun and Abraham (2021); Callaway and Sant'Anna (2021); Goodman-Bacon (2021)). In robustness checks, we use the estimator developed by Sun and Abraham (2021); results are largely consistent with findings from our baseline set-up.

Figure 6 reports the estimated coefficients. Relative to the later-treated comparison group, both men and women experience statistically significant and persistent earnings declines after marriage, as well as statistically significant and sizable increase in the likelihood of reporting zero labor earnings, i.e. exiting the labor market. For earnings, compared to $t-3$ level, men experience around a 19% decline in earnings five years post-marriage, while women experience around a 30% decline, conditional on still employed in the labor market. For likelihood of exits, relative to the $t-3$ level, men's likelihood increases by roughly 4%, while women's likelihood increases by roughly 13% five years into their marriages. Coefficients post-marriage are all statistically significant at the 1% level (except for the earnings coefficient at $t = 0$ for men, where the coefficient is insignificant.) The use of individual and age fixed effects ensures that these patterns are not explained by age differences or unobserved heterogeneity in earnings potential, reinforcing that the discontinuity aligns closely

with the marriage event itself. Since we focus on a sub-population of individuals who married between 2008-2017, in particular, those who do not have children prior to the fourth year of their marriage, these labor supply and earnings responses are not driven by child-related factors. As we will show in Section 3.4, results documented here are robust to a differently constructed comparison group.



(a) Real Total Labor Earnings | Employed (b) Likelihood of No Reported Labor Earnings

Figure 6

The earnings profiles exhibit a trend change, rather than a discrete level shift, upon marriage. The likelihood of exiting the labor market also shows an upward trend after marriage. In the next subsection, we demonstrate that beyond these extensive-margin changes, married couples also reduce their hours worked.

One might wonder why these adjustments occur gradually rather than immediately. An intuitive explanation is that labor supply adjustments are not frictionless and therefore take time to materialize. Another possibility is that as marriages age, couples' consumption and leisure preferences evolve. Both mechanisms could contribute to the gradual changes observed in earnings and labor supply trends.

3.2 Work Hours and Leisure

To examine mechanisms underlying the earnings patterns, we use the PSFD survey data to analyze changes in work and leisure hours around marriage. Due to the smaller PSFD sample, we estimate a difference-in-differences model rather than a full event study:

$$Y_i^s = \beta_0 + \beta_1 \text{Treatment}_i^s + \beta_2 \text{Post}_i^s + \beta_3 \text{Treatment}_i^s \times \text{Post}_i^s + \alpha_i^s + \text{Age}_i^s + \epsilon_i^s \qquad (3)$$

Table 2 reports the results using self-reported work hours and the estimated leisure hours as outcomes. In each marriage year t regression, the variable *Treatment* is equal to 1 if an individual is married in t, and equal to 0 if individuals are in the later-treated comparison group. *Post* is equal to one in years after marriage year t. *DID* is the interaction of *Treatment* and *Post*, and is the coefficient of interest. On average, both women and men see a decline in weekly work hours post-marriage. Men see an average of 8-hour decline in work hours post-marriage compared to their later treated (married) counterparts, and an average of 10-hour increase in estimated leisure hours, both of which are statistically significant at the 10% level. Women see a much smaller change post-marriage; on average, they experience a 3-hour decline in weekly work hours post-marriage, and no change in estimated leisure hours due to the increase in post-marriage home production (chore hours). One notable trait of these individuals is that on average, men work more than 40 hours per week pre-marriage, while women work around 40 hours. The average man works a significantly higher number of hours compared to the average woman at the baseline, which may help explain the large differences in the changes in work hours post-marriage between men and women. In Appendix A Figure A6, we show that using the administrative tax data, married men and women see a decline in the likelihood of being a multiple-job holder post-marriage, a pattern consistent with (and partially explain) the decline in work hours observed in the survey responses.

Outcome Variable:	Self-Reported Work Hours		Estimated Leisure Hours	
	Female	Male	Female	Male
Treatment	2.386	9.564**	1.471	-11.022**
	(4.283)	(4.484)	(5.147)	(1.312)
Post	1.883	1.317	-1.334	-1.525
	(2.279)	(2.377)	(2.673)	(2.628)
DID	-3.028	-8.369 *	-0.286	10.463 *
	(4.209)	(4.731)	(4.845)	(5.848)
Mean ($t-3$ to $t-1$)	40	46	67	61
N	669	1,125	574	965
AR^2	0.1218	0.0863	0.1612	0.1017

Note: Control group is later-treated group (more than four years later.) Post-period is up to 4 years.

Panel unbalanced and does not include zero earnings from attrited respondents.

Table 2: Difference-in-differences Regression Results

Combining results using the administrative tax data on earnings and our time-use data, we find that (1) on average, both men and women see a sizable increase in the likelihood of exiting the labor market post-marriage, and (2) on average, both men and women de-

crease hours supply post-marriage. This suggests that the earnings decline we observe upon marriage are due to both extensive and intensive margins of labor supply adjustments.

3.3 Heterogeneity in Household Characteristics

Exploiting the richness of the data, we explore several heterogeneity in household characteristics. In this subsection, we present results for households separate by age at marriage, as well as results looking heterogeneous response by differences in pre-marital wealth. We also looked into whether (1) spouses worked in the same firm pre-marriage, and (2) differences in firm-level married-worker share contribute to differences in the earnings response of workers. These results are reported in Appendix A.2. Across all subsamples, earnings display a clear and similar trend break at marriage, suggesting that the observed changes are robust and not driven by spouses' marriage age composition or workplace characteristics.

3.3.1 Age at Marriage

We classify individuals as "young" if they marry below the median marriage age for their gender in that year. Each couple categorized into one of the four groups: no young spouse, young female spouse, young male spouse, or both young. We run the same event study regression in Equation 2 separately for the four groups. Figure 7 plots earnings by age composition of the couple. In all groups, earnings trajectories change sharply at marriage, indicating that the behavioral change is not driven by age composition.

While all four groups exhibit trend breaks at the timing of marriage, younger couples exhibit larger relative earnings losses. These patterns exist because young workers are compared with later-married young workers who are on much steeper growing earnings trends, while older workers are compared to later-married older workers in later stage of their life cycles. Since age is correlated with the extent to which earnings change upon marriage, in our model in Section 5, we allow age to specifically affect leisure level of individuals.

3.3.2 Pre-Marital Wealth

In this section, we explore how pre-marital economic conditions shape the earnings response to marriage by looking at pre-marital earnings and residential property ownership.



(a) Female (b) Male

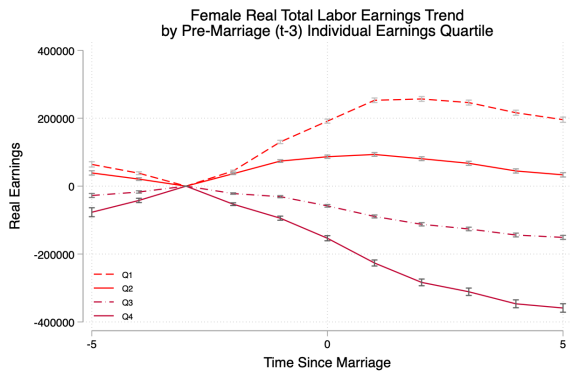
Figure 7: Earnings Trends by Marital Age: Later Treated Comparison

Pre-Marital Earnings Quartile. We split the sample into quartiles based on earnings at $t-3$ and trace earnings trajectories before and after marriage (Figure 8). These are again event study coefficients we obtain by estimating Equation 2 separately for four groups for each gender, compared against the later-treated individuals. Panels (a) and (b) use individual quartiles, while panels (c) and (d) use couples' combined earnings quartiles.

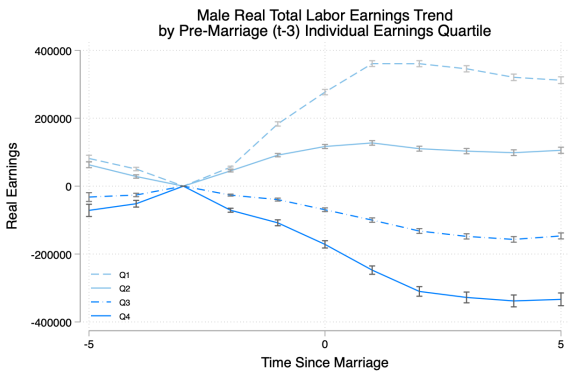
Individuals in higher pre-marriage earnings quartiles experience the largest post-marriage earnings declines, though those in lower quartiles also show a clear slowdown in earnings trajectories. The wealthier groups even exhibit an earnings slowdown before marriage, suggesting differential anticipatory behavior by pre-marriage earnings groups. These results are consistent with wealthier individuals substituting toward leisure more once married. In Appendix A.2, we report the differences-in-differences results on work hours, splitting the sample by whether the respondent earns above or below the median earnings.

Assets: Residential Property Ownership. In addition to the documented larger behavioral response to marriage of higher earners, we further explore whether pre-marriage wealth, beyond earnings, drives post-marriage labor supply adjustments. In particular, we focus on one type of assets: residential property, which is a key form of wealth in Taiwan. We measure property ownership at $t-3$. We analyze six definitions of wealth status pre-marriage: own assets, spouse's assets, combined spousal assets, family assets (including parents and grandparents), spouse's family assets, and total family assets. Individuals are grouped into asset quartiles in $t-3$ and such group is fixed across time.

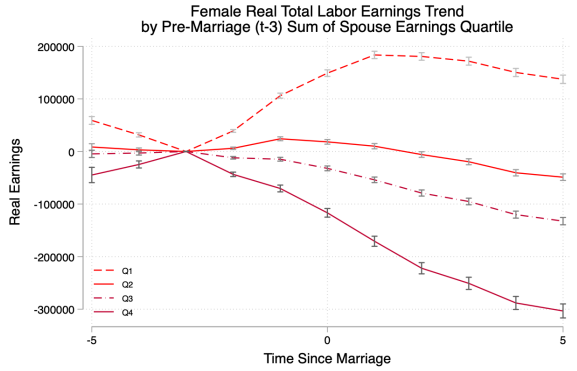
Real estates are generally considered large financial assets in Taiwan. According to data from Global Property Guide, Taipei, the capital city of Taiwan, is ranked the second most expensive city to purchase real estate properties in Asia in April 2024. The same data



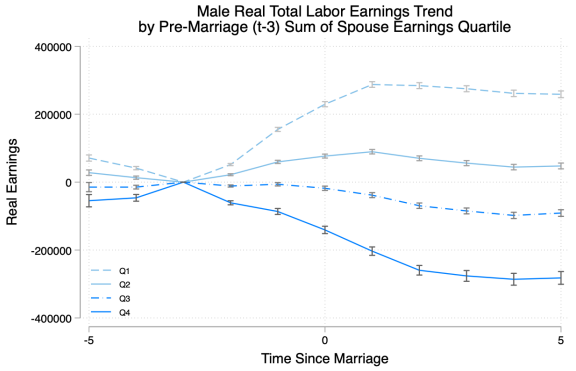
(a) Female - Individual Earnings



(b) Male - Individual Earnings



(c) Female - Sum of Spouse Earnings



(d) Male - Sum of Spouse Earnings

Figure 8: Earnings Trends by Pre-Marriage Earnings Group (Quartile at $t-3$)

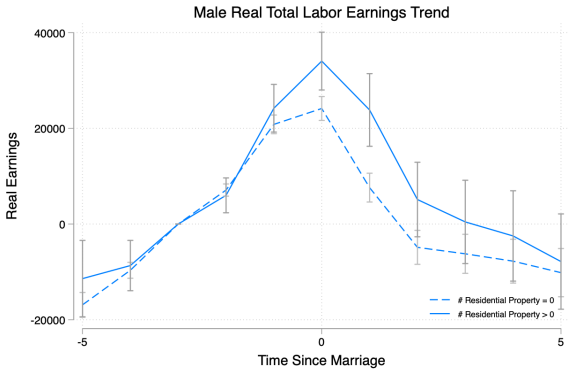
also ranks Taipei as the fifth most expensive for renting a residential property with a single bedroom and living room. Culturally, it is common for parents and/or grandparents to assist children in purchasing residential properties due to how expensive these are. Hence, in additional to looking at whether the newly wedded individuals themselves own residential properties prior to their marriage, we also look at property ownership by parents and grandparents, as it is not common to have newly wedded individuals owning real estate properties prior to marriage without assistance from their families[6].

Figures 9 and 10 show that individuals with higher pre-marriage asset holdings earn more before marriage but experience sharper earnings declines afterward. Over time, their earnings converge toward or even fall below those of less-wealthy counterparts, particularly among women. These patterns add to our previous findings: wealthier individuals on average see a larger earnings response to marriage.

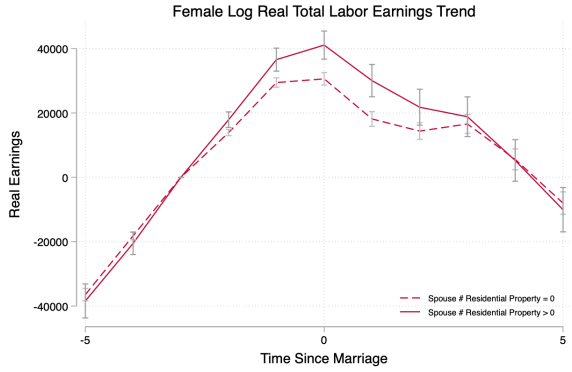
[6]We detail our asset measurement in Appendix C



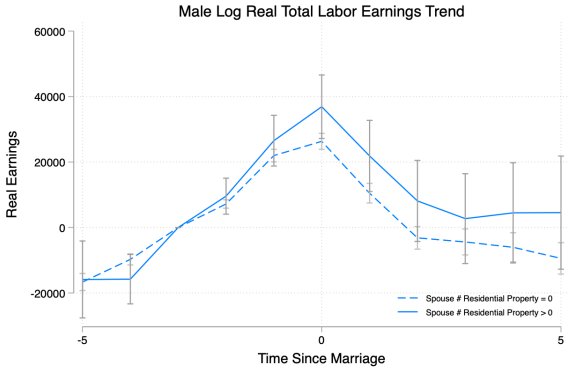
(a) Female (Own Real Estate)



(b) Male (Own Real Estate)



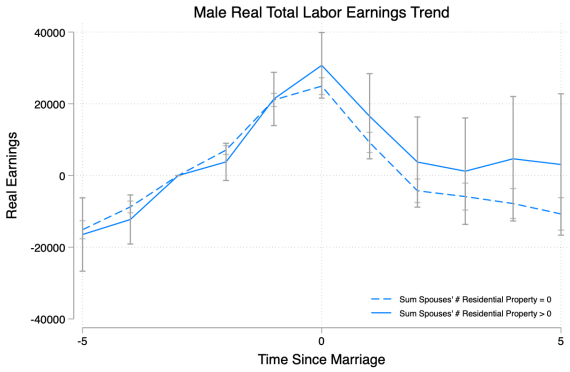
(c) Female (Future Spouse's Real Estate)



(d) Male (Future Spouse's Real Estate)

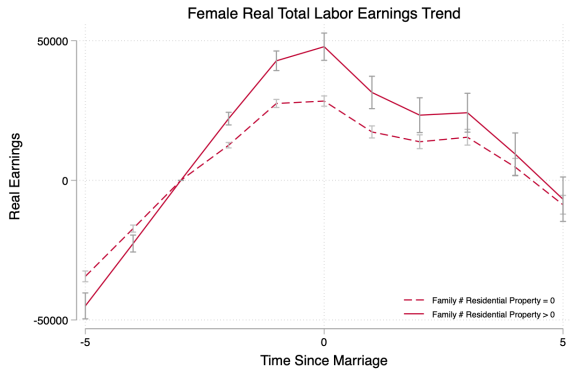


(e) Female (Sum of Spouses' Real Estate)

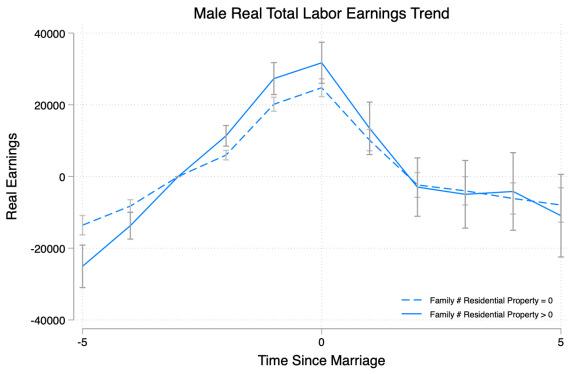


(f) Male (Sum of Spouses' Real Estate)

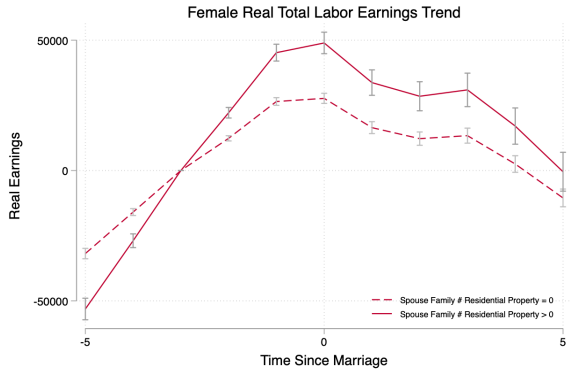
Figure 9: Earnings Trends by Pre-Marriage ($t-3$) Individual/Spouse Assets (Real Estate: Housing), Controlling for Age and Individual FEs



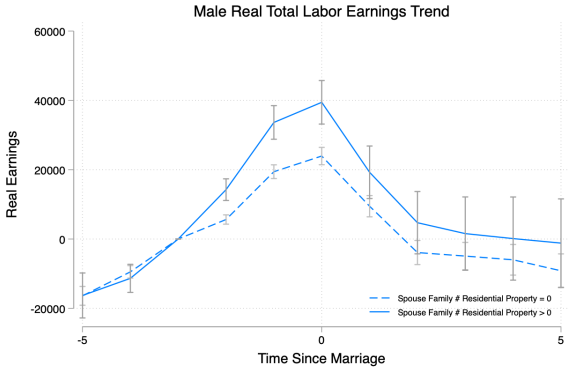
(a) Female (Family's Real Estate)



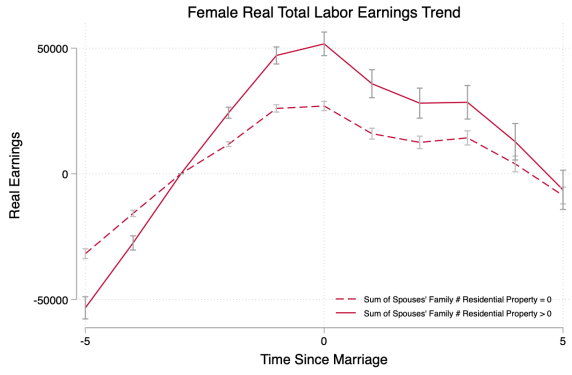
(b) Male (Family's Real Estate)



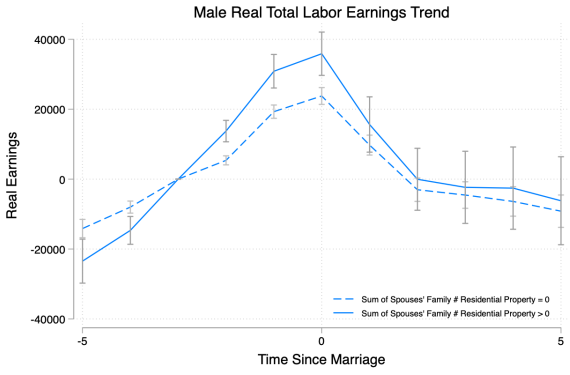
(c) Female by Future Spouse's Family's Number of Houses



(d) Male (Future Spouse's Family's Real Estate)



(e) Female (Sum of Own and Future Spouse's Families' Real Estate)



(f) Male (Sum of Own and Future Spouse's Families' Real Estate)

Figure 10: Earnings Trends by Pre-Marriage $(t-3)$ Individual/Spouse **Family** Assets (Real Estate: Housing), Controlling for Age and Individual FEs

Our subgroup analyses of pre-marital earnings and assets indicate that wealthier couples are more likely to reduce their work hours and earnings after marriage. While this pattern may reflect nonlinear wealth effects on labor supply, it can also be interpreted as evidence that joint leisure with one's spouse functions as a luxury good, disproportionately consumed by higher-wealth households. In addition to these findings, we examine whether earnings responses differ between spouses when pre-marital earnings are unequal. These supplementary results, presented in Appendix A.4, show that the lower-earning spouse experiences a substantially larger earnings response upon marriage, whereas the higher-earning spouse exhibits a smaller change.

3.4 Robustness: Propensity Score Matching

As a final robustness check, we repeat the event study using a propensity score–matched comparison group. Individuals may choose to marry when financially stable or near their earnings peak. To test whether such selection explains our findings, we match each treated individual to a later-married comparison individual based on gender and pre-marriage industry, earnings level, and earnings growth between $t-3$ and $t-1$. Different from the later-treated comparison group where we assume the average later-married individuals are characteristically similar to earlier-married individuals, this exercise allows use to select an individual that is observationally similar to a "treated individual" as the comparison.

Figure 11 reports the results. Even when matched on pre-marriage earnings trajectories, both men and women experience large and persistent earnings declines following marriage. This strongly suggests that the earnings changes are not driven by selection into marriage timing or life-cycle positioning, but behavioral adjustments associated with marriage itself.



Figure 11: Propensity Score Matching Event Study

4 Discussion: Potential Mechanisms

4.1 Who Steps Away From the Labor Market?

When attempting to explain the labor supply and earnings pattern we observe around marriage year, two natural candidates come to mind: (1) wealth effects of marriage: married couples share goods and experience an economies of scale in consumption, and (2) leisure complementarity: married couples gain higher leisure utility when spending leisure hours with one another. In this subsection, we do several exercises to document some patterns consistent with both of these hypotheses: at least a fraction of our sample exhibit strong wealth effects and/or leisure complementarity starting at marriage.

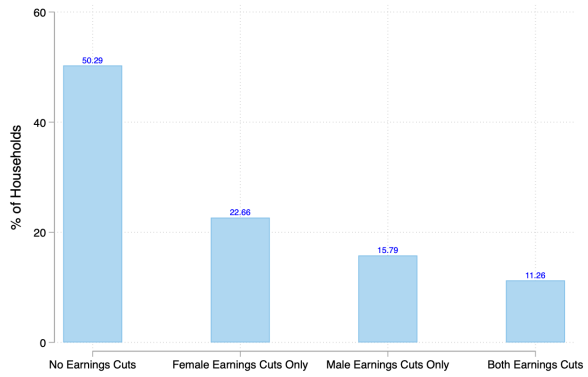
We begin by examining which of the spouses reduce their labor supply after marriage. Some classical theories on family labor supply would suggest spousal specialization in market and home production. If this theory holds, then post-marriage, we are more likely to see the spouse with comparative advantage in home production adjust labor supply downwards or exit, while the other spouse with comparative advantage in market product increase work hours. If both spouses adjust labor supply in the same direction, this pattern would be inconsistent with the specialization theory. Both spouses adjusting work hours downwards would be a pattern consistent with wealth effects and/or leisure complementarity. Our exercise will inform us about the fraction of couples exhibiting behavior consistent or inconsistent with different theories.

Because we need to observe both spouses pre- and post-marriage, we rely on the administrative tax data on earnings for this exercise. We use earnings decline to proxy for labor supply adjustments on the intensive margin, and use earnings dropping to zero to indicate labor market exits. Specifically, we compare each individual's earnings in $t+1$ to $t-3$, where t denotes the year of marriage. An earnings cut is defined as $Earnings_{t+1} - Earnings_{t-3} < 0$, conditional on having positive earnings in $t-3$. We consider cuts for both total and main labor earnings. An exit is defined as $Earnings_{t+1} = 0$, conditional on having positive earnings in $t-3$.

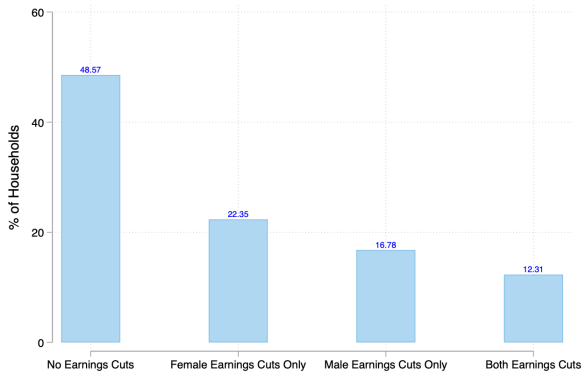
Since most individuals in Taiwan marry between ages 29 to 31, typically a period of rising earnings, a decline in earnings after marriage likely reflects a deliberate labor supply adjustment. Figure 13 categorizes couples into four groups: (1) neither spouse experiences an earnings cut or exit, (2) only the female does, (3) only the male does, or (4) both do. These patterns reveal household-level adjustments following marriage. When both spouses

reduce labor supply, this behavior is consistent with both wealth effects and leisure complementarity. Importantly, when only one spouse cuts back their labor supply, this does not contradict wealth effects or leisure complementarity if one spouse has significantly lower marginal returns to work, or if one spouse already works few hours, the other may simply reduce work to align leisure time.

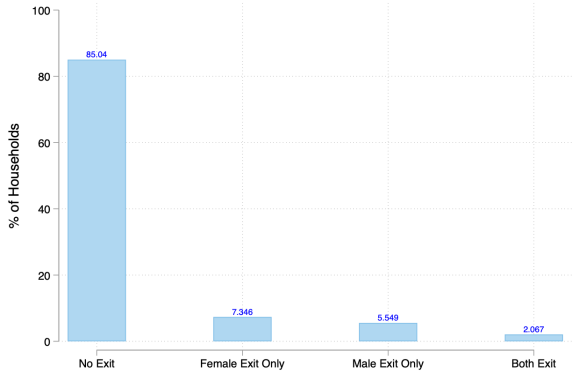
Figure 12 panel (c) shows labor market exits. Around 14% of men and women who were working at $t-3$ exit the labor market by $t+1$. Although this share is smaller than that for earnings cuts, these exits significantly contribute to the aggregate decline in earnings observed around marriage.



(a) Intensive Margin: Total Labor Earnings



(b) Intensive Margin: Main Labor Earnings



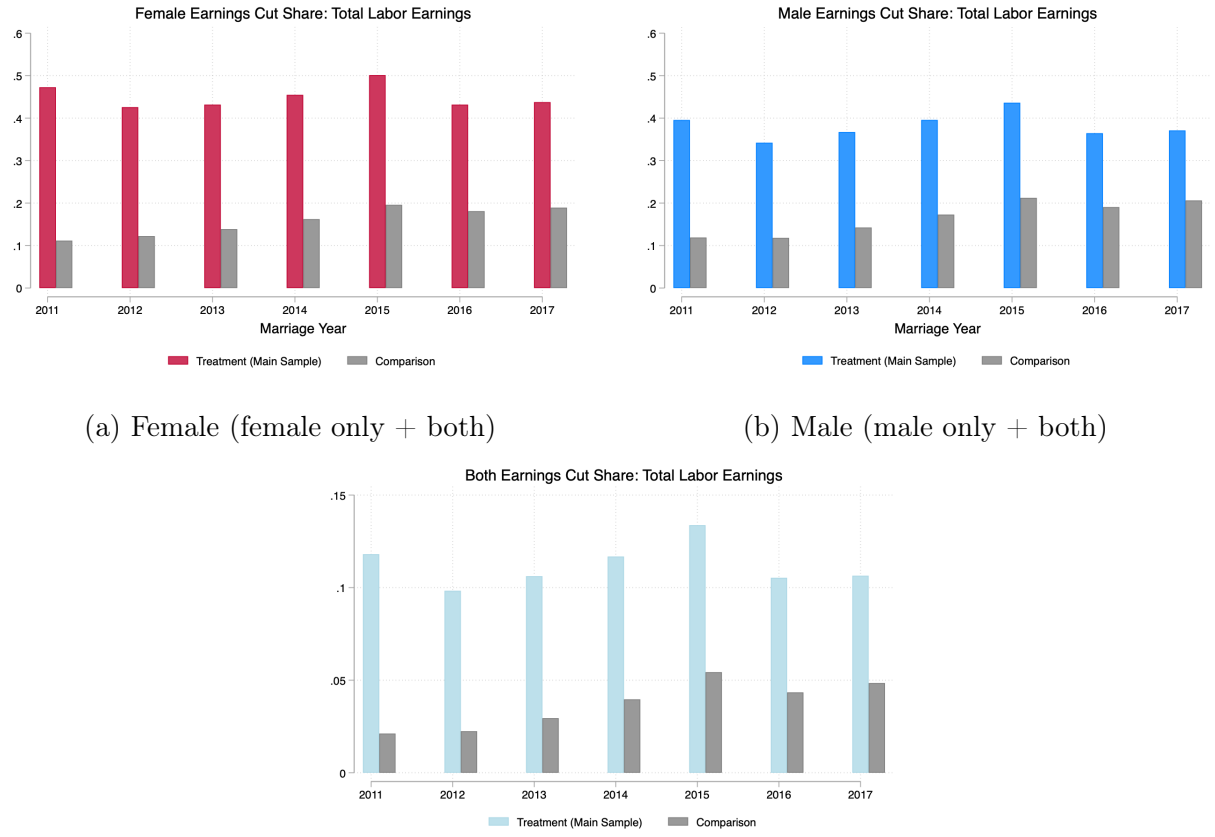
(c) Extensive Margin: Labor Supply

Figure 12: Decomposition: Who Steps Away from Labor Market?

A concern is that part of this drop may reflect year-specific macroeconomic conditions rather than marriage itself[7]. For example, someone marrying in 2007 would have their $t+1$ year as 2008, which is a recession year, potentially biasing results. To address this, we compute for each year between 2011 and 2017 the share of individuals experiencing earnings

[7]Note that including calendar year fixed effects in our main analysis does not change the findings.

cuts between $t+1$ and $t-3$ among individuals who were not married between the five year window $t-3$ and $t+1$ but were married at some other time between 2008 to 2017. This group approximates the general population while holding marriage propensities constant.[8]



(a) Female (female only + both)

(b) Male (male only + both)

(c) Both Spouses Earnings Cuts

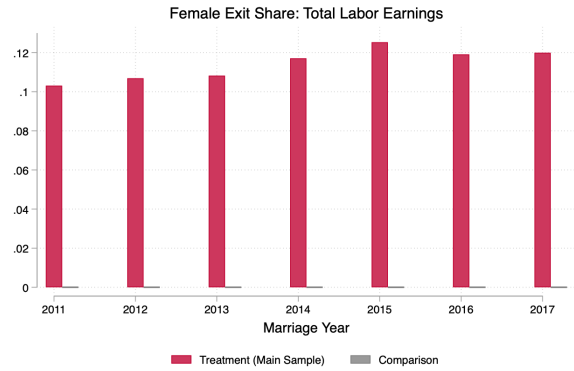
Figure 13: Share with Earnings Cuts (Cond. on Positive Earnings in t-3)

Figure 13 compares earnings cut shares between treated and comparison samples. Panel (a) plots female cut shares, adding up fractions of households with only the female experiencing a cut and those with both spouses cutting back. We plot similarly for panel (b). Panel (c) plots only the fraction of households where both spouses see an earnings cut. Across all years, treated individuals (colored bars) consistently exhibit higher rates of earnings cuts than their counterparts (gray bars). Thus, while aggregate fluctuations matter, most of the decline observed post-marriage is not driven by year effects.

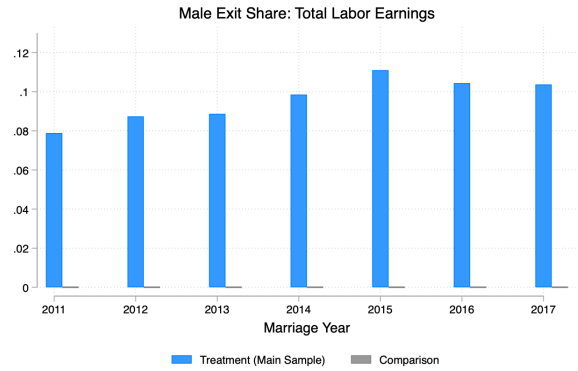
A similar pattern holds on the extensive margin. Figure 14 shows that labor market

[8]In a robustness check, we use only the later married sample as the comparison. The share of spouses undergoing pay cuts for all three groups in the treated (married) sample exceeds the comparison sample by an even larger degree.

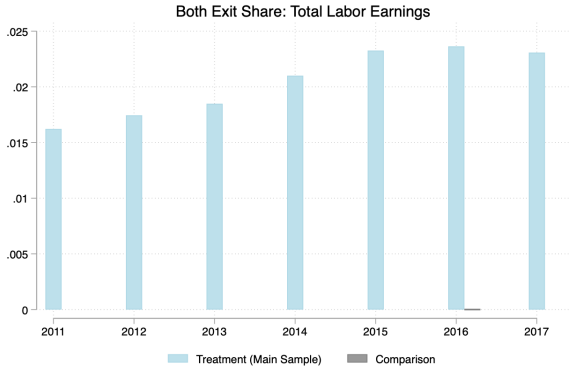
exits among treated individuals consistently exceed the population average. Combining both margins, we conclude that men and women without children actively reduce labor supply, both extensively and intensively, following marriage, beyond what annual fluctuations would predict. These findings, in particular the much larger share of households with both spouses adjusting labor supply, supports the interpretation that marriage induces behavioral changes consistent with wealth effects and/or leisure complementarities.



(a) Female (female only + both)



(b) Male (male only + both)



(c) Both Spouses Exit

Figure 14: Exit Share, $\{(Earnings_{t+1}) <= 0\} \cap \{(Earnings_{t-3}) > 0\}$

While wealth effects and leisure complementarity naturally come to mind when explaining the documented empirical facts, one must be aware of the other changes also happening around the marriage event. In particular, when couples get married, they also experience substitution effects. These substitution effects are two-folds.

First, differences in the marginal returns to work between couples may lead to intra-household labor reallocation. When individuals marry and begin to jointly maximize household utility, the problem changes from individual optimization to joint optimization. Because consumption is partially common to both spouses, the optimal allocation of work hours de-

pends on relative wages and marginal utilities of leisure. If one spouse has a higher market wage, the couple can increase total household utility by having that spouse work more, while the lower-wage spouse works less. This substitution effect does not necessarily change total labor supply but redistributes it across spouses.

Second, the sharing consumption changes the effective return to work for each spouse. Before marriage, an additional dollar earned increases only the individual's own utility, yet after marriage, since consumption is partially pooled, an additional dollar earned by either spouse raises joint consumption and therefore joint utility. Thus, the marginal benefit of work rises because each dollar now contributes to both partners' well-being. This creates an incentive for both spouses to work more, a different substitution effect that could impact on total labor supply of the household.

Both substitution effects would suggest movements contradicting the 11% of our sample, where we observe downward adjustments in labor supply for both spouses. Because wealth effects and substitution effects contribute to opposite forces, and the net effects of these forces are ambiguous, one might wonder if leisure complementarity can play a larger part in driving the post-marriage earnings patterns. In the next sub-section, we provide suggestive evidence that couples exhibit complementarity in non-work hours through the joint distribution of spousal labor supply choices.

4.2 Complementarity: Spouse Coordination in Work Hours

We next use survey data to present further data patterns supporting leisure complementarity. We look into the work hours of distribution of couples. Figure 16 shows the joint distribution of annual work-hour "choices" categorized into four groups:

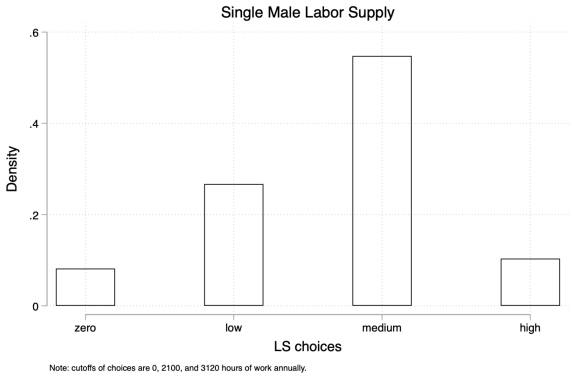
1. Choice 0: non-participation (0 hours),
2. Choice 1: 1–2100 hours,
3. Choice 2: 2100–3120 hours, and
4. Choice 3: above 3120 hours

For reference, these categories correspond roughly to part-time, full-time, and overtime levels. We use the same categorization in our model exercises. On average, female workers who

choose choices 1, 2, and 3 have average work hours 1925, 2535, and 3739 respectively, while for male workers, their choices corresponds to average work hours 1910, 2627, and 3889.

Figure 15 panels (a) and (b) show that single households tend to choose medium hours supply, corresponding to choice 2 in our categorization. To compare single household choices to those of married ones, we randomly pair single female to single male to construct a combination of choices had these joint choices been random. We repeat this random pairing process for 10 times and take the average of these joint choices. In panel (c), the black bars indicate true choices of married households, while blue ones indicate "random joint choices." One can easily observe that the highest peaks for married households are the coordinated choices (low, low) and (medium, medium), where spouses either (1) both work hours between part-time and full-time (2080), or (2) both work between 2100 and 3120 hours annually. While the blue bars, indicating randomly paired single households' joint choices, also see a large peak at (medium, medium), the married households exhibit an even larger mass. Moreover, we observe a large increase in the mass in (low, low). In short, all coordinated choices except for (zero, zero) see larger mass for the married households, while uncoordinated choices see a decline in the masses.

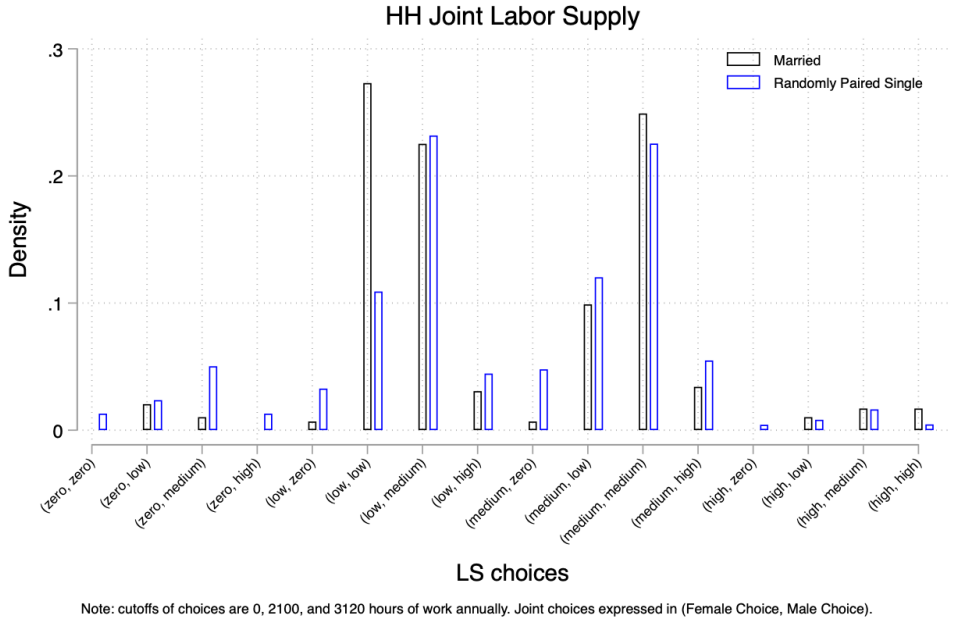
Note that in the survey, respondents are asked to report their average weekly work hours, and although aggregated at the annual level, these reported annual hours seem extremely high. In our model section, we will explore changes in work hours in percents so the comparison is not subject to the scale.



(a) Single Male



(b) Single Female



(c) Married Household Combined LS vs Randomly Paired Single Households

Figure 15: PSFD Distribution of Work Hour Choices

5 Spousal Labor Supply with Leisure Complementarity

5.1 Model

In Sections 3 and 4, we documented a decline in earnings and a rise in leisure hours among married couples who do not have children early in their marriage. The data patterns suggest that wealth effects and/or leisure complementarity may be important drivers of these changes. As discussed earlier, the impact of marriage on labor supply through wealth and substitution effects is theoretically ambiguous, whereas leisure complementarity should unambiguously shift joint labor supply downward.

To examine how leisure complementarity influences household choices, we extend the collective labor supply model of Michaud and Vermeulen (2011) and apply it to our data. We assume strong wealth effects of marriage by allowing full consumption sharing between spouses once they marry. Under this assumption, our estimated degree of leisure complementarity can be interpreted as a lower bound on the true preference for joint leisure.

We estimate the model using maximum likelihood, choosing parameters to maximize the likelihood of observing the data given the model. The goals of this exercise are threefold: (1) to identify gender-specific preferences for consumption and leisure, (2) to quantify the role of leisure complementarity in shaping spousal labor supply choices, and (3) to conduct counterfactual analyses to draw policy and aggregate implications. Due to the small sample size and the unbalanced nature of the panel where spousal work hours are only observed after marriage, we employ a static model and treat marriage as exogenous, taking marital status as observed in the data.

Let l denote leisure, c denote consumption, and X denote individual characteristics. Each individual's utility is determined by their own leisure, consumption level, which is set to equal to earnings, and individual characteristics. There are no savings. For individual j in household i, we can write their direct utility in as the following:

$$v^j(c_i^f, c_i^m, l_i^f, l_i^m; X_i^j) = \beta_{c0}^j(X_i^j)\frac{c_i^{\beta_{c1}^j(X_i^j)}}{\beta_{c1}^j(X_i^j)} + \beta_j^j(X_i^j, l_i^{-j})\ln\left(l_i^j\right) \tag{4}$$

where $-j$ denotes the other person within household i. Vector X_i denotes individual observable characteristics, which includes education and age. This set-up of the utility function includes the complementarity in leisure between spouses.

For simplicity, we assume that individuals can make discrete choices to their labor supply. Let worker's choice set of work hours $h_p^j \in P$, where $P = \{1, ..., P_{FT}\}$. By construction, each worker will then have a set of discrete choices of leisure hours: $l_p^j = \bar{L} - h_p^j$, where $\bar{L}$ denotes the total time endowment each worker has in a year, net of time spent on other necessities such as sleep hours. We set the size of the choice set P to four: individuals face choices $p \in \{0, 1, 2, 3\}$. Choice 0 corresponds to 0 hours, while others correspond to hours between the cutoffs 2100 and 3120 (i.e. choice 1: between 0 and 2100; choice 2: between 2100 and 3120; choice 3: above 3120), which roughly corresponds to working part-time, full-time, and over-time. We restrict the marginal utilities with respect to an agent's own consumption and leisure to be positive, assuming $\beta_{c0}^j > 0$ and $\beta_j^j(X_i^j, l_i^{-j}) > 0$. Modifying from the assumption in Michaud and Vermeulen (2011), we assume the following forms:

$$\beta_{c0}^j = \exp\left(\gamma_{c0}^j\right) \tag{5}$$

$$\beta_j^j(X_i^j, l_i^{-j}) = \begin{cases} \exp\left(X_i^{j'}\delta^j\right) & \text{if single} \\ \exp\left(X_i^{j'}\delta^j + \gamma_1^j l_i^{-j} + \gamma_2^j (l_i^{-j})^2 + \gamma_3^j (l_i^j - l_i^{-j})^2\right) & \text{if married} \end{cases} \tag{6}$$

l_i^{-j} indicates the leisure level of the spouse, and $(l_i^j - l_i^{-j})^2$ captures the difference in own and spouse leisure levels.

In a collective framework, total household utility takes the form of the weighted sum of the pre-marital utilities of the spouses. The weights assigned to the spouses are referred to as the Pareto weights as they result in Pareto-efficient intra-household allocations. Let μ denote the Pareto weight of men, and $(1 - \mu)$ denote that of women. These Pareto weights are often defined as functions of the work hours choices, and are determined by the relative wages of the spouses. For simplicity of our exercise, we assume that $\mu = 0.5$. We do a robustness check following implications from the literature and define the Pareto weights as a function of relative wages of the spouses [9]; results are reported in Appendix D and are consistent with our baseline findings.

We can then write single and married households' maximization problems. Let $\mathbf{a}_i = (l_i^f, l_i^m, c_i)'$, $\mathbf{D}_i = (D_i^f, D_i^m)'$, where D_i^f and D_i^m are indicators for marital status. $D_i^f = 1$ and $D_i^m = 0$ if the focal individual is female and single, and vice versa. Let $\mathbf{X}_i = (X_i^{f'}, X_i^{m'})$

[9] For individuals not working, we impute their wages using a fixed effect regression on age, gender, and education level. In the robustness check, we define relative earnings capacity r_i is as $r_i = \ln\left(\frac{w_i^m}{w_i^f}\right)$ where w denotes wages of individuals. The Pareto weight is defined as $\mu(r_i) = \frac{\exp(\nu r_i)}{1+\exp(\nu r_i)}$ where ν is a parameter to be estimated.

include all observable characteristics. $w_i^j(\bar{L} - l_i^j)$ denotes labor earnings, and y_i denotes non-labor earnings. Household utility maximization problems are:

Single Households. Individuals maximize their own utility, subject to a budget constraint:

$$\begin{aligned}\max_{l_i^j, c_i} U^h(\mathbf{a}_i; \mathbf{D}_i, \mathbf{X}_i) &= v^j(l_i^j, c_i; X_i^j) \\ &= \beta_{c0}^j \frac{c_i^{1-\beta_{c1}^j}}{1-\beta_{c1}^j} + \beta_j^j(X_i^j) \ln\left(l_i^j\right) \\ &= \beta_{c0}^j \frac{c_i^{1-\beta_{c1}^j}}{1-\beta_{c1}^j} + \exp\left(X_i^{j'} \delta^j\right) \ln\left(l_i^j\right)\end{aligned} \tag{7}$$

$$\textit{subject to} \qquad c_i = w_i^j(\bar{L} - l_i^j) + y_i \tag{8}$$

Married Households. We assume that there is only one public good to be consumed by the household to model strong wealth effects of marriage. c is shared entirely among members of the household, and each of the household members receive the same utility. The public goods assumption captures the economies of scale of consumption within the households; given that c is entirely shared, the budget set of a married household is effectively twice as large as a single household[10]:

$$\begin{aligned}&\max_{l_i^f, l_i^m, c_i} U^h(\mathbf{a}_i; r_i, \mathbf{D}_i, \mathbf{X}_i) = \tilde{v}^m + \tilde{v}^f = 2 \times \left[\mu v^m(l_i^f, l_i^m, c_i; X_i^m) + (1-\mu(r_i)) v^f(l_i^f, l_i^m, c_i; X_i^f)\right] \\ &= 2 \times \left[\mu(r_i)\left(\beta_{c0}^m \frac{c_i^{1-\beta_{c1}^m}}{1-\beta_{c1}^m} + \beta_m^m(X_i^m, l_i^f) \ln\left(l_i^m\right)\right) + (1 - \mu\left(\beta_{c0}^f \frac{c_i^{1-\beta_{c1}^f}}{1-\beta_{c1}^f} + \beta_f^f(X_i^f, l_i^m) \ln\left(l_i^f\right)\right)\right] \\ &= 2 \times \left[\mu\left(\beta_{c0}^m \frac{c_i^{1-\beta_{c1}^m}}{1-\beta_{c1}^m} + \exp\left(X_i^{m'} \delta^m + \gamma_1^m(l_i^f) + \gamma_2^m(l_i^f)^2 + \gamma_3^m(l_i^m - l_i^f)^2\right) \ln\left(l_i^m\right)\right)\right. \\ &\left. + (1 - \mu\left(\beta_{c0}^f \frac{c_i^{1-\beta_{c1}^f}}{1-\beta_{c1}^f} + \exp\left(X_i^{f'} \delta^f + \gamma_1^f(l_i^m) + \gamma_2^f(l_i^m)^2 + \gamma_3^f(l_i^m - l_i^f)^2\right) \ln\left(l_i^f\right)\right)\right]\end{aligned} \tag{9}$$

[10] In a less stringent assumption, we scale household c by dividing it by $2^{0.7}$. 0.7 is the family size scaling parameter that we took directly from Buhmann et al. (1988). Results using this set-up is largely consistent with our baseline set-up. We also estimated the model using a variety of scaling parameters. Magnitudes of leisure complementarity parameters are increasing when the scaling parameter increases (i.e. when spouses are able to share fewer goods), supporting that our leisure complementarity estimates are lower bounds.

$$\textit{subject to} \qquad c_i = w_i^m(\bar{L} - l_i^m) + w_i^f(\bar{L} - l_i^f) + y_i \tag{10}$$

The household utility maximization problem can be rewritten as

$$\begin{aligned}\max_{l_i^f, l_i^m, c_i} U^h(\mathbf{a}_i; r_i, \mathbf{D}_i, \mathbf{X}_i) &= (1 - D_i^m)v^f(l_i^f, \bar{l}^m, c_i; X_i^f) + (1 - D_i^f)v^m(\bar{l}^f, l_i^m, c_i; X_i^m) \\ &+ D_i^f D_i^m \Big[\mu(r_i)v^m(l_i^f, l_i^m, c_i; X_i^m) + (1 - \mu(r_i))v^f(l_i^f, l_i^m, c_i; X_i^f)\Big]\end{aligned} \tag{11}$$

$$\textit{subject to} \qquad c_i \leq D_i^m[w_i^m(\bar{L} - l_i^m)] + D_i^f[w_i^f(\bar{L} - l_i^f)] + y_i \tag{12}$$

where v^j takes the form described in Equation (4). Since each spouse in a given pair has a total of P choices of labor supply, a pair has P^2 possible labor supply decisions. Let s be the collection from 1 to P^2. For simplicity of estimation, we assume that utility of s is defined as

$$U_{si}^h = U^h(\mathbf{a}_i^s; r_i, \mathbf{D}_i, \mathbf{X}_i) + \epsilon_{si} \tag{13}$$

where ϵ_{si} is assumed to be I.I.D. across s with type 1 extreme value distribution. This assumption allows us to significantly simplify the problem as the choice probabilities have a closed-form solution.

Household i chooses s to maximize U^h. With the EV1 distribution of ϵ_{si}, the probability of choosing s is

$$Pr(U_{sit}^h > U_{s'i}^h \forall s' \neq s) = Pr(\mathbf{a}_i^s \mid r_i, \mathbf{D}_i, \mathbf{X}_i) = \frac{\exp(U^h(\mathbf{a}_i^s; r_i, \mathbf{D}_i, \mathbf{X}_i))}{\sum_{s'=1,\ldots,P'} \exp(U^h(\mathbf{a}_i^{s'}; r_i, \mathbf{D}_i, \mathbf{X}_i))} \tag{14}$$

where $P' = P$ pre-marriage, and $P' = P^2$ post-marriage.

The maximum likelihood problem is then

$$\max_{\boldsymbol{\beta}} \sum_i \sum_s D_{is} \ln(Pr(\mathbf{a}_i^s \mid r_i, \mathbf{D}_i, \mathbf{X}_i)) \tag{15}$$

where $D_{is} = 1$ is a dummy and equals to 1 only when s is chosen. The parameters of interest to be estimated here are the preference parameters and the Pareto weights. These parameters include β_{c0}^f, β_{c1}^f, β_{c0}^m, β_{c1}^m, δ^f, δ^m, γ_1^f, γ_1^m, γ_2^f, γ_2^m, γ_3^f, and γ_3^m. The Pareto weight parameter is estimated in the robustness check.

5.2 Estimation and Results

5.2.1 Estimation

Identification. For the identification of consumption parameters, we rely on single household observations. We estimate β_{c0}^m, β_{c1}^m, δ^m using single men's variations in leisure (l_i^m) and consumption, and likewise estimate β_{c0}^f, β_{c1}^f, δ^f using single women's variations. Parameters common to single and married households are assumed to be the same. Single men and women are assume to have $\bar{l}^f = 0$ and $\bar{l}^m = 0$ respectively. For the spouse leisure terms γ_1^m, γ_1^f, γ_2^m, γ_2^f, γ_3^m, and γ_3^f, we use the variation of joint labor supply choices of married households[11].

Preference Parameter Estimates. Using the survey data, we apply the model to 938 households. Among these households, 278 are single female households, 367 are single male, and 293 are married. These are the households for which we observe individual's age (birth year), education level, work hours, and wages. For those who reported having zero work hours, we impute their wages using a fixed effect regression on gender, age, and education level. We estimate the preference parameters and report the results in Table 3.

From the z-values of the preference parameters we can see that, apart from the parameter of the constant of leisure for men, all other estimates are significant at least at the 1% level. Age is positively correlated with leisure hours for both men and women, indicating that as individuals age, they supply relatively less work hours. Education is positively correlated with leisure, indicating that on average, more educated individuals take more leisure hours.

Our main focus is on the spouse leisure parameters. The positive and significant prefer-

[11]Estimation of the Pareto weight parameter ν also relies on the variation of labor supply choices of married households. Estimated ν is reported in Appendix D.2 Table D1.

ence parameters for spouse's leisure levels, and negative parameters for the square of that together indicate that individuals of both genders on average experience increasing leisure utility with respect to their spouse's leisure hours, but at a diminishing rate. The negative and significant estimate for the difference between spouses' leisure also indicate complementarity or preferences for coordination. These estimates are consistent with our hypothesis that married individuals jointly decrease work hours to have leisure hours spent together.

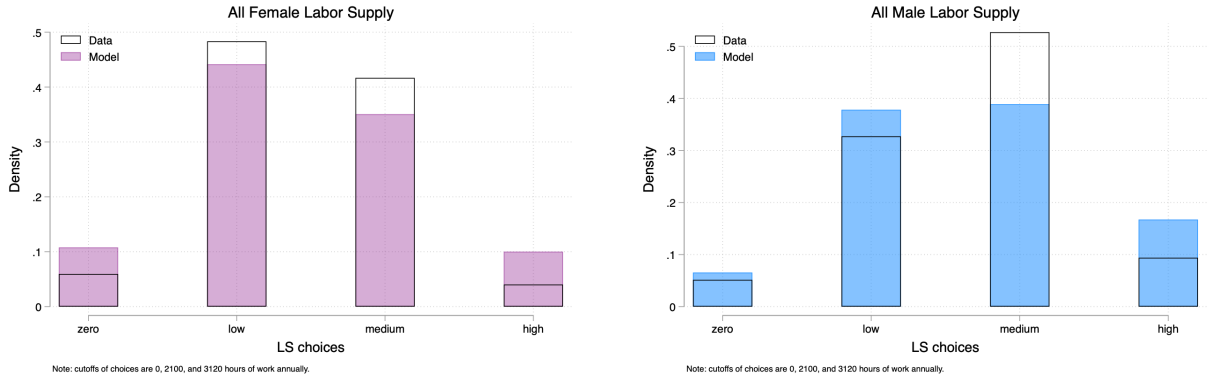
	Estimate	Std. Err.	z-value
Men's Preference Parameters			
Consumption			
β^m_{c0}	0.20***	0.001	3.63
β^m_{c1}	0.80***	0.01	11.11
Leisure			
Constant	-0.03	0.06	0.09
Spouse Leisure Level	0.59***	0.01	6.63
(Spouse Leisure Level)^2	-0.08***	0.01	-6.40
Own and Spouse Leisure Diff.	-0.06***	0.00	-2.52
Age	0.02***	0.00	1.03
Education	0.05***	0.00	1.88
Women's Preference Parameters			
Consumption			
β^f_{c0}	0.62***	0.04	2.26
β^f_{c1}	1.11***	0.02	6.39
Leisure			
Constant	-0.64***	0.09	0.04
Spouse Leisure Level	0.53***	0.01	4.74
(Spouse Leisure Level)^2	-0.07***	0.01	-4.75
Own and Spouse Leisure Diff.	-0.03***	0.00	-2.33
Age	0.02***	0.00	1.20
Education	0.11***	0.00	2.34
Observations	938 HH (278 SF, 367 SM, 293 Mar.)		
Log-Likelihood	-1397.10		

Table 3: Estimation Results

5.2.2 Model Fit

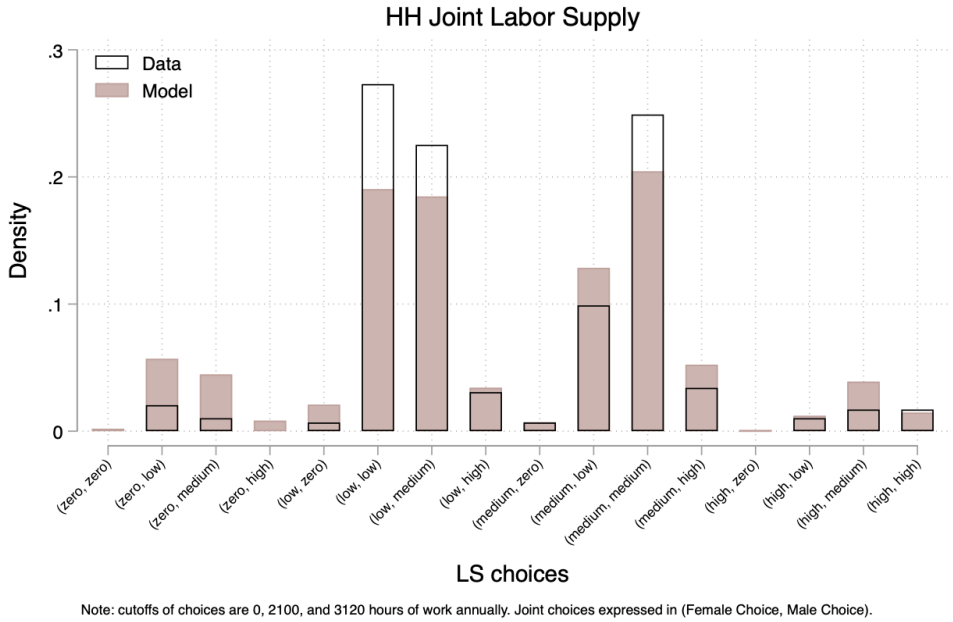
Using the estimated preference parameters, we simulate individuals' labor supply choices. Figure 16 compares the distribution of aggregate labor supply in the model-generated data to that in the observed data, while Figure 17 shows the distribution of joint labor supply choices among married couples. Results for single and married individuals, disaggregated by gender, are presented in Appendix D.1. As shown, the model reproduces the key patterns of labor supply observed in the data, indicating that the estimated preferences capture the main behavioral responses.

In the model, individuals choose among four discrete labor supply levels (0, 1, 2, 3) and four levels of household chore hours (0, 1, 2, 3). The total time endowment is normalized to 7, implying a base leisure level of 1. Following the same approach used for labor supply, we compare the model-implied leisure distributions with those observed in the data. These comparisons are also reported in Appendix D.1.



(a) All Female (b) All Male

Figure 16: Model-Generated vs Data LS Choices: Aggregate



(a) Married Household Combined LS

Figure 17: Model-Generated vs Data LS Choices

5.3 The Force of Leisure Complementarity

With the model fitting the data reasonably well, we next examine the role of leisure complementarity in shaping labor supply decisions. Using the estimated parameters, we simulate household choices excluding spouse leisure complementarity to assess its impact. Table 4 reports the average hours worked per person under both the baseline model and this counterfactual scenario.

As shown in the second panel, relative to the baseline, married men increase their average hours supplied, while married women decrease theirs. On average, individuals work more total hours compared to the baseline, and the fraction of nonparticipants rises for both married men and women, indicating a more dispersed distribution of labor supply choices.

These results align with intuition. When couples derive utility from joint leisure, they tend to coordinate their work hours, leading to more clustered choices. In contrast, once leisure complementarity is removed, coordinated work schedules become less valuable, resulting in greater dispersion and higher overall hours worked.

Table 4: Labor Supply Distribution by Model, Gender, and Marital Status

Model	Gender	Category	Average Work Hours	Fraction Unemployed
Baseline Model	Male	Single	2367	10%
		Married	2418	2%
	Female	Single	2187	9%
		Married	2076	11%
	Aggregate	Single	2275	10%
		Married	2189	6%
No Leisure Comp.	Male	Single	-	
		Married	2552 (↑)	9%
	Female	Single	-	
		Married	1954 (↓)	24%
	Aggregate	Single	-	
		Married	2253 (↑)	17%

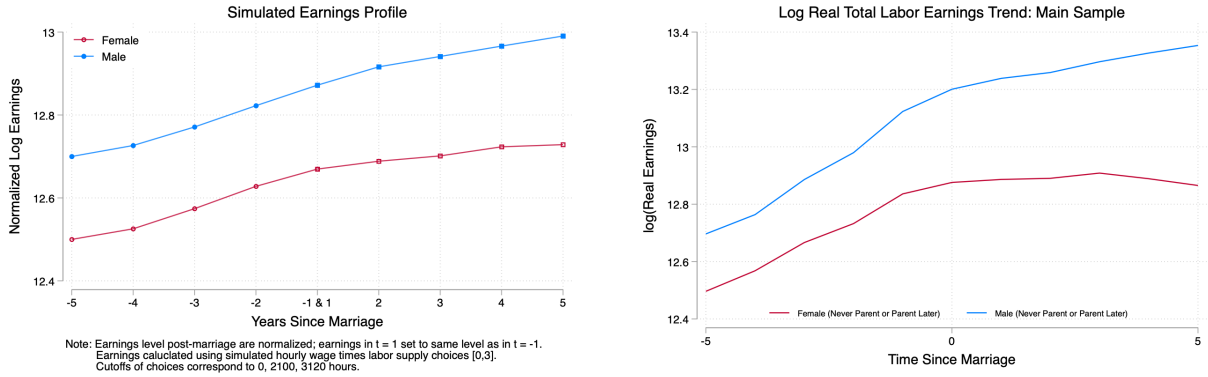
5.4 Validation and Counterfactual Exercises

5.4.1 Simulated Earnings Paths

In the following exercise, we simulate a panel data of 10,000 individuals with 10 periods to plot earnings trends. Workers draw random initial wages, which grow by 5% each year. To match what is observed in the administrative data, where we see some female workers shift to firms with lower quality (see Appendix A), we let female workers' wage growth grow only by 3% per year post-marriage. Workers are paired randomly and their marriage year is drawn randomly between t = 5 and t = 8. We also draw initial age between 18 to 50; education is drawn between 0 and 15 and are fixed over time. Pre-marriage, workers choose labor supply given their wage, age, education, and the single-household utility function. Once they arrive at their marriage year, they choose labor supply maximizing the married-household utility. We use the simulated labor supply choices multiplied by wages to generate "earnings." Below are the results.

Figure 18(a) plots the simulated log earnings profiles, while Figure 1918 shows the true profiles from the administrative data. Pattern-wise, our simulated earnings paths match well with the true, although we under-predict the size of changes in the slope, as well as the magnitude of growth across time for men. Note that preference parameters of single and married households estimated from the model uses a cross-sectional data with no time

dynamics involved. Despite so, our simulated earnings profile see patterns largely consistent with the true data, suggesting that our model explains observed behavior reasonably well.

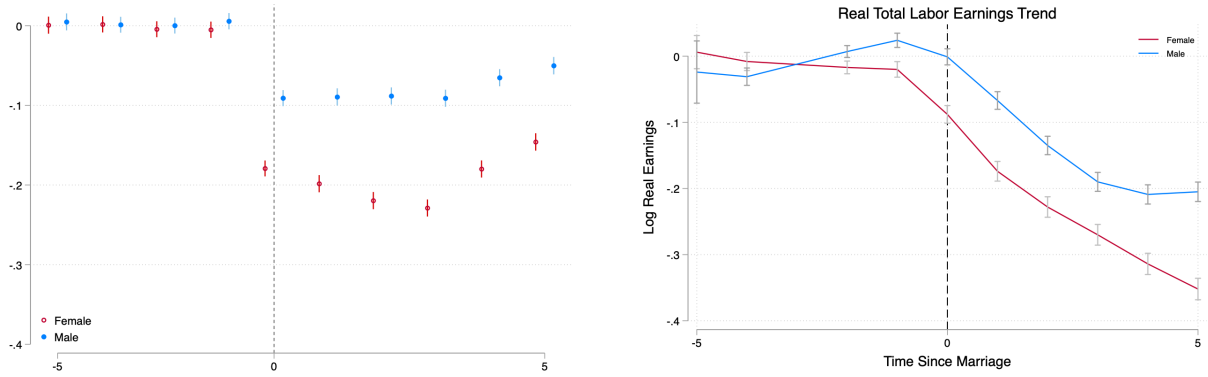


(a) Simulated Earnings Paths

(b) Data: Real Labor Earnings Paths

Figure 18: Earnings Paths: Simulation vs Data

Next, we construct the later treated comparison group in the simulated data in the same way we construct the comparison group in Section 3. We then run the same staggered event study regression using the simulated data. Below are the results.



(a) Simulated Panel

(b) Data

Figure 19: Event Studies: Simulation vs Data

We can plot the average of the post-marriage earnings of the simulated panel, and compare the level to that of the real data. Furthermore, we can also simulate earnings when the complementarity channel is shut down. Figure 20 shows these comparisons: the colored dash lines show that the model estimates a reasonable post-marriage average earnings that matches well with the real levels we observe, while the grayscale dashed lines show that without leisure complementarity, married households supply more work hours, leading to higher average earnings.

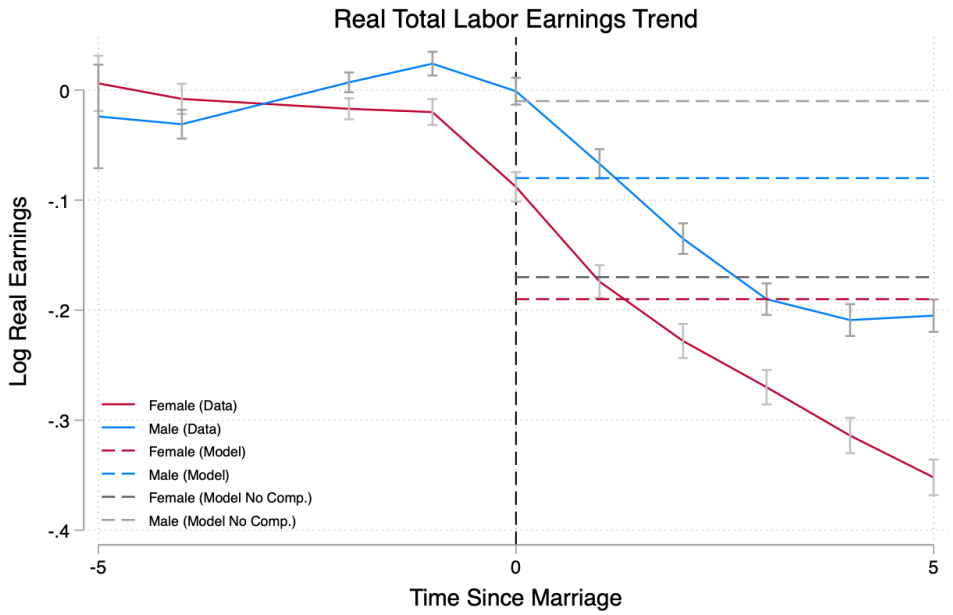


Figure 20: Real Earnings vs Average Simulated Earnings

One notable feature of the simulated earnings paths is the sharp decline in earnings at the onset of marriage. The structure of the model does not allow us to replicate the earnings trends observed in the real data, as it assumes frictionless adjustments in labor supply. Moreover, the model holds preference parameters fixed, whereas in reality, individuals' preferences for consumption and leisure are likely to evolve over time after marriage. For these reasons, the model cannot reproduce the downward earnings trend seen in the data. Nevertheless, the overall patterns of behavior generated by the model remain broadly consistent with those observed empirically.

Next, we turn to potential policy implications we may draw from the model. In the following sections, we explore how labor supply responds to (1) government lump-sum transfers, (2) differences in marriage rates, and (3) differences in marriage rates alongside aggregate shocks. These exercises allow us to think about how policies pass through to labor supply choices of households, as well as provide potential insights to labor supply in economies with low marriage rates. We report findings from the fiscal transfers and the aggregate wage shocks in the subsequent sections; the findings from the differences in marriage rates are in the appendix.

5.4.2 Government Transfers

In 2009, the Taiwanese government distributed consumer vouchers to all citizens as part of an economic stimulus package to offset the effects of the global financial crisis. Similarly, in 2020, Triple Stimulus Vouchers were issued in response to the COVID-19 recession. Most recently, the Legislative Yuan passed a special act authorizing cash transfers of 10,000 NTD (approximately 333 USD) to all citizens.

These fiscal transfers aim primarily to boost consumption and aggregate demand. However, such lump-sum transfers may also generate income or wealth effects, potentially altering household labor supply. For single households, our model predicts a straightforward wealth effect: a higher budget set raises the opportunity cost of working relative to leisure, reducing labor supply. For married households, however, the response is less clear. Married individuals already consume at a higher level, and they account for both their own and their spouse's leisure. These additional features of married households make the prediction for married households less straightforward.

In this section, we use the estimated preference parameters to examine how fiscal transfers affect the labor supply of single and married households. We model the transfer as an increase in household consumption, consistent with the model's hand-to-mouth assumption.

In 2014, the midpoint of our marriage-year sample, the median annual earnings in Taiwan were about 440,000 NTD (roughly 14,667 USD). A transfer of 10,000 NTD thus represents about 2.3% of annual income. Accordingly, we increase households' consumption by 2.5% of mean consumption in the data to simulate this policy. We also consider a larger 5% increase as an additional exercise.

Table 5 summarizes the resulting percentage changes in labor supply by marital status, calculated from simulated choices using the mean gender-specific work hours of each option in the data. As expected, higher transfers reduce labor supply, reflecting a standard wealth effect. Since consumption is assumed to be fully contemporaneous in our model, all transfers are immediately translated into consumption. The corresponding choice distributions under different transfer scenarios are reported in Appendix G.

Married households exhibit a smaller adjustment in labor supply following the transfer. This dampened response arises because married individuals already consume at a higher level than singles due to shared household consumption, making the marginal effect of additional transfers relatively small. The mathematical derivations of the marginal utility and labor supply adjustment costs under fiscal transfers are provided in Appendix F. Overall, lump-

Table 5: Labor Supply Change by Counterfactual Scenarios: Transfers

Labor Supply (Hours)	**Consumption Increase**	
	2.5%	**5%**
All Female	-11%	-13%
All Male	-5%	-8%
All Labor Supply	-7%	-10%
Single Female	-17%	-19%
Single Male	-7%	-11%
All Single	-11%	-14%
Married Female	-0.8%	-1%
Married Male	-0.8%	-2%
All Married	-0.8%	-2%

sum fiscal transfers reduce aggregate labor supply, with most of the adjustment driven by single households.

Shutting down Leisure Complementarity. We do the same exercise by setting leisure complementarity to zero. This exercise help us understand how leisure complementarity changes workers choices. Below, we report the table for the changes in the average number of hours supplied under (1) the baseline model with transfers, compared to (2) the model without leisure complementarity with transfers. As one can observe, in the first panel, married households do not see a large difference in hours supplied post-transfer. When there is no leisure complementarity, however, the changes in hours supplied for married households become much more pronounced. This implies that the complementarity in spouse leisure regulates the movements of hours supplied for married households.

5.4.3 Pass-Through to Labor Supply: Aggregate Shocks and Marriage Rates

In the final counterfactual exercise, we analyze how an aggregate economic shock affects labor supply decisions under varying marriage rates. Specifically, we simulate outcomes when all individuals experience a 50% wage reduction, under three scenarios: (1) the baseline marriage rate, (2) a 20% decline in the marriage rate, and (3) a 50% decline. The corresponding shifts in the distribution of choices are presented in Appendix G.3, while the table below reports the implied percentage changes in work hours. Each column compares hours between scenarios with and without wage cuts, holding the marriage rate constant.

Although differences in marriage rates do not substantially alter aggregate labor supply

Table G1: CF Transfers 2.5%: Labor Supply Distribution by Models

Model	**Gender**	**Status**	Δ%
Baseline (Transfers)	All Households	Female	↓ 7%
		Male	↓ 6%
		Aggregate	↓ 6.4%
	Single Households	Female	↓ 17%
		Male	↓ 8%
		All Single	↓ 12%
	Married Households	Female	↑ 2%
		Male	↓ 4%
		All Married	↓ 1%
No Leisure Comp. (Transfers)	All Households	Female	↓ 10%
		Male	↓ 5%
		Aggregate	↓ 7.3%
	Single Households	Female	-
		Male	-
		All Single	-
	Married Households	Female	↓ 18%
		Male	↓ 11%
		All Married	↓ 14.5%

Note: Δ% for baseline model refers to changes pre- and post-transfer.

levels[12], they do influence the transmission of shocks to labor supply. Average hours worked decline monotonically as marriage rates fall. As shown in Appendix G, single households adjust their labor supply more extensively than married households. Appendix E derives the corresponding Frisch elasticities, showing that married households exhibit lower elasticity than singles, explaining their smaller adjustment to shocks.

These findings have broader implications for economies with declining marriage rates. Because single and married households differ in their preferences and constraints regarding work and leisure, changes in population composition can alter the aggregate responsiveness of labor supply to economic shocks. Married households consume at a higher level due to wealth effects of marriage, and spouses coordinate their work hours due to leisure complementarity. Their wealth and leisure preferences regulate the responses to exogenous factors such as fiscal transfers and wage shocks. Consequently, married households tend to exhibit greater stability in their labor supply behavior compared to single households.

[12]See Appendix G.2.

Table 6: Labor Supply Change by Counterfactual Scenarios: Aggregate Shock

Labor Supply (Hours) with Wage ↓ 50%	**Marriage Rate Decline**		
	0%	**20%**	**50%**
All Female	-3%	-5%	-4%
All Male	-4%	-4%	-5%
All Labor Supply	-4%	-4%	-5%

Note: Changes here refer to the difference in hours between no change in wages versus wage decline by 50%, holding marriage rate constant.

6 Conclusion

This paper explores how households re-optimize when individuals enter marriages. In particular, we aim at understanding how the changes in household conditions, namely, wealth and leisure preferences, shape post-marriage labor supply decisions. We document a novel fact of earnings decline for both men and women immediately following their marriages, conditional on not having children within the first four years of their marriages. We hypothesize that this decline is attributable to wealth effects of marriages, as well as complementarity in leisure preferences between spouses. Our empirical analysis using both a universal administrative tax data and a survey data on self-reported time use show that (1) around 11% of households see earnings cuts for both spouses immediately following their marriage, suggesting that at least 11% of these households experienced wealth effects and potentially a change in leisure preferences, and (2) spouses generally choose work hours that are close to each other, suggesting a coordination of work and non-work hours, a pattern in line with our leisure complementarity story. We construct comparison groups using various methods and performed analyses for various sub-samples; all results show that the large earnings decline for both men and women are robust and not driven by particular characteristics of households.

We construct a structural collective labor supply model to estimate gender-specific preference parameters for consumption and leisure. We estimate these parameters using the survey data on time use and maximum likelihood. We find strong leisure complementarity between spouses for both genders: both men and women on average care about their spouses' leisure level and dislike large discrepancies in the amount of leisure hours between them and their spouses. Our decomposition exercise show that when shutting down the leisure com-

plementarity channel in our model, simulated choices imply that spouses tend to coordinate less in work hours (effects are mostly on the intensive margin).

We use the model to simulate earnings profiles, the patterns of which are consistent with earnings paths observed in the administrative tax data. We then use the model to perform counterfactual exercises. Results indicate that married households generally see "stickier" choices with labor supply changing at a smaller degree when given an aggregate shock, which is a direct consequence of spousal leisure terms in one's own utility function. The model also implies that as marriage rate declines, a trend that many developed countries currently exhibit, aggregate labor supply are more likely to change when the economy experience an aggregate shock. The composition of single and married households within the economy directly impacts how aggregate shocks and policies pass through to aggregate labor supply.

Several future extensions of this paper can be done: first, the current model is static and does not allow for dynamic choices for the same households pre- and post-marriage. This decision is largely due to the limitation of the time-use survey data. To extend the model into a dynamic setting, we will have to rely on the panel structure of the administrative data, though certain assumptions about hours supplied would have to be made. Second, the current model does not fit single household's choice distributions as closely as it does married households. We may thus have to consider other factors that could affect choices and improve the fit of the model. Lastly, though the choice of looking only at married households without children in the first four years after their marriages comes from the goal of understanding marriage effects on earnings net of child effects, this selection may have led to our sample preferring more leisure hours compare to the population; in future works we may incorporate couples with children back into the analysis and allow fertility to be an additional choice margin.

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Appendices

Appendix A: Additional Empirical Results

A.1 Definitions used by National Statistics of Taiwan

Below are the definitions used to generate the data used to plot Figures 1 and 2:

1. Labor force: refers to the civilian population aged 15 years or older who are eligible to work during the data standard week, including the employed and the unemployed.

2. Employed: refers to those aged 15 years or older who are engaged in paid work or unpaid family work for more than 15 hours during the data standard week.

3. Unemployed: refers to those aged 15 years or older who meet the following conditions during the data standard week: (i) are unemployed; (ii) are available to work at any time; (iii) are looking for work or have looked for work and are awaiting results. In addition, it also includes those waiting to be reinstated and those who have found employment but have not started working and are not paid.

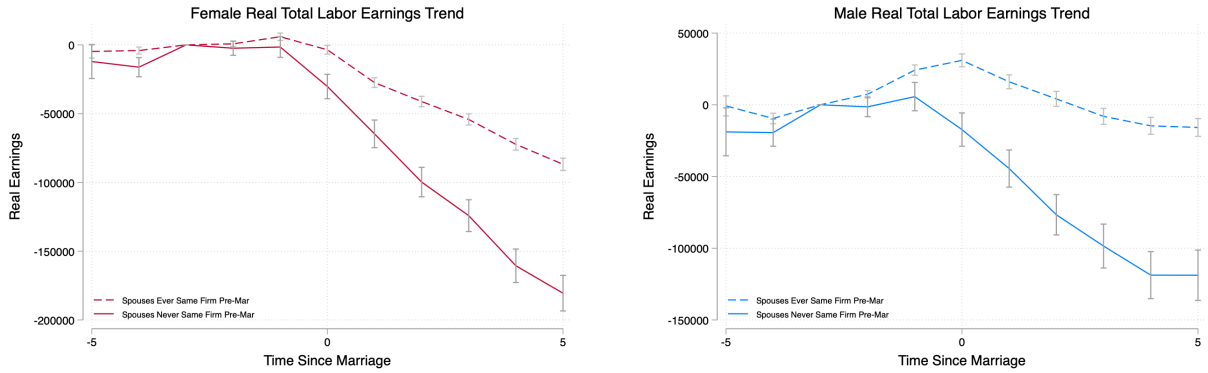
4. Non-labor force: refers to the civilian population aged 15 years or older who are not considered part of the labor force during the data standard week, including those who are not working or looking for work due to reasons such as studying, housework, old age, physical or mental disability, wanting to work but not looking for work, and other reasons.

5. Labor force participation rate: the ratio of the labor force to the civilian population aged 15 years or older. Unemployment rate: the ratio of the unemployed to the labor force.

A.2 Other Heterogeneities in Household Characteristics

In this section, we explore whether there are heterogeneous earnings response to marriage base on (1) whether spouses worked in the same firm pre-marriage, and (2) firm-level married-worker share.

Spouses in the Same Firm To test whether proximity at work affects post-marriage behavior, we examine couples employed at the same firm during the three years leading up to marriage. Because most Taiwanese firms are small or medium-sized (98% of total employment in 2023), working in the same firm likely implies regular on-the-job contact. We again estimate Equation 2 separately for whether the spouse worked in the same firm ever between $t-3$ to $t-1$. Figure A1 shows that both men and women experience large earnings declines at marriage regardless of whether they worked in the same firm. This pattern supports the hypothesis that work proximity is not a driving factor of the labor supply and earnings change we observe at marriage, and that the observed behavioral changes cannot be explained by spouses simply seeing each other on-the-job; the changes are most likely linked to non-work interactions, such as joint home production or joint leisure. However, in terms of magnitude of decline, relative to their matched comparison group, couples who did not work together experience larger post-marriage earnings declines, which speaks to the higher need of joint non-work time if couples have lower work proximity pre-marriage.



(a) Female (b) Male

Figure A1: Earnings Trends by Whether Spouses Worked in the Same Firm

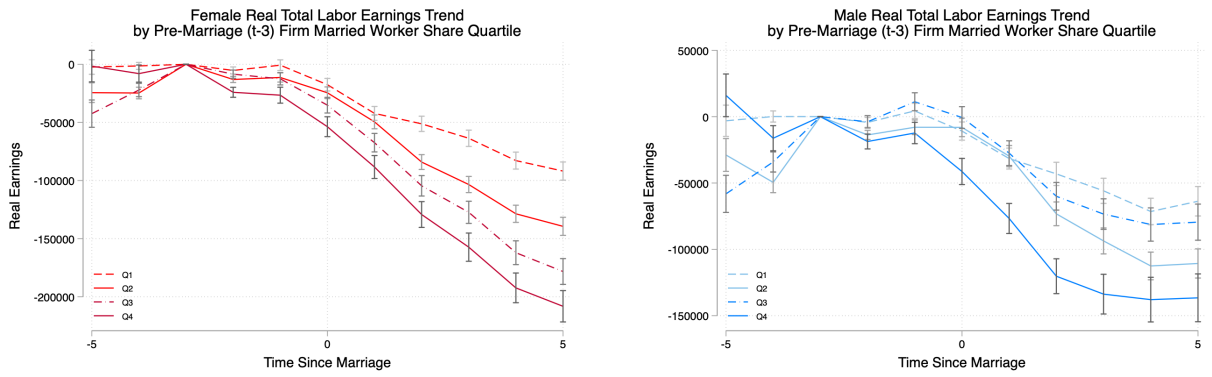
Firm's Married Worker Share Finally, we consider firm environments. Anecdotes have suggested that the behavioral changes surrounding marriage could be related to work culture. Culturally, it is quite a strong sentiment that a married individual has to devote more time to the family; firms may thus require single workers to work over hours, while have married workers only work regular hours.

If employers adjust workloads or expectations based on marital status, or if workplace norms shape behavior through peer effects, the share of married workers in a firm could influence post-marriage labor supply. More specifically, if a firm has mostly single employees, when one person gets married, the tasks that the person once was expected to complete in their over-time hours gets reassigned to other single workers in the firm. Since the firm consists of predominantly single individuals, dividing the tasks up may not be too challenging. By contrast, if a firm has most workers already married, then the reallocation of duty for an additional married person may not be as easy.

Alternatively, one can easily think of an opposite force with which a firm's married worker share could impact on individual behavior. Peer learning could also drive changes in labor supply choices. Suppose a firm has a large fraction of married individuals who immediately reduce work hours when they get married: this could create an environment in which other workers feel more comfortable taking time off when they themselves form a family. We can explore these potential other mechanisms by looking into firms' married worker share.

We compute each firm's married-worker share annually. Firms are grouped into quartiles based on their married-work share compared to other firms. We assign individuals the value observed at their employer three years before marriage ($t-3$), treating it as a fixed pre-marriage characteristic.

We again estimate Equation 2 for the four firm groups separately for both genders. Across all quartiles, both genders exhibit clear trend breaks at marriage. Interestingly, earnings adjustments are largest in the highest quartile, consisting of firms with the greatest share of married employees, which suggests that peer learning or social norms, rather than employer-imposed expectations, may be at play. Splitting the sample further by firm size yields similar results, indicating that these patterns are not driven by firm composition.



(a) Female

(b) Male

Figure A2: Earnings Trends Relative to Comparison Group, Firm Married Worker Share

A.3 Hours Response Heterogeneity: Differences in Pre-Marriage Earnings

We use survey data to examine whether pre-marriage earnings predict differential adjustments in work hours after marriage. Given the smaller sample size, we split individuals into above- and below-median pre-marriage earnings groups and estimate a difference-in-differences model (Table A3).

Among above-median earners, female spouses exhibit significant reductions in self-reported work hours and increases in leisure time after marriage, whereas effects for men are smaller. These results complement our administrative data findings: higher-income individuals, especially female, are more likely to cut back on work and expand leisure post-marriage. Note that pre-marriage earnings are measured at $t-3$; this analysis focuses on individuals with positive pre-marital income, and hence the sample here is much smaller than the previous difference-in-differences sample.

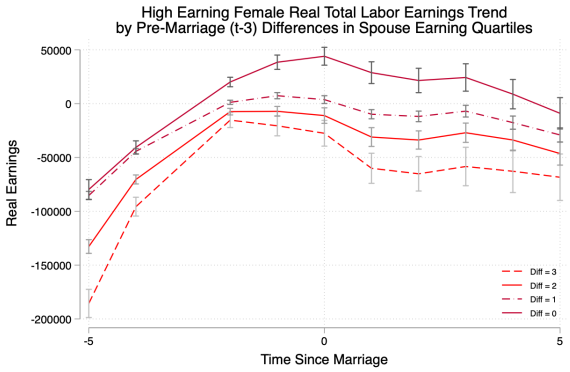
Outcome Variable:	Self-Reported Work Hours		Estimated Leisure Hours	
	Female	Male	Female	Male
Treatment	24.901***	32.762*	-18.968**	-31.369*
	(3.290)	(18.270)	(7.022)	(17.644)
Post	6.058**	4.993	-1.816	-5.767
	(2.792)	(5.013)	(2.866)	(6.224)
DID	-1.269	-12.860	0.008	13.585
	(6.068)	(19.612)	(6.438)	(16.788)
$\mathbb{1}${Pre-Mar Earnings Above Median}	22.598***	16.189*	-12.976**	-13.292
	(3.903)	(9.174)	(4.779)	(9.516)
Treatment x $\mathbb{1}${Pre-Mar Earnings Above Median}	-21.231**	-23.497	19.683	18.929
	(5.615)	(19.060)	(12.949)	(19.091)
Post x $\mathbb{1}${Pre-Mar Earnings Above Median}	-7.742**	-8.171	2.324	9.257
	(3.215)	(6.707)	(4.528)	(8.001)
DID x $\mathbb{1}${Pre-Mar Earnings Above Median}	-3.392	0.900	6.997	0.184
	(6.319)	(23.133)	(10.341)	(22.161)
N	199	518	174	466
AR^2	0.5046	0.1844	0.6114	0.2362

Table A3: Difference-in-differences Regression Results by Pre-Marriage Earnings Group

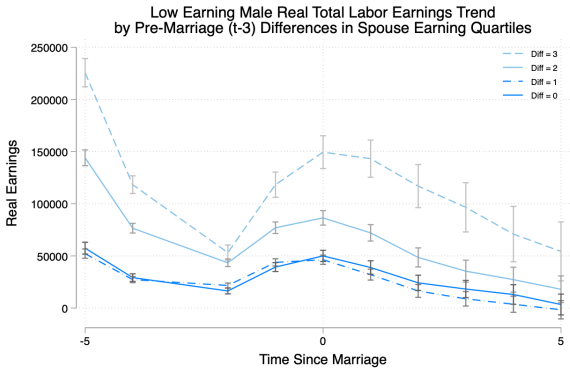
A.4 Differences in Earnings Quartile of Spouses

Below we present the earnings trends of different subgroups, separated by the distance between the spouses' earnings quartile and conditioning on individual and age effects. Each coefficient indicates the level of earnings relative to $t-3$ earnings. When difference is zero, this means that the spouses are in the same quartile in $t-3$. We plot these responses separately by whether the spouse is the higher earner or the lower earner in the household.

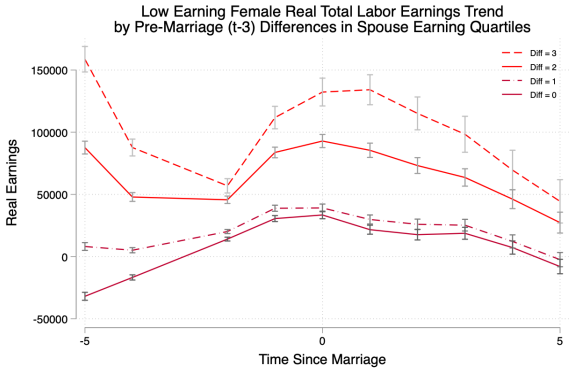
For higher earnings, the patterns are similar across the four groups, while for the lower earners (Panels (b) and (c)), observe that the lowest earners (with Diff = 3) are the ones that sees the largest decline in earnings post-marriage.



(a) High-Earning Female



(b) Low-Earning Male



(c) Low-Earning Female



(d) High-Earning Male

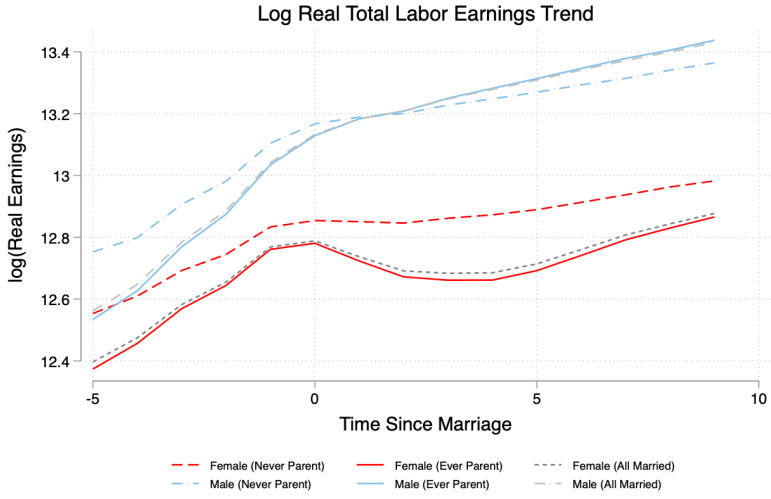
Figure A4: Earnings Trends - Differences in Spouse Pre-Marriage Earnings Quartiles

A.5 Additional Plots

Figures A5 and A6 below present more earnings trends by different household types.

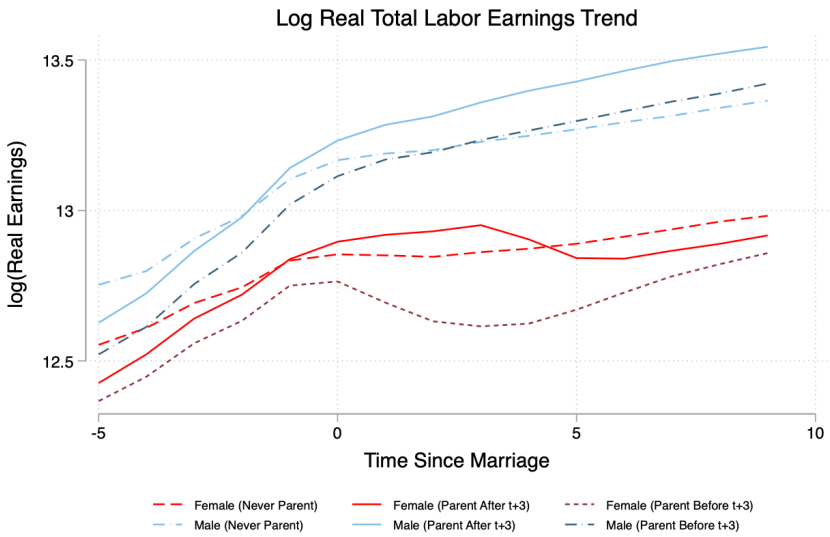


(a) All Married

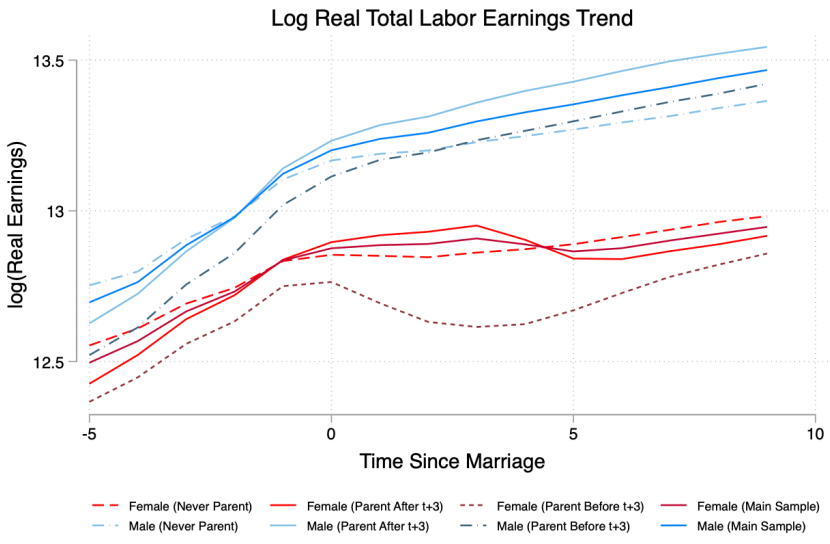


(b) By Whether Ever Parent

Figure A5: Earnings Trends by Household Types



(a) By Parent Timing



(b) Main Sample vs Other Groups

Figure A6: Additional Earnings Trends by Household Types

Figure A7 below presents the trends in firm effects by gender, plotted against years since marriage; Figure A8 plots the likelihood of switching employers in a similar fashion.

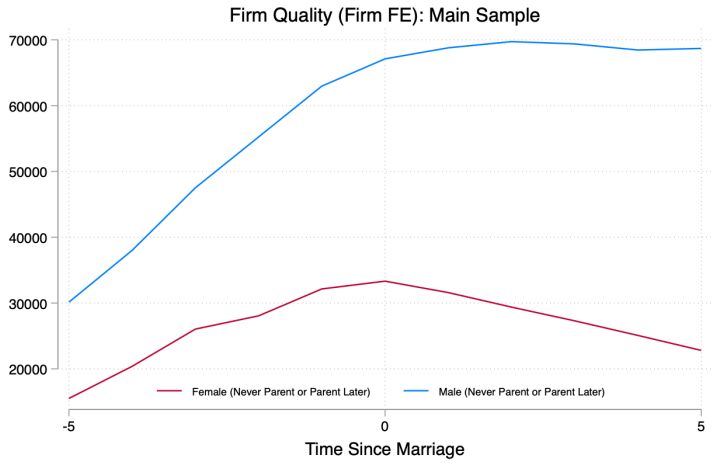


Figure A7: Firm Effects by Gender and Years Since Marriage

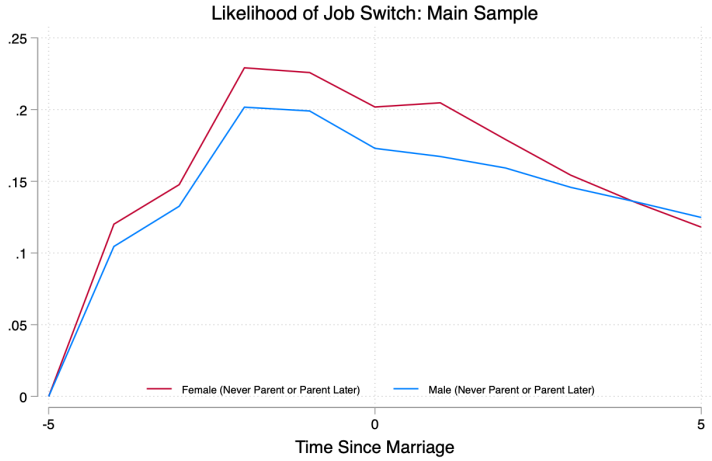


Figure A8: Likelihood of Job Switches by Gender and Years Since Marriage

Figure A9 plots the likelihood of an individual leaving the labor market and never return within the span of the data; Figure A10 plots the likelihood of being a multiple-job holder.

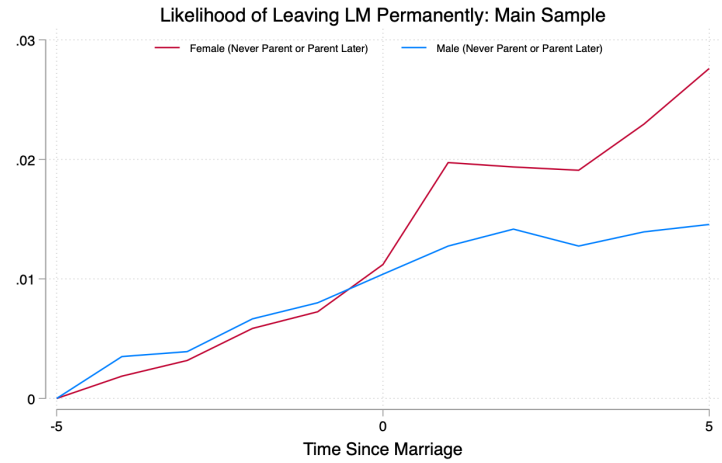


Figure A9: Likelihood of Leaving Labor Market Permanently, by Gender and Years Since Marriage

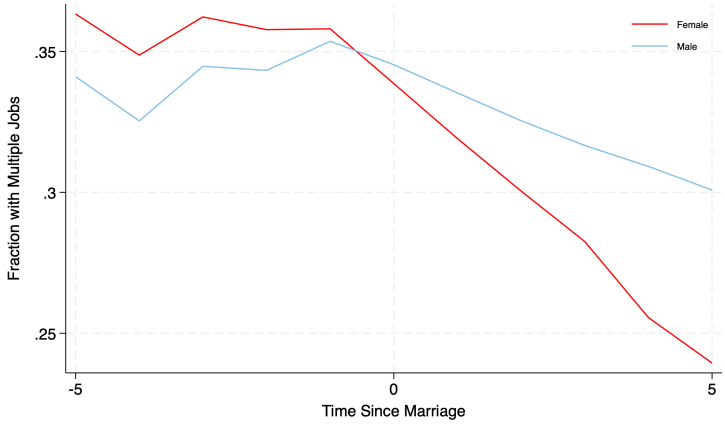
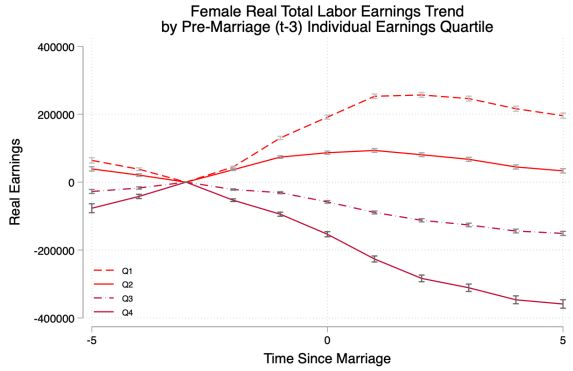
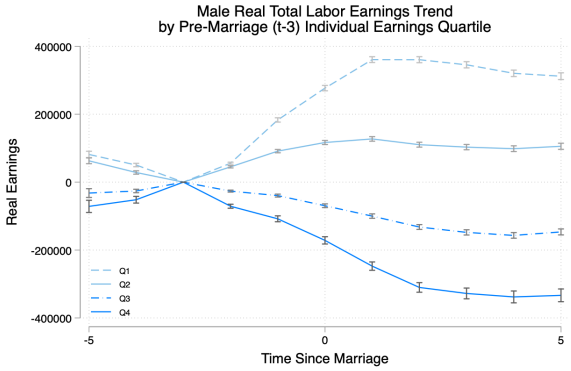


Figure A10: Likelihood of being Multiple Job Holder by Gender and Years Since Marriage

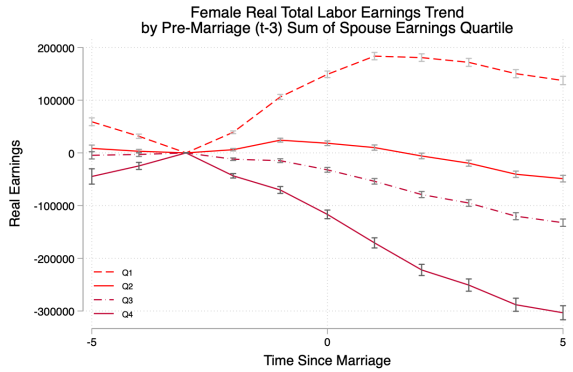
Figure A11 compares the earnings paths of different pre-marriage earnings groups to constructed comparison groups.



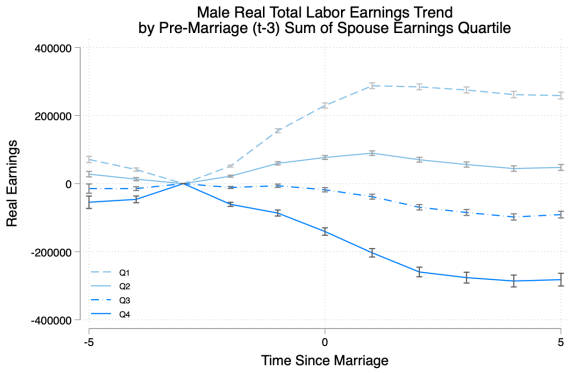
(a) Female - Individual Earnings



(b) Male - Individual Earnings



(c) Female - Sum of Spouse Earnings



(d) Male - Sum of Spouse Earnings

Figure A11: Event Studies by Pre-Marriage Earnings Group (Quartile at $t-3$) - Compared Against Constructed Control

Appendix B: Cross-Country Comparison - NLSY97

Below are the earnings and work hours trends of the U.S. constructed by the National Longitudinal Survey of Yout 1997 (NLSY97) data.



Figure B1: NLSY97 - Earnings Trends Against Marriage Year

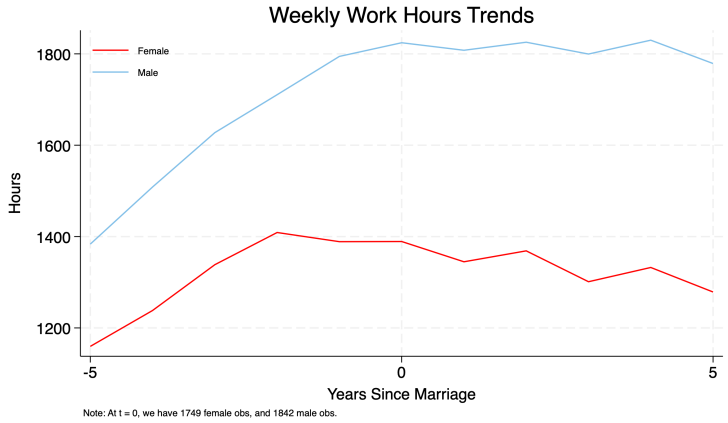


Figure B2: NLSY97 - Hours Trends Against Marriage Year

Figures B3 and B4 splits the sample by whether the individual ever had any children. One can observe that the pattern is very similar to what we saw using the Taiwanese administrative data.

Similar to what we did for the main analysis of the paper, we further ran event studies controlling for age and individual fixed effects. Though due to the smaller sample size we see a larger standard error, one can conclude that the pattern still holds even with these controls. Below are the figures. These findings suggests that the adjustments in work hours

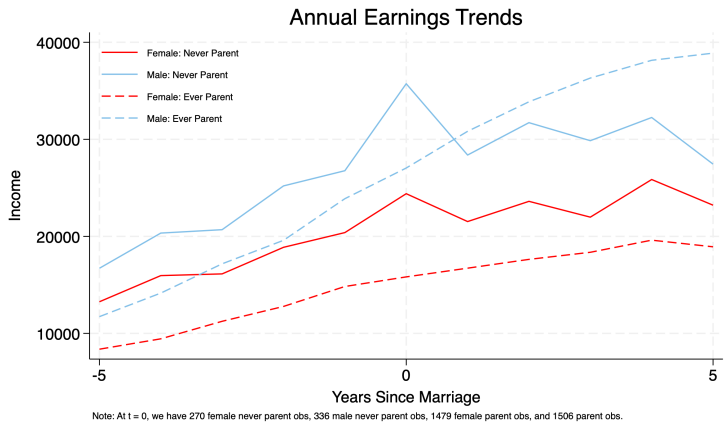


Figure B3: NLSY97 - Earnings Trends Against Marriage Year, Ever vs Never Parent

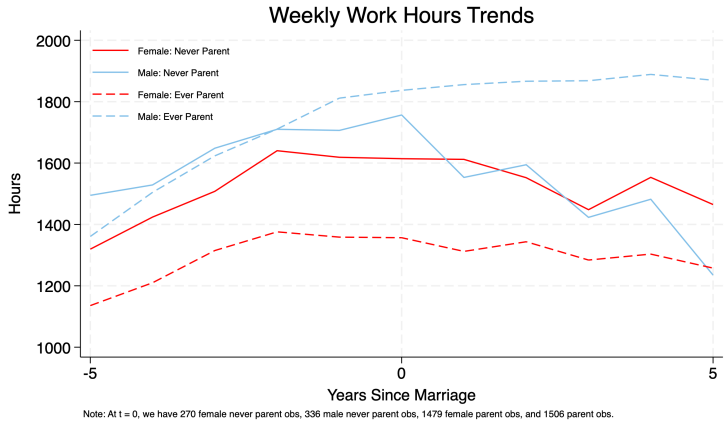


Figure B4: NLSY97 Sample - Hours Trends Against Marriage Year, Ever vs Never Parent

and therefore earnings is not a pattern only observed in the Taiwanese data. Even in the U.S. where the labor market, the culture and the norms are drastically different from Taiwan, we see similar behavior of married men and women.

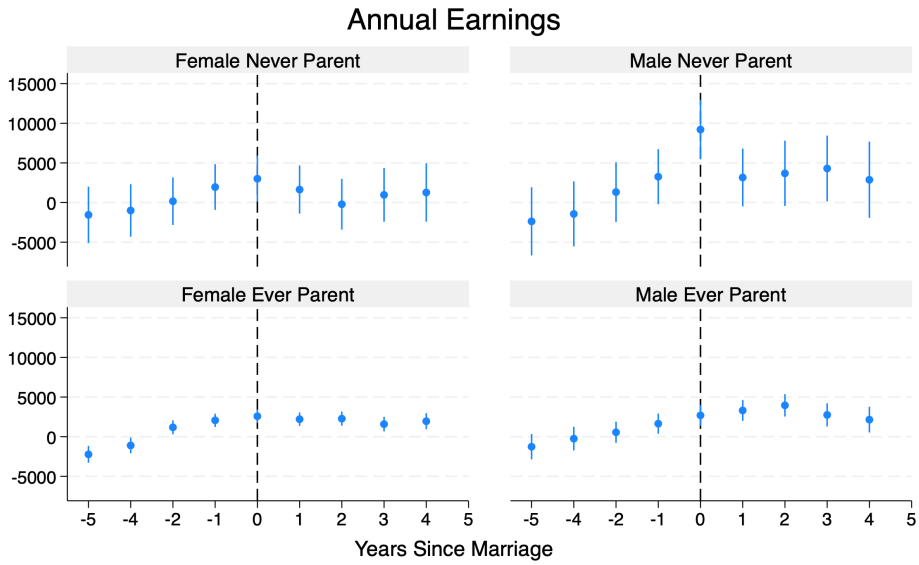


Figure B5: NLSY97 - Earnings Trends with Age and Individual FEs

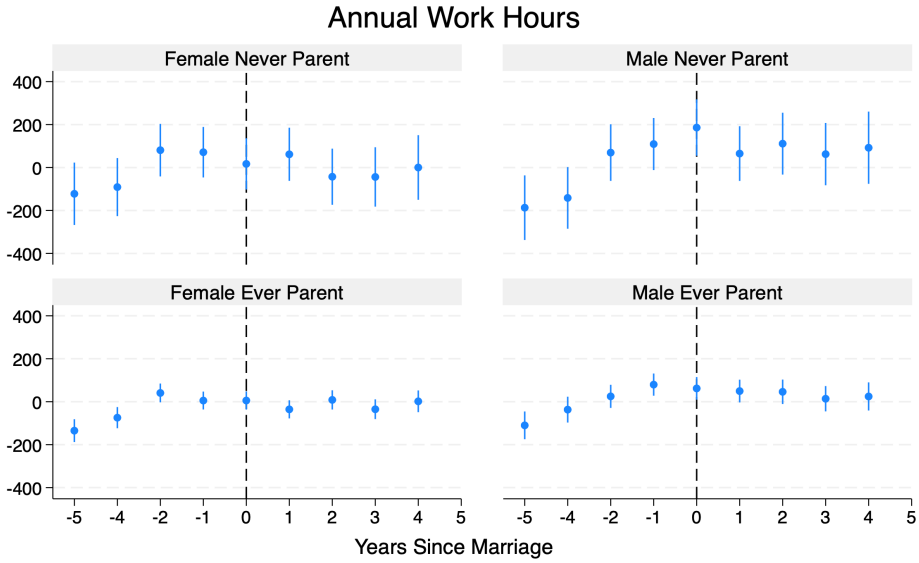


Figure B6: NLSY97 Sample - Hours Trends with Age and Individual FEs

Appendix C: Assets Data

C.1 Assets Calculation and Imputation

Land and Housing. We obtained per unit land and house price using public information from the real estate information platform of the Ministry of the Interior.

The Ministry of the Interior started recording transaction price registration data since 2013. We obtain the data from the site, and then calculate the average unit real estate price for each transaction as well as the real estate price for each county and city.

County/city and township/district codes consist of a county/city code plus a two-digit district code (e.g., Songshan District, Taipei City = A01). The county code matches the first digit of the ID number. District codes are available from the transaction registration data, which allows us to match transaction records to our tax data using district codes. We match the records to our administrative tax data by year. After computing the average unit price for each county/city, for each township/district within that county/city (using Songshan District as an example, which has code A01 in Taipei City), we adjust its unit real estate price as follows:

$$p_{A01,t} \equiv \frac{p_{A,t} + \sum_{i=1}^{n} p_{A01,t,i}}{n+1}$$

where $p_{A,t}$ is the average unit real estate price of Taipei City in year t, $p_{A01,t,i}$ is the j-th transaction in Songshan District that year, and n is the number of transactions in Songshan that year. We do such a adjustment because many districts have very few transactions, making prices unrepresentative and highly volatile. With this empirical Bayes adjustment, as n decreases, the city average weighs more heavily; when $n = 0$, we simply replace the district average with the city average.

We then use the administrative tax data to compute

$$r^{h}_{A01,t} \equiv \frac{\sum_{i=1}^{m^h} {}_{A01,t} p^{ah}_{A01,t,i} \times a^{h}_{A01,t,i}}{\sum_{i=1}^{m^l_{A01,t}} p^{al}_{A01,t,i} \times a^{l}_{A01,t,i} + \sum_{i=1}^{m^h_{A01,t}} p^{ah}_{A01,t,i} \times a^{h}_{A01,t,i}}$$

where m^l, p^{al}, a^l are the number of land parcels, unit assessed land values, and land area from the land file respectively; m^h, p^{ah}, a^h are the number of housing units, unit assessed housing

values, and housing area from the housing file respectively. $r^h_{A01,t}$ measures the proportion of housing in the real estate value of Songshan District in Taipei for that year.

We can then calculate adjusted unit market values of housing and land for Songshan:

$$\begin{aligned} p^h_{A01,t} &\equiv p_{A01,t} \times r^h_{A01,t} \\ p^l_{A01,t} &\equiv p_{A01,t} \times (1 - r^h_{A01,t}) \end{aligned}$$

We can also compute the average assessed unit value of land and housing for Songshan that year. For the i-th transaction of housing and for the i-th transaction of land, the adjusted unit values are

$$\begin{aligned} p^h_{A01,t,i} &\equiv p^h_{A01,t} \times \frac{p^{ah}_{A01,t,i}}{p^{ah}_{A01,t}} \\ p^l_{A01,t,i} &\equiv p^l_{A01,t} \times \frac{p^{al}_{A01,t,i}}{p^{al}_{A01,t}} \end{aligned}$$

For remote counties like Penghu, Kinmen, and Lienchiang, where transaction counts are few and relatively unstable, we directly use assessed values as market prices without adjustment.

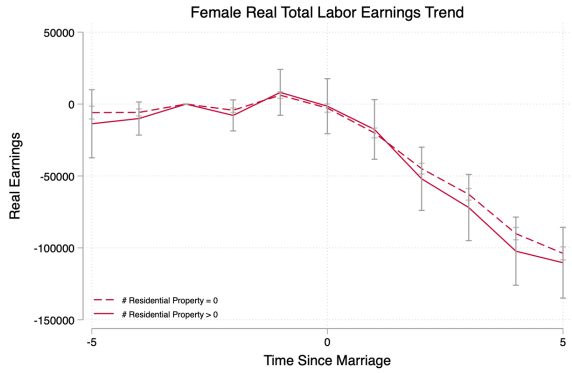
For years before 2013, we use the Sinyi Housing Price Index to calculate annual growth rates for each county/city. Prices are then calculated using the previous year's unit value. For example, if the growth rate of Taipei's index between year t and $t+1$ (where $t < 2013$) is $g_{A,t}$, then

$$p^{A01,t} = \frac{p_{A01,t+1}}{1 + g_{At}}$$

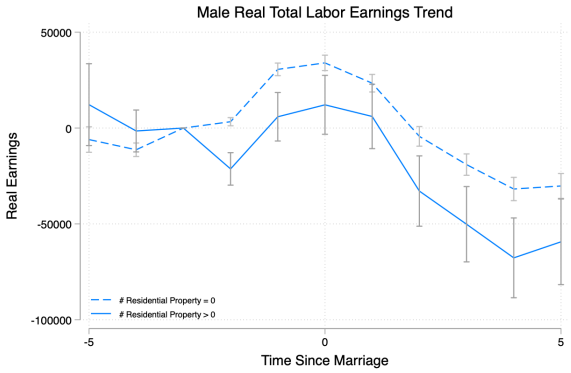
Thus, we can backtrack from 2013 to 2012, from 2012 to 2011, and so on. For counties without a local Sinyi index, we substitute the national index.

C.2 Real Earnings Trends by Pre-Marriage Units of Housing

The figures below show the results of comparing real total earnings of married individuals to those in the comparison group.



(a) Female (Own Real Estate)



(b) Male (Own Real Estate)



(c) Female, (Future Spouse's Real Estate)



(d) Male, (Future Spouse's Real Estate)

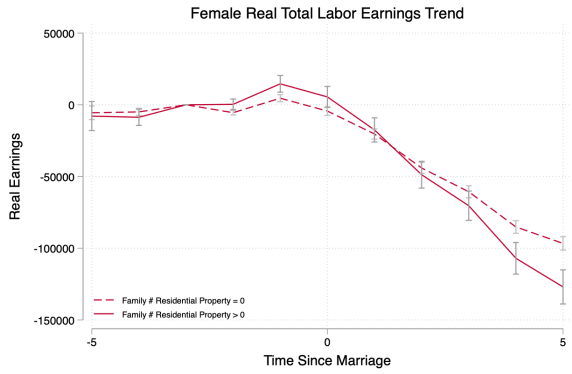


(e) Female, (Sum of Spouses' Real Estate)

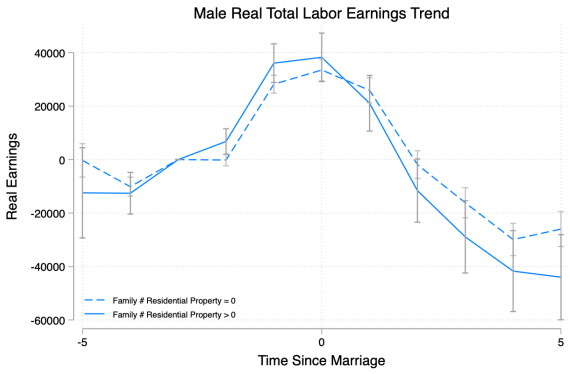


(f) Male, (Sum of Spouses' Real Estate)

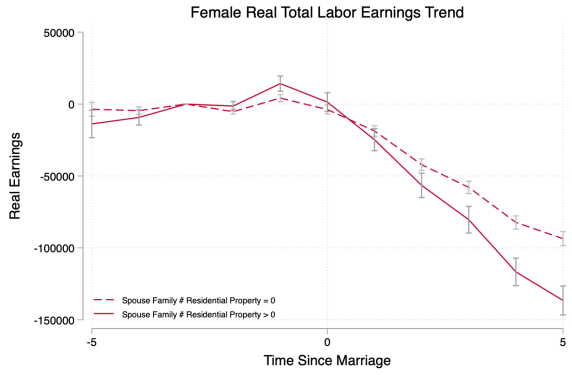
Figure C1: Earnings Trends by Pre-Marriage $(t-3)$ Individual/Spouse Assets (Real Estate: Housing), Controlling for Age and Individual FEs



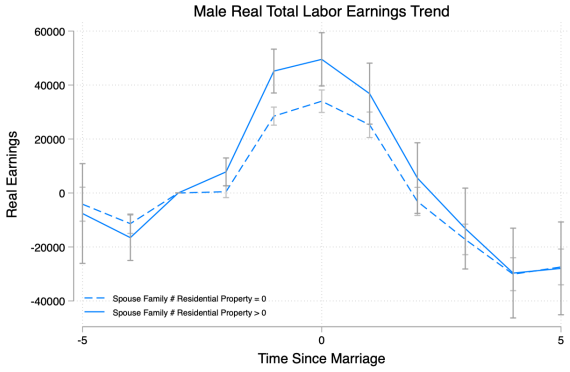
(a) Female (Family's Real Estate)



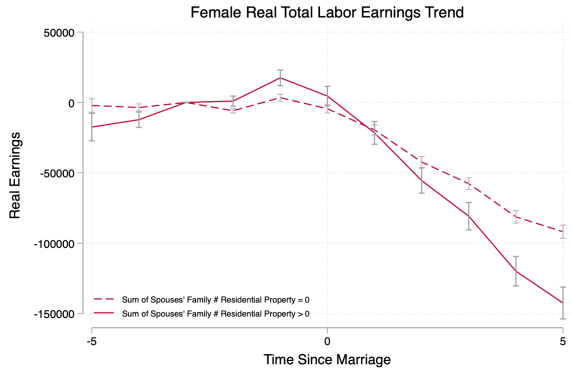
(b) Male (Family's Real Estate)



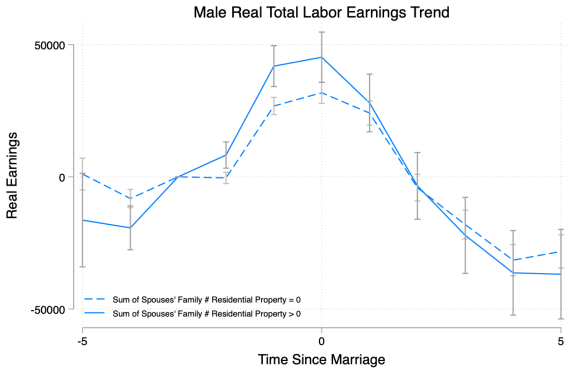
(c) Female, by Future Spouse's Family's Number of Houses



(d) Male (Future Spouse's Family's Real Estate)



(e) Female (Sum of Own and Future Spouse's Families' Real Estate)



(f) Male (Sum of Own and Future Spouse's Families' Real Estate)

Figure C2: Earnings Trends by Pre-Marriage $(t-3)$ Individual/Spouse **Family** Assets (Real Estate: Housing), Controlling for Age and Individual FEs

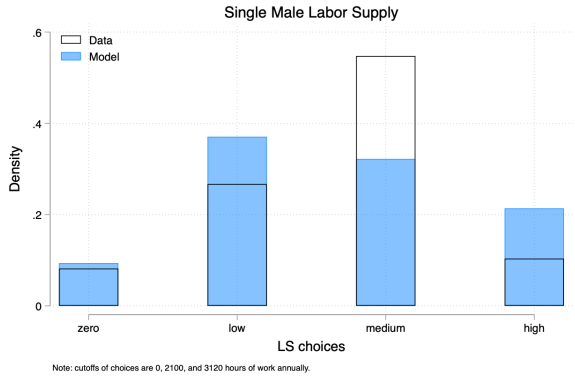
Appendix D: Baseline Model Fit & Alternative Model

D.1 Additional Figures for Baseline Model Fit

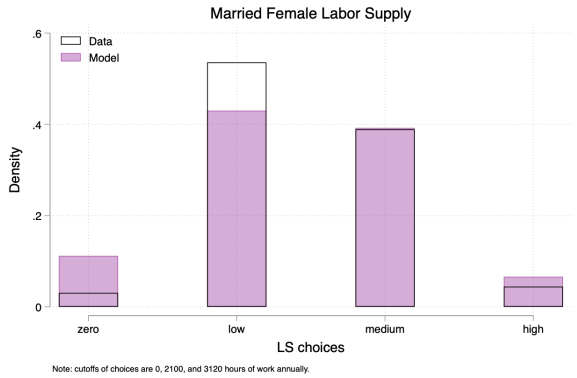
Below, we plot the distribution of labor supply choices and leisure choices by household types. Single households see a under-prediction in the third choice (hours between 2100 and 3120). For married households, the distribution of the joint labor supply choices predicted by the model are consistent with the real data pattern wise. Split by gender, we could see a very close match up for married men, while a slight under-prediction for low work hours for married women.



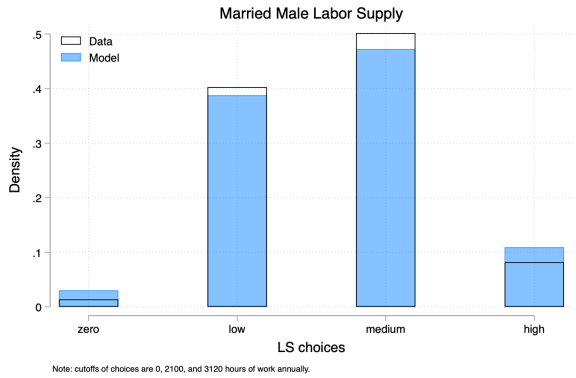
(a) Single Female



(b) Single Male

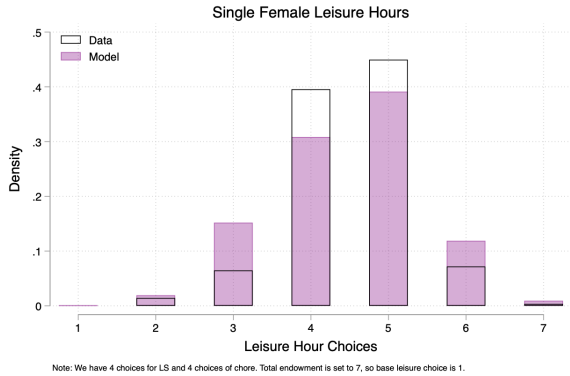


(c) Married Female

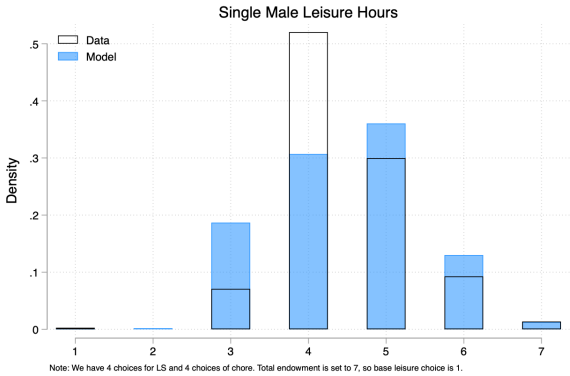


(d) Married Male

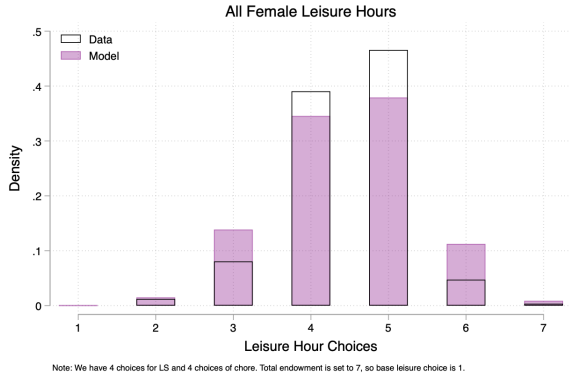
Figure D1: Model-Generated vs Data LS Choices



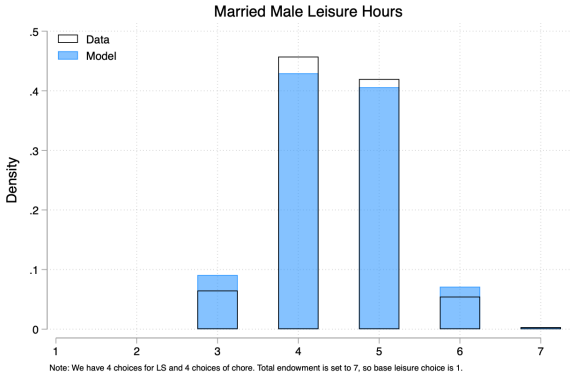
(a) Single Female



(b) Single Male

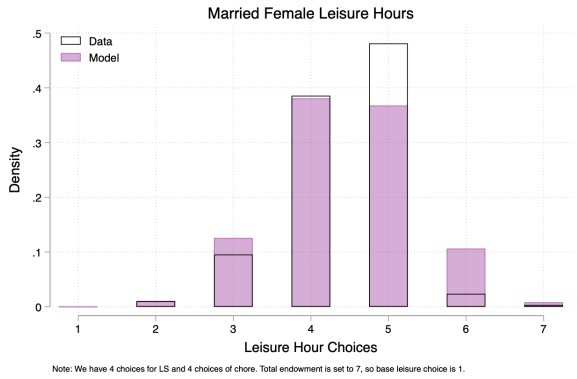


(c) Married Female

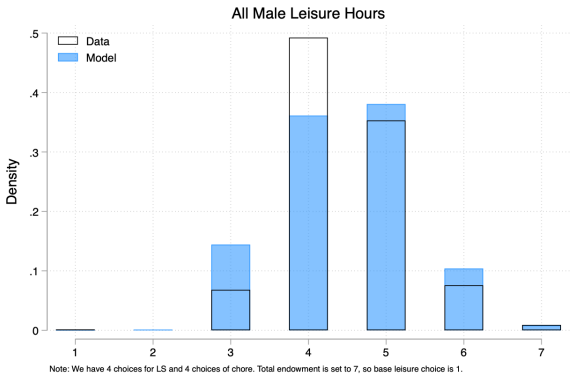


(d) Married Male

Figure D2: Model-Generated vs Data Leisure Hours



(a) All Female

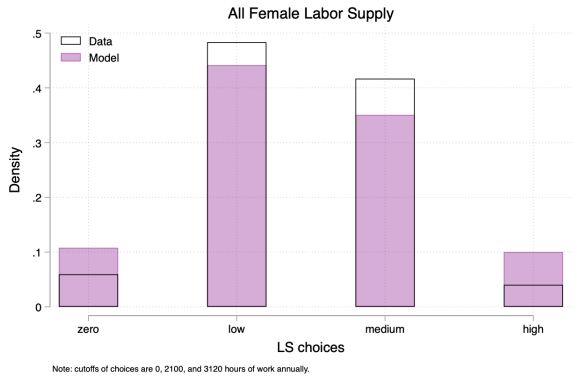


(b) All Male

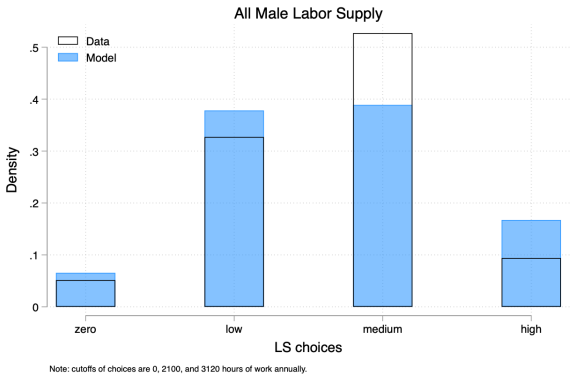
Figure D3: Model-Generated vs Data Leisure Hours

D.2 Alternative Model Specification

Below is the table that reports estimated parameters when we define Pareto weights as a function of relative wages of spouse. Below the table, we also present the model fit of this alternative specification.



(a) All Female

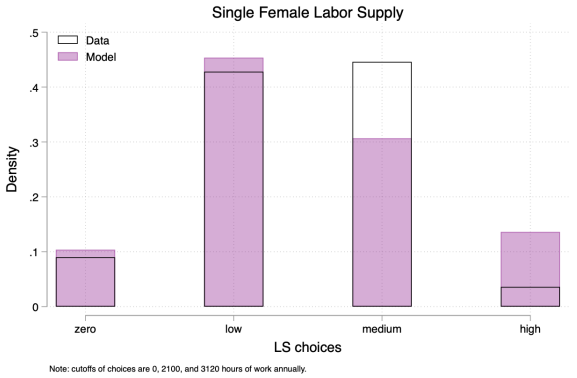


(b) All Male

Figure D4: Model-Generated vs Data LS Choices: Aggregate

	Estimate	Std. Err.	z-value
Men's Preference Parameters			
Consumption			
β_{c0}^{m}	0.19***	0.05	3.63
β_{c1}^{m}	0.79***	0.01	11.11
Leisure			
Constant	0.02	0.06	0.09
Spouse Leisure Level	0.52***	0.01	6.63
(Spouse Leisure Level)^2	-0.07***	0.00	-6.40
Own and Spouse Leisure Diff.	-0.05***	0.00	-2.52
0.00 Age	0.02***	0.02	1.03
Education	0.05***	0.00	1.88
Women's Preference Parameters			
Consumption			
β_{c0}^{f}	0.35***	0.02	2.26
β_{c1}^{f}	0.90***	0.01	6.39
Leisure			
Constant	0.11*	0.07	0.04
Spouse Leisure	0.45***	0.01	4.74
(Spouse Leisure Level)^2	-0.06***	0.00	-4.75
Own and Spouse Leisure Diff.	-0.04***	0.00	-2.33
Age***	0.02	0.00	1.20
Education	0.07***	0.00	2.34
Pareto Weight			
Men's Relative Wage	0.80***	0.03	2.96
Observations	938 HH (278 SF, 367 SM, 293 Mar.)		
Log-Likelihood	-1389.73		

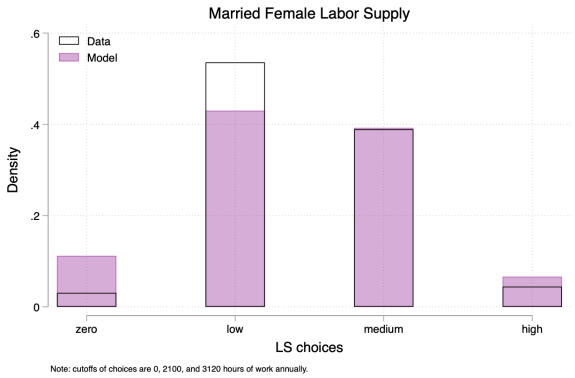
Table D1: Estimation Results



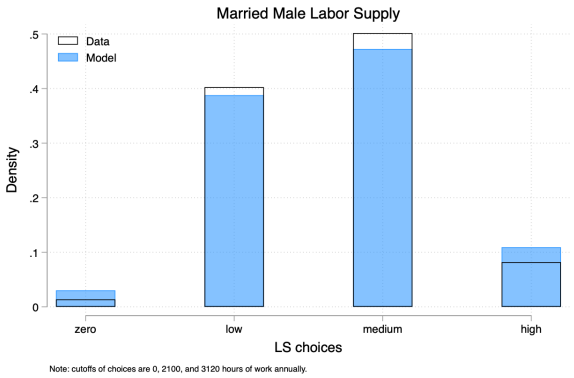
(a) Single Female



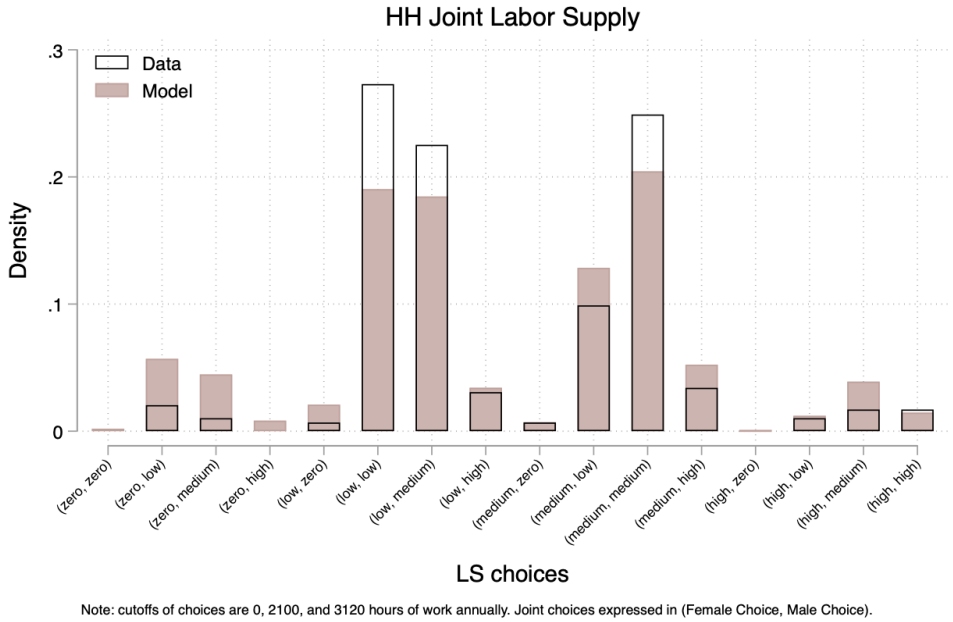
(b) Single Male



(c) Married Female

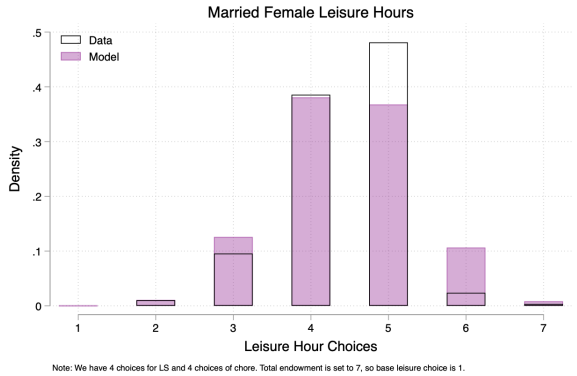


(d) Married Male

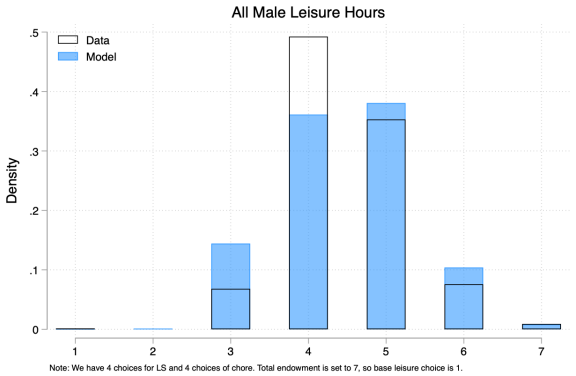


(e) Married Household Combined LS

Figure D5: Model-Generated vs Data LS Choices

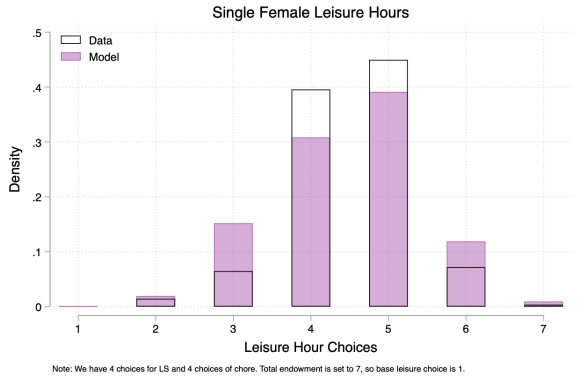


(a) All Female

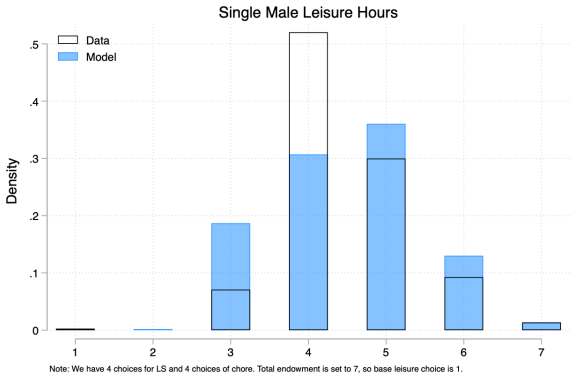


(b) All Male

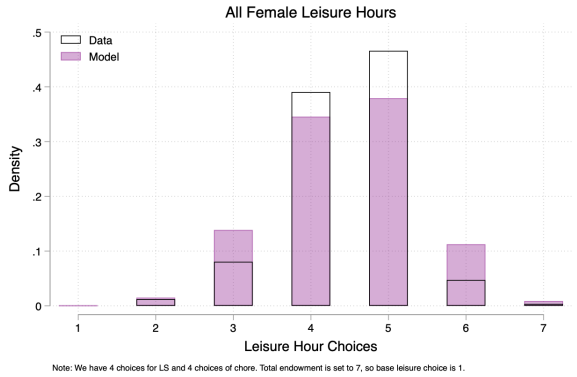
Figure D6: Model-Generated vs Data Leisure Hours



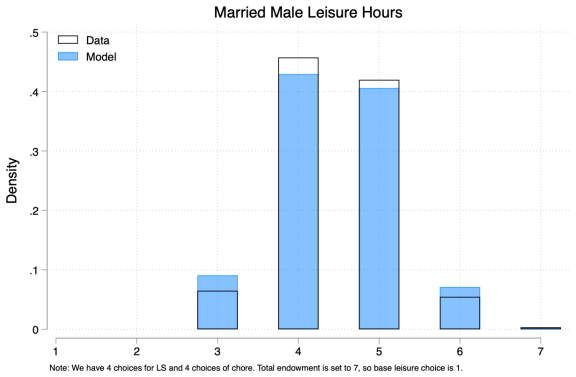
(a) Single Female



(b) Single Male



(c) Married Female



(d) Married Male

Figure D7: Model-Generated vs Data Leisure Hours

Appendix E: Derivation of the Frisch Elasticity

1. Single Households

For a single individual of type j, the first-order condition (FOC) is:

$$\frac{\beta_j^j}{l} = M_c(c)\, w, \qquad \text{where } M_c(c) \equiv \beta_{c0}^j\, c^{-\beta_{c1}^j}.$$

Solve for leisure:

$$l = \frac{\beta_j^j}{M_c\, w}.$$

Differentiate holding M_c fixed (this is the Frisch exercise, holding the marginal utility of wealth constant). For a small proportional change in wage:

$$\frac{d\ln l}{d\ln w}\Big|_{M_c} = -1.$$

Thus, leisure has unit (negative) elasticity with respect to wage under a log-type leisure term. For hours $h = \bar{L} - l$,

$$\frac{dh}{dw} = -\frac{dl}{dw} = \frac{l}{w}.$$

Hence, the Frisch elasticity of hours (the percentage change in hours per percentage change in wage, holding M_c fixed) is:

$$\boxed{\varepsilon_h^{(\text{single})} = \frac{d\ln h}{d\ln w}\Big|_{M_c} = \frac{l}{h}.}$$

Thus, the single's hour elasticity equals the ratio of leisure to hours at the baseline. Intuitively, if leisure is small relative to hours, hours are less elastic.

2. Married Households

The married FOCs (from earlier) are:

$$F_m(l^m, l^f, c) \equiv \mu\frac{\beta_m^m(l^f, l^m)}{l^m} + (1-\mu)\frac{\partial\beta_f^f}{\partial l^m}\ln l^f - M_c(c)\, w^m = 0,$$

$$F_f(l^m, l^f, c) \equiv (1-\mu)\frac{\beta_f^f(l^m, l^f)}{l^f} + \mu\frac{\partial\beta_m^m}{\partial l^f}\ln l^m - M_c(c)\, w^f = 0,$$

with

$$M_c(c) = \mu\beta_{c0}^m c^{-\beta_{c1}^m} + (1-\mu)\beta_{c0}^f c^{-\beta_{c1}^f}.$$

For the Frisch elasticity, we hold M_c fixed. Take a small proportional change in one wage (say w^m), and linearize the two FOCs in percentage changes $x_m \equiv d\ln l^m$, $x_f \equiv d\ln l^f$, and $s \equiv d\ln w^m$.

We can express this system as:

$$\underbrace{\begin{pmatrix} A_{mm} & A_{mf} \\ A_{fm} & A_{ff} \end{pmatrix}}_{\mathbf{A}} \begin{pmatrix} x_m \\ x_f \end{pmatrix} = \begin{pmatrix} B_m \\ B_f \end{pmatrix} s.$$

Here,

$$A_{mm} = -\frac{\partial F_m}{\partial \ln l^m}, \quad A_{mf} = -\frac{\partial F_m}{\partial \ln l^f}, \quad \text{etc.}$$

and

$$B_m = M_c w^m, \quad B_f = 0 \quad \text{(since only } w^m \text{ changes)}.$$

A collects second-derivative terms from the β and ln terms. They are typically **positive on the diagonal** because leisure utility is concave in l^m and l^f; off-diagonal elements are typically **positive when leisure is complementary across spouses** because

$$\frac{\partial^2 v}{\partial l^m \, \partial l^f} > 0.$$

Solving the above system:

$$\begin{pmatrix} x_m \\ x_f \end{pmatrix} = \mathbf{A}^{-1} \begin{pmatrix} B_m \\ B_f \end{pmatrix} s.$$

The Frisch elasticity of male hours (percentage change in male hours per percentage change in male wage, holding M_c fixed) is:

$$\varepsilon_h^{(m)} = \frac{d\ln h^m}{d\ln w^m}\Big|_{M_c} = \frac{l^m}{h^m} x_m,$$

since $d\ln h^m = (l^m/h^m)\, d\ln l^m$.

3. Discussions

Single v.s. Married Frisch Elasticities. Two mathematical facts explain why married responses are smaller:

1. **The married denominator is a matrix with larger curvature.** In the single case, the relevant curvature term is scalar:

$$A_{\text{single}} \sim \frac{\beta_j^j}{l^2}.$$

For the married case, the matrix $\mathbf{A}$ has diagonals with additional curvature terms from cross-leisure effects (the γ terms) and positive off-diagonals when leisure is complementary across spouses ($\partial^2 v/\partial l^m \partial l^f > 0$). Thus, $\mathbf{A}$ is "larger" in a positive-definite sense.

2. **Inverting a higher-curvature matrix yields smaller responses.** Comparing the single scalar denominator A_{single} to the relevant element of $\mathbf{A}^{-1}$:

$$x_m = [\mathbf{A}^{-1}\mathbf{B}]_1 = \frac{A_{ff}B_m - A_{mf}B_f}{\det(\mathbf{A})}s.$$

With $B_f = 0$, we have $x_m = (A_{ff}B_m)/\det(\mathbf{A})$. Because $\det(\mathbf{A})$ increases with curvature and complementarity, $|x_m| < 1$, implying a smaller Frisch response.

Comparisons of curvatures. Let a_{single} denote the single-agent curvature, and $\mathbf{A}$ the married Jacobian. For a single:

$$x^{\text{single}} = -1.$$

For the married male:

$$x_m = \frac{\text{adj}(\mathbf{A})_{11}\, B_m}{\det(\mathbf{A})}s.$$

Since $\det(\mathbf{A})$ rises with diagonal curvature and positive off-diagonals,

$$|x_m| < |x^{\text{single}}| \quad \Rightarrow \quad \varepsilon_h^{(\text{married})} < \varepsilon_h^{(\text{single})}.$$

Summary. From our derivation, we can draw the following conclusions:

1. When leisure complementarity is *negative*, married elasticity could exceed single elasticity. Our model estimation suggests that spouses have positive leisure complementarity.
2. For single households, under log-leisure preferences, $\varepsilon_h^{(\text{single})} = l/h$.
3. For married households, the matrix $\mathbf{A}$ encodes higher curvature and complementarity, yielding smaller ε_h.

Hence, married individuals exhibit smaller Frisch hour elasticities than comparable singles, all else equal.

Appendix F: Lump-sum Fiscal Transfers

We derive the difference in labor supply response to a lump-sum transfer for single and married households under the utility functions used in the model.

1. Setup

For a single of type j, utility is given by

$$v^j(c,l) = \beta_{c0}^j \frac{c^{1-\beta_{c1}^j}}{1-\beta_{c1}^j} + \beta_j^j \ln(l),$$

where $c = w^j h + y$ and $l = \bar{L} - h$.

For a married household,

$$U^{hh} = 2\left[\mu(r) v^m(c, l^m, l^f) + (1-\mu(r)) v^f(c, l^m, l^f)\right],$$

with joint consumption $c = w^m h^m + w^f h^f + y$, and

$$v^m = \beta_{c0}^m \frac{c^{1-\beta_{c1}^m}}{1-\beta_{c1}^m} + \beta_m^m(l^f, l^m)\ln(l^m), \qquad v^f = \beta_{c0}^f \frac{c^{1-\beta_{c1}^f}}{1-\beta_{c1}^f} + \beta_f^f(l^m, l^f)\ln(l^f).$$

2. Single Individual: Reduce Labor by One Hour

The baseline values are h, $l = \bar{L} - h$, and $c = w^j h + y$. After reducing labor by one hour, we have

$$h' = h - 1, \quad l' = l + 1, \quad c' = c - w^j + \Delta y_{\text{single}},$$

where Δy_{single} denotes the lump-sum transfer.

The exact net utility change is

$$\boxed{\Delta U_{\text{single}} = v^j(c - w^j + \Delta y_{\text{single}},\, l+1) - v^j(c,\, l)}.$$

Expanding this expression gives

$$\Delta U_{\text{single}} = \beta_{c0}^j \frac{(c - w^j + \Delta y_{\text{single}})^{1-\beta_{c1}^j} - c^{1-\beta_{c1}^j}}{1-\beta_{c1}^j} + \beta_j^j \left[\ln(l+1) - \ln(l)\right].$$

3. Married Couple: Both Reduce Labor by One Hour

Baseline choices are (h^f, h^m), $l^f = \bar{L} - h^f$, $l^m = \bar{L} - h^m$, and $c = w^f h^f + w^m h^m + y$. After both spouses reduce work by one hour:

$$h^{f'} = h^f - 1, \quad h^{m'} = h^m - 1, \quad l^{f'} = l^f + 1, \quad l^{m'} = l^m + 1,$$

so that consumption changes by

$$\Delta c_{\text{hh}} = -(w^f + w^m) + \Delta y_{\text{hh}},$$

where Δy_{hh} is the total transfer to the household (e.g. $\Delta y_{\text{hh}} = 2T$ if each spouse receives T).

The net utility change is

$$\boxed{\Delta U_{\text{hh}} = 2\left[\mu(r)\left(v^m(c + \Delta c_{\text{hh}},\, l^m + 1,\, l^f + 1) - v^m(c,\, l^m,\, l^f)\right) + (1 - \mu(r))\left(v^f(\cdot) - v^f(\cdot)\right)\right].}$$

Expanding yields

$$\Delta U_{\text{hh}} = 2\Bigg\{\mu\left[\beta^m_{c0}\frac{(c + \Delta c_{\text{hh}})^{1-\beta^m_{c1}} - c^{1-\beta^m_{c1}}}{1 - \beta^m_{c1}} + \beta^m_m(l^f + 1, l^m + 1)\ln\frac{l^m + 1}{l^m}\right] + (1 - \mu)\left[\beta^f_{c0}\frac{(c + \Delta c_{\text{hh}})^{1-\beta^f_{c1}} - c^{1-\beta^f_{c1}}}{1 - \beta^f_{c1}} + \beta^f_f(l^m + 1, l^f + 1)\ln\frac{l^f + 1}{l^f}\right]\Bigg\}.$$

4. Linearized Comparison

For small changes, we linearize around the baseline. Define marginal utilities:

$$MU^j_c(c) = \beta^j_{c0} c^{-\beta^j_{c1}}, \quad MU^j_l = \frac{\beta^j_j}{l},$$

and for married couples, define household-weighted marginal leisure and consumption utilities:

$$\mathcal{M}^m_l = \mu\frac{\beta^m_m(l^f, l^m)}{l^m} + (1 - \mu)\frac{\partial \beta^f_f}{\partial l^m}\ln l^f, \quad \mathcal{M}^f_l = (1 - \mu)\frac{\beta^f_f(l^m, l^f)}{l^f} + \mu\frac{\partial \beta^m_m}{\partial l^f}\ln l^m,$$
$$M_c = \mu MU^m_c + (1 - \mu)MU^f_c.$$

The first-order approximations are:

$$\Delta U_{\text{single}} \approx MU^j_l(1) + MU^j_c(\Delta y_{\text{single}} - w^j),$$
$$\Delta U_{\text{hh}} \approx 2[\mathcal{M}^m_l + \mathcal{M}^f_l] + 2M_c(\Delta y_{\text{hh}} - (w^m + w^f)).$$

5. Comparative Statics

The single will reduce work if

$$MU_l^j + MU_c^j(\Delta y_{\text{single}} - w^j) > 0,$$

while the married couple will do so if

$$\mathcal{M}_l^m + \mathcal{M}_l^f + M_c(\Delta y_{\text{hh}} - (w^m + w^f)) > 0.$$

Key differences that make the married household less responsive:

1. **Larger income cost:** The couple loses $w^m + w^f$ in earnings when both reduce work, compared to w^j for a single.
2. **Shared consumption:** The marginal utility of consumption is pooled (M_c), so per-person benefit of the transfer is diluted.
3. **Leisure complementarity:** If $\gamma_3(l^m - l^f)^2$ penalizes leisure gaps, joint leisure changes must be coordinated, reducing the net gain.
4. **Scaling:** The factor of 2 in utility normalization does not offset the larger combined income loss.

Thus, a larger Δy_{hh} (or per-person transfer T) is required to induce the same leisure increase as for singles.

6. Transfer Thresholds

For singles, the minimum transfer T that induces a one-hour reduction satisfies

$$T > w^j - \frac{MU_l^j}{MU_c^j}.$$

For married households,

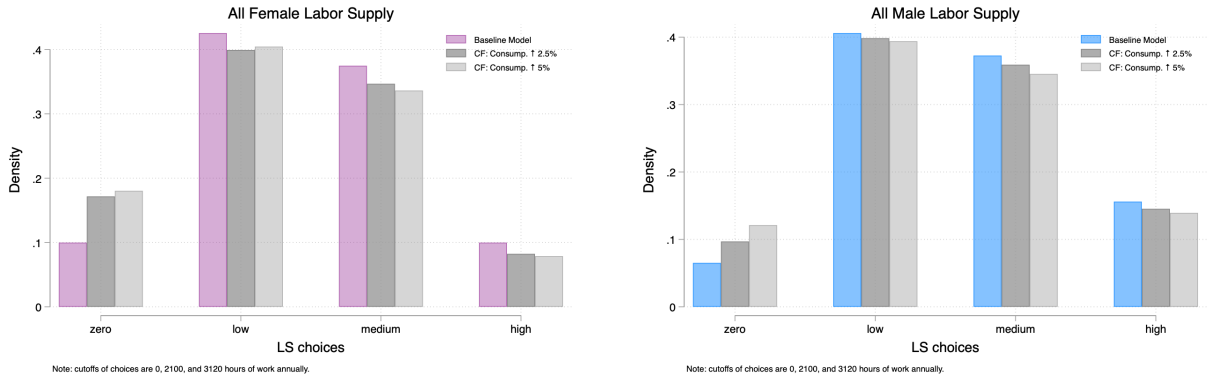
$$2T > (w^m + w^f) - \frac{\mathcal{M}_l^m + \mathcal{M}_l^f}{M_c} \quad \Longrightarrow \quad T > \frac{1}{2}\left[(w^m + w^f) - \frac{\mathcal{M}_l^m + \mathcal{M}_l^f}{M_c}\right].$$

Since $\frac{1}{2}(w^m + w^f) > w^j$ in most cases, married households generally exhibit smaller labor supply responses to a lump-sum transfer.

Appendix G: Model Implied Choices Distributions

G.1 Government Fiscal Transfers

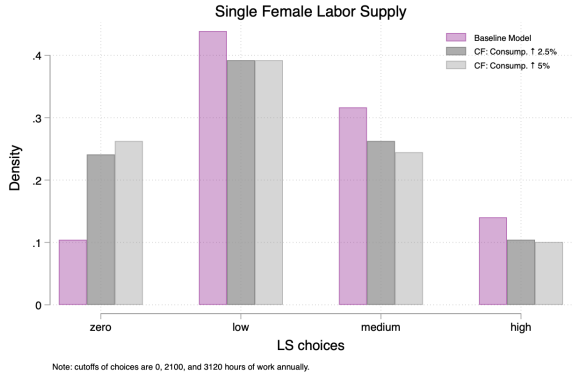
Figures below plot the aggregate labor supply by genders post-transfer.



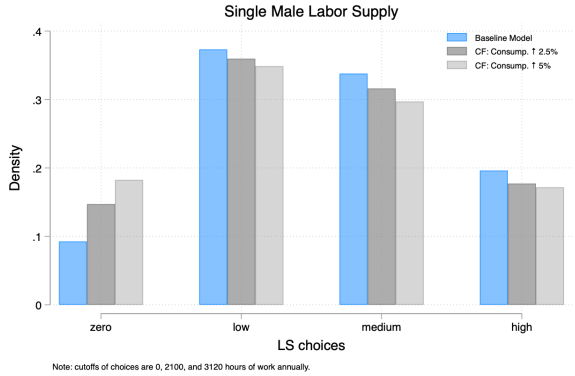
(a) All Female (b) All Male

Figure G1: Counterfactual Exercises: Transfers (Aggregate LS by Gender)

We also plot the choice distributions by household types in Figure G2. As one would expect for single households, transfers lead to wealth effects, providing disincentives to work; for both men and women, we see a decline in labor supply, the magnitude of which is increasing in the amount of transfers. For married households, labor supply changes are less apparent: individuals experience disutility in spousal leisure hour differences, which dampens the effects on labor supply through wealth effects. Though we also see declines in joint labor supply, the magnitude of change is smaller than that of single households. For easier visualization, we also plot the *changes* in the mass of choices in Figure G3.



(a) Single Female



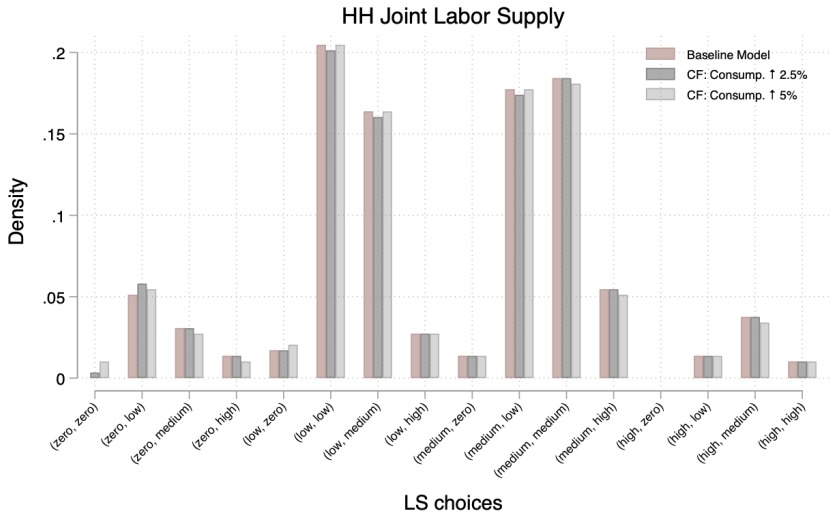
(b) Single Male



(c) Married Female

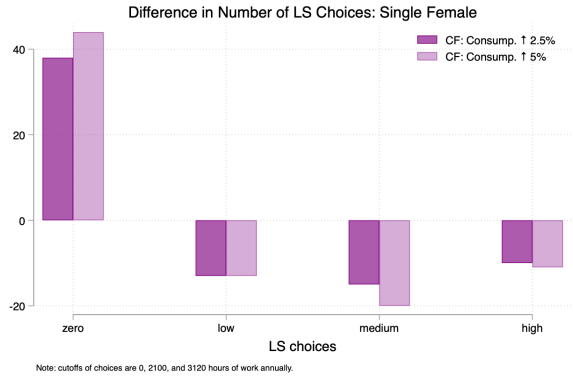


(d) Married Male

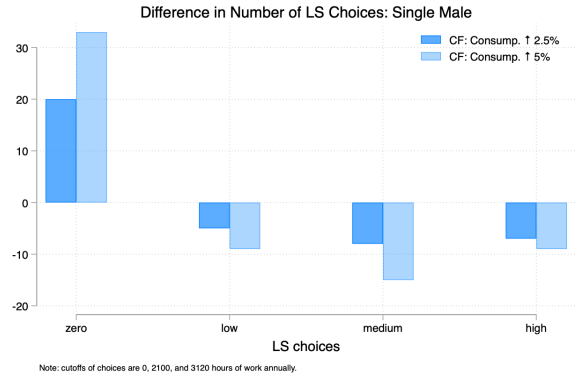


(e) Married Household Combined LS

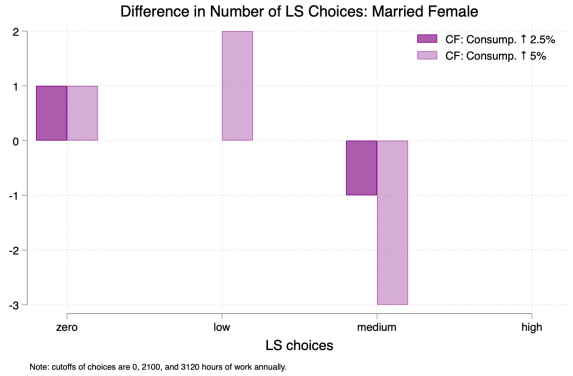
Figure G2: Counterfactual Exercises: Transfers



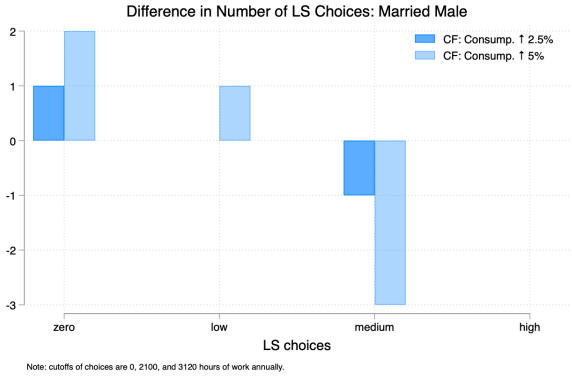
(a) Single Female



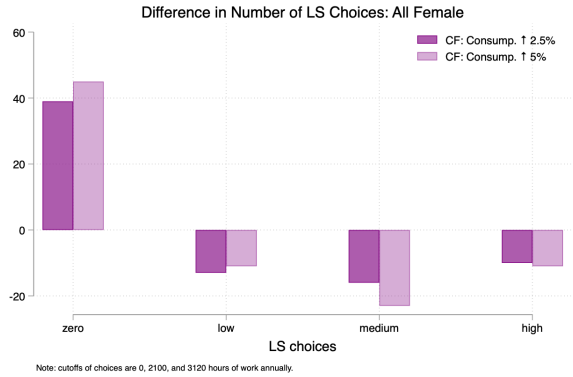
(b) Single Male



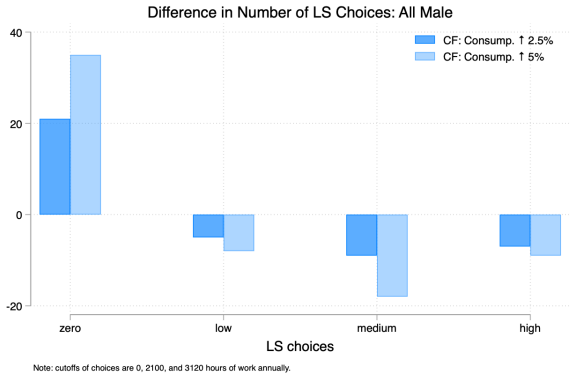
(c) Married Female



(d) Married Male



(e) All Female



(f) All Male

Figure G3: Counterfactual Exercises: Transfers - Differences in Choices

Shutting Down Leisure Complementarity. Below, we simulate choices with different models under the scenario with 2.5% and 5% increase in consumption. Tables below report these results. The percent changes are calculated using simulated choices (as opposed to using hours as in Table 6). For the baseline model with transfer, we compare the average changes in choices to the baseline model without transfer. For the model without leisure complementarity, we compare household's average choices to the choices of the baseline model with transfer (choices in the panel above). Most notably, using the baseline model, we see a decrease in average labor supply choices of 8% for single men and 17% for single women when given the transfer. Married men and women see a much smaller change. However, once we shut down spouse leisure terms, the changes in choices of married individuals see an *additional* change of 11% and 18% for men and women respectively. The magnitude of labor supply responses of married households are larger than the single individuals using the baseline with transfers. This reaffirms that the dampened changes in labor supply from wealth effects come from the spouse leisure terms, under which spouses experience disutilities from shifting away from coordinated work hours.

Table G1: CF Transfers 2.5%: Labor Supply Distribution by Models

Model	**Gender**	**Status**	**Choice 0**	**Choice 1**	**Choice 2**	**Choice 3**	**Avg.**	Δ%
Baseline (CF)	Male	Single	0.15	0.36	0.32	0.18	1.52	↓ 8%
		Married	0.03	0.45	0.41	0.11	1.59	↓ 4%
		Pooled	0.10	0.40	0.36	0.15	1.55	↓ 6%
	Female	Single	0.24	0.39	0.26	0.10	1.23	↓ 17%
		Married	0.11	0.41	0.43	0.06	1.44	↑ 2%
		Pooled	0.17	0.40	0.35	0.08	1.34	↓ 7%
No Leis. Comp. (CF)	Male	Single	0.15	0.36	0.32	0.18	1.52	-
		Married	0.23	0.30	0.28	0.18	1.42	↓ 11%
		Pooled	0.18	0.33	0.30	0.18	1.48	↓ 5%
	Female	Single	0.24	0.39	0.26	0.10	1.23	-
		Married	0.33	0.28	0.26	0.13	1.18	↓ 18%
		Pooled	0.29	0.34	0.26	0.12	1.21	↓ 10%

Note: Δ% for baseline model refers to changes pre- and post-transfer.
Δ% for the rest refers to the percent change compared to the baseline model with transfer.

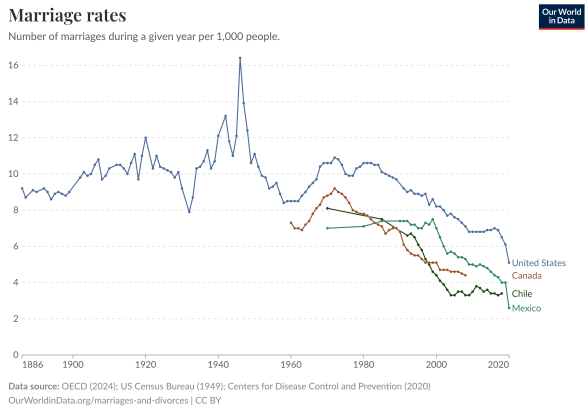
Table G2: CF Transfers 5%: Labor Supply Distribution by Models

Model	Gender	Status	Choice 0	Choice 1	Choice 2	Choice 3	Avg.	Δ%
Baseline (CF)	Male	Single	0.18	0.35	0.30	0.17	1.46	↓ 11%
		Married	0.04	0.45	0.41	0.10	1.56	↓ 2%
		Pooled	0.12	0.39	0.35	0.14	1.50	↓ 7%
	Female	Single	0.26	0.39	0.24	0.10	1.18	↓ 21%
		Married	0.10	0.42	0.42	0.06	1.44	↓ 1%
		Pooled	0.18	0.40	0.34	0.08	1.31	↓ 11%
No Leis. Comp. (CF)	Male	Single	0.18	0.35	0.30	0.17	1.46	-
		Married	0.25	0.31	0.27	0.18	1.38	↓ 12%
		Pooled	0.21	0.33	0.28	0.17	1.42	↓ 8%
	Female	Single	0.26	0.39	0.24	0.10	1.18	-
		Married	0.33	0.28	0.26	0.13	1.17	↓ 18%
		Pooled	0.30	0.34	0.25	0.11	1.18	↓ 13%

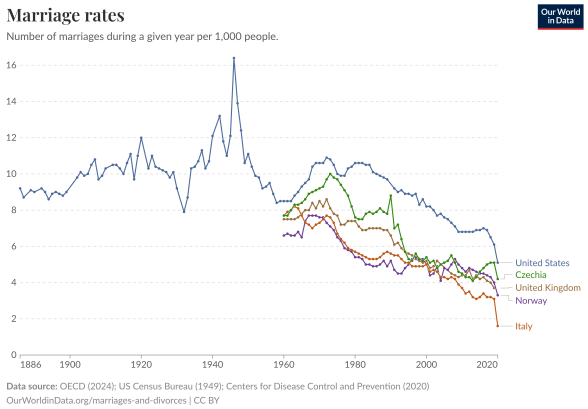
Note: Δ% for baseline model refers to changes pre- and post-transfer.
Δ% for the rest refers to the percent change compared to the baseline model with transfer.

G.2 Low Marriage Rates

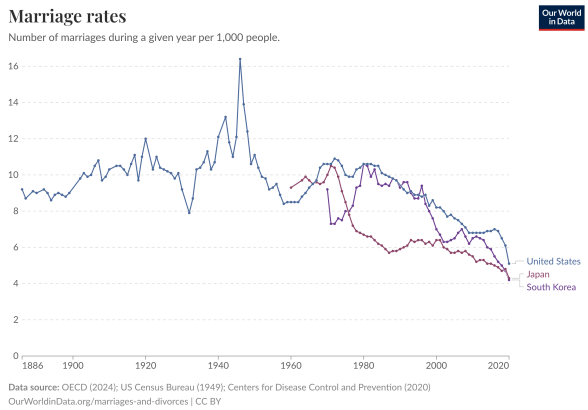
Most developed countries have seen a decline in marriage rates. Figures below show trends plotted by Our World in Data:



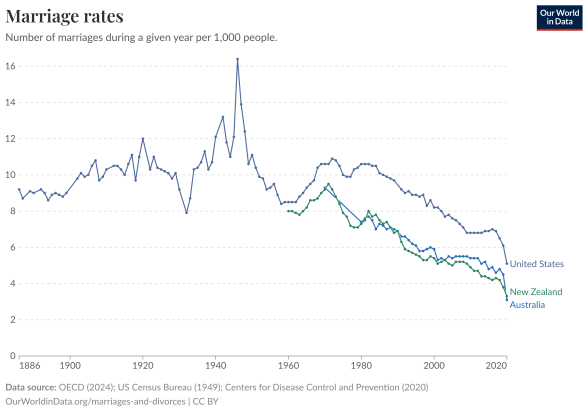
(a) US vs Northern & Latin American Countries



(b) US vs European Countries



(c) US vs East Asian Countries



(d) US vs Oceanian Countries

Figure G4: Comparison Across Different Countries and Continents

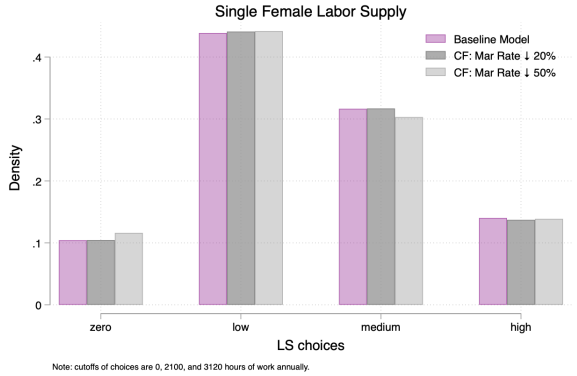
We use the model to understand whether lower marriage rates affect aggregate labor supply. For the purpose of this exercise, we randomly break up married individuals in our dataset, and let them choose labor supply by adopting the single-household utility. Below, we report the changes in labor supply using average work hours of each choices multiplied by the choices of households in Table.

As we have shown earlier, some countries such as Japan, South Korea, Norway, United Kingdom, New Zealand and Australia have seen a large and persistent decline in marriage rates for more than 50% since the 1970s. Our model predicts that with a 50% marriage rate decline, aggregate labor supply sees an increase of only 0.01%.

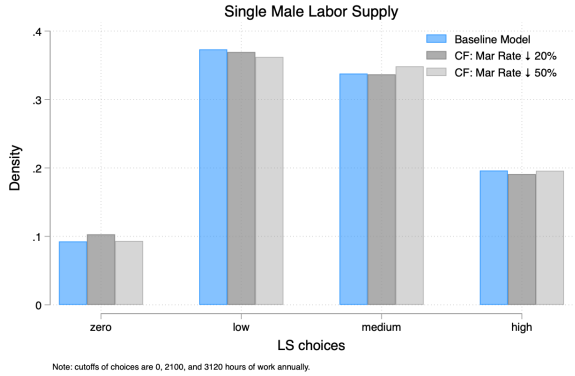
Table G3: Labor Supply Change by Counterfactual Scenarios: Marriage Rates

Labor Supply (Hours)	**Marriage Rate Decline**		
	20%	**50%**	**100%**
All Female	-0.8%	-0.9%	0.9%
All Male	-0.9%	0.7%	0.2%
All Labor Supply	-0.8%	0.01%	0.5%

Figures below plot the distribution of simulated choices. One can see that by altering the marriage rates in our data, we only see a slight change in the distribution of labor supply choices. Figure 31 plots the changes for aggregate female and male labor supply. While we do see an increase in the mass for "high" labor supply, we also see an increase in the likelihood of supply zero hours. On the aggregate, it is not immediately obvious how each of these scenarios impact on aggregate labor supply. And hence, as in the previous exercise,



(a) Single Female



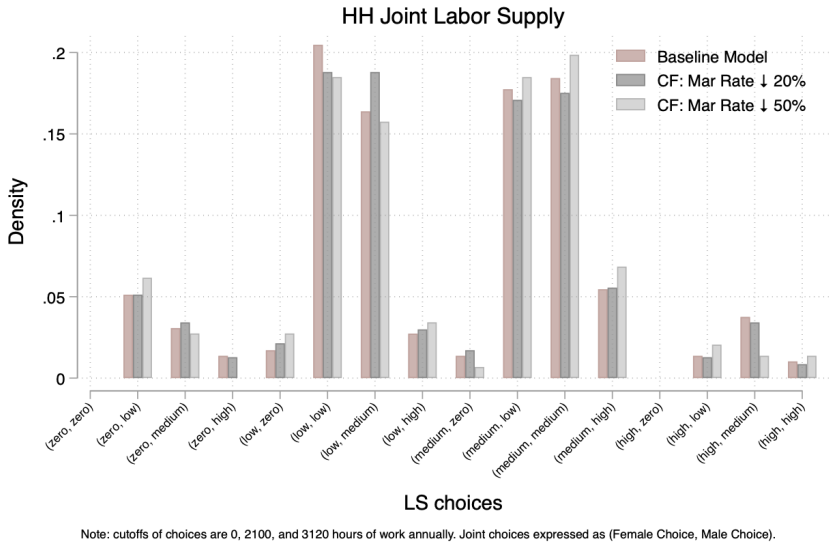
(b) Single Male



(c) Married Female

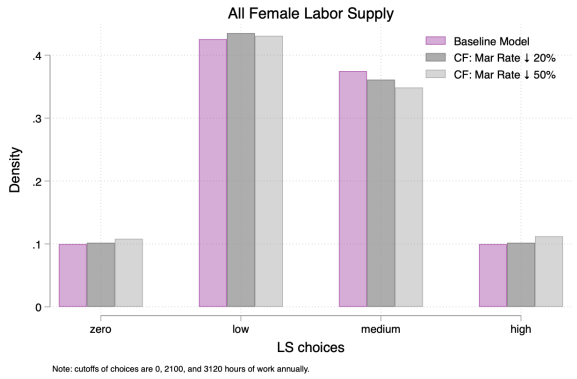


(d) Married Male



(e) Married Household Combined LS

Figure G5: Counterfactual Exercises: Different Marriage Rates



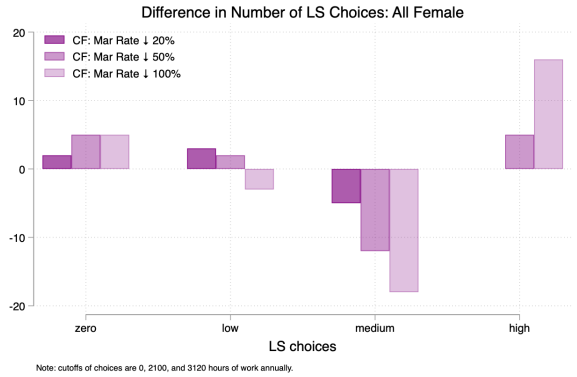
(a) All Female



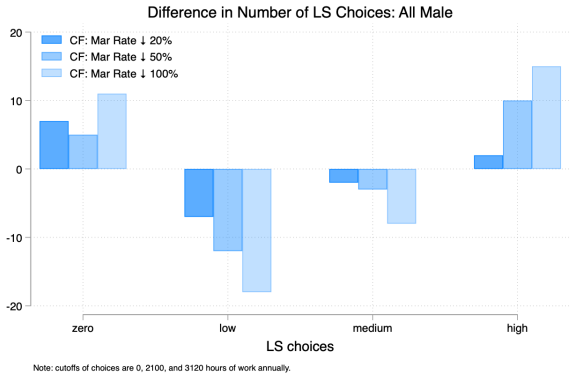
(b) All Male

Figure G6: Counterfactual Exercises: Different Marriage Rates (Aggregate LS by Gender)

For easier visualization, we plot the changes in the mass of each labor supply choice below.



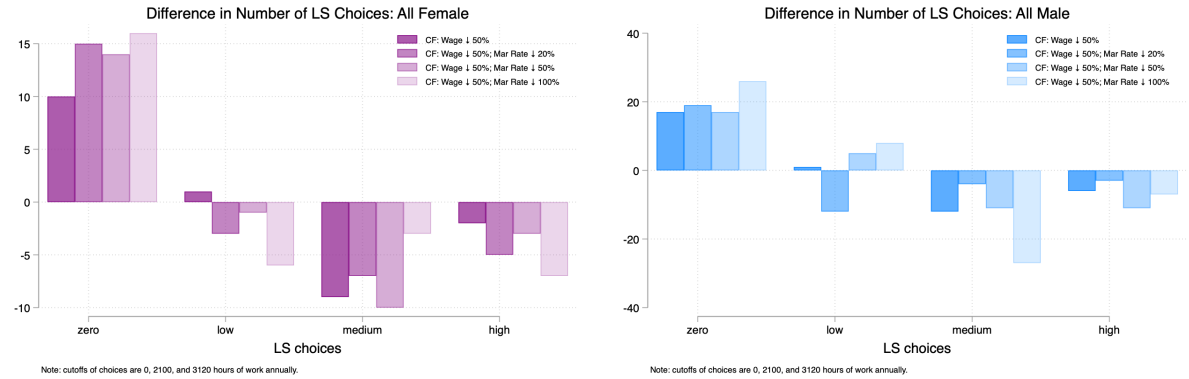
(a) Aggregate Female Labor Supply Changes



(b) Aggregate Male Labor Supply Changes

Figure G7: Counterfactual Exercises: Declining Marriage Rates - Differences in Choices

G.3 Aggregate Wage Shock with Different Marriage Rates



(a) Aggregate Female Labor Supply Changes (b) Aggregate Male Labor Supply Changes

Figure G8: Counterfactual Exercises: Aggregate Shock (Wage ↓ 50%)



(a) Single Female



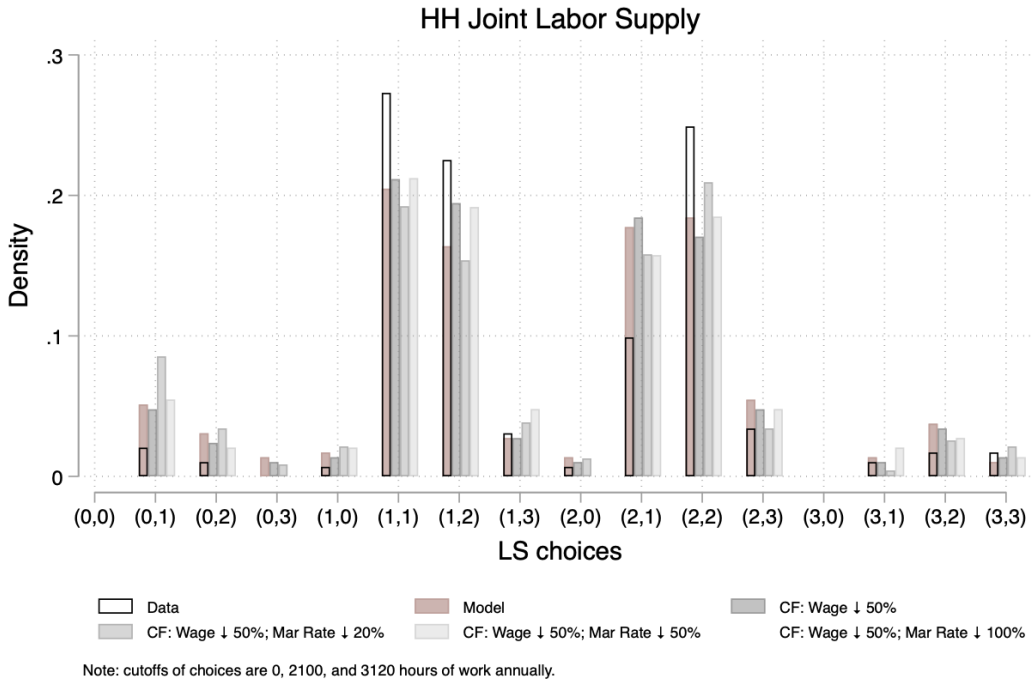
(b) Single Male



(c) Married Female



(d) Married Male



(e) Married Household Combined LS

Figure G9: Counterfactual Exercises: Aggregate Shocks



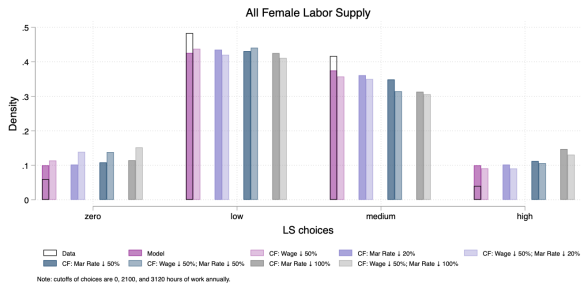
(a) All Female



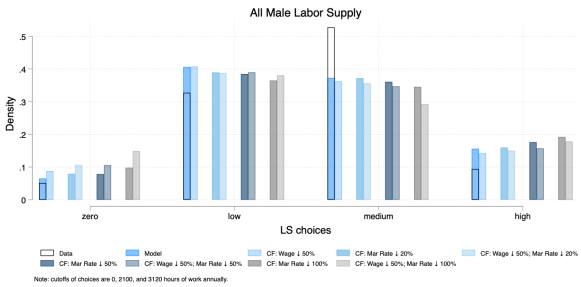
(b) All Male

Figure G10: Counterfactual Exercises: Aggregate Shock (Aggregate LS by Gender)

Figures below show the full choice distribution for aggregate wage shocks (wage decline by 50%) under different marriage rates.



(a) All Female



(b) All Male

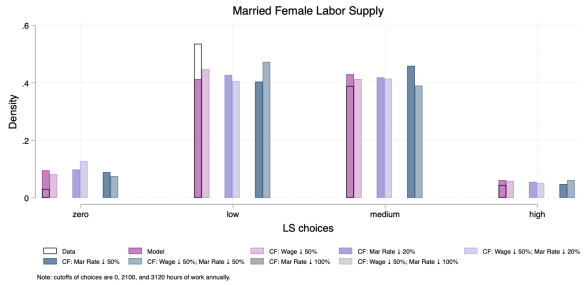
Figure G11: Counterfactual Exercises: Aggregate Shock Responses by Marriage Rates



(a) Single Female



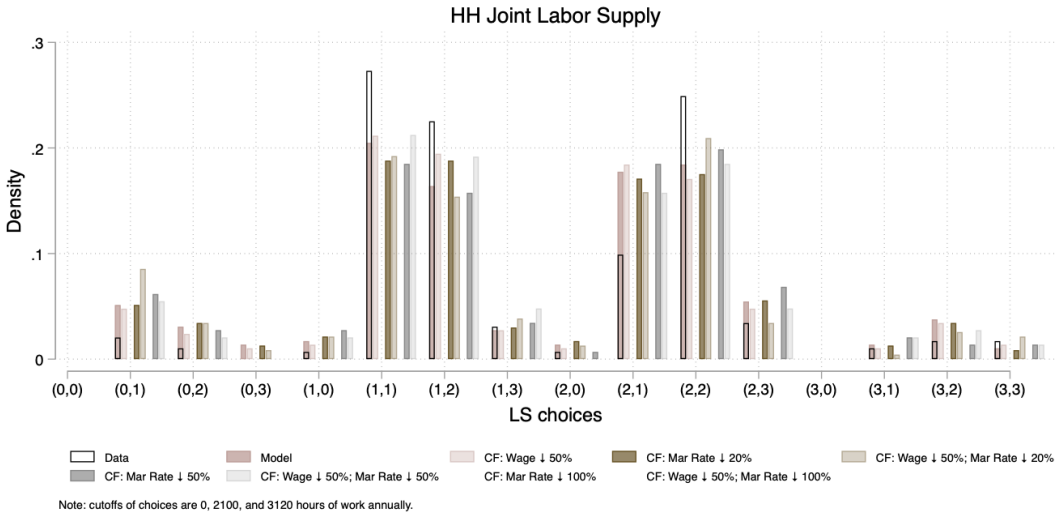
(b) Single Male



(c) Married Female



(d) Married Male



(e) Married Household Combined LS

Figure G12: Counterfactual Exercises: Aggregate Shock Responses by Marriage Rates (by Household Type)