

# Marry for Money or Time?

## Explaining New Marriage Trends in the U.S.

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### Abstract

This paper examines the recent trends in marriage rates in the U.S. from 2000 to 2021, focusing on the role of wage structure and work hours explaining these changes. Using IPUMS data, I show that the wage structure changed as well as a significant reduction in work hours for men across all income groups, with a slight increase for women. This study highlights that work hours, not just wages, significantly influence marriage patterns. The analysis finds that reductions in male work hours may increase marriage probability, suggesting that time availability is a crucial factor in household dynamics. A marriage model calibrated to 2000 and tested with 2021 data supports the hypothesis that changes in working hours better explain recent marriage trends than changes in wages. This paper contributes to understanding the economic determinants of marriage by emphasizing the critical role of working hours.

**JEL CLASSIFICATION:** D13, D31, D83, I20, J12, J16, O33

**Key words:** Marriage, Income groups, working hours, wage structure

# 1 Introduction

Over the past several decades, aggregate marriage rates have been declining worldwide, a trend with far-reaching social and economic implications for household formations, fertility rates, labor market dynamics, and inequality. Understanding the factors driving changes in marriage patterns is crucial for policymakers and researchers alike. This global trend aligns with the findings by [Moro et al. \(2017\)](#)), who, using cross-country panel data on marital statistics from 1900 to 2000 for 16 OECD countries, identifies a hump-shaped pattern in the fraction of married individuals. The peak in marriage rates, falling between 1960 and 1980, underscores a turning point, after which marriage rates began their steady decline. Many other economists highlighted the same trend.

It has been understood now that the decline in marriage has been accompanied by several changes and stylized facts. First, the literature emphasizes that marriage patterns are not homogeneous across groups, particularly among different education levels ([Chiappori et al. \(2018\)](#); [Chiappori et al. \(2020\)](#)) and racial groups ([Caucutt et al. \(2021\)](#)). In the United States for example, the decline in marriage rates has been most apparent among non-college-educated and Black Americans ([Greenwood et al. \(2016\)](#); [Caucutt et al. \(2021\)](#)). Another established stylized fact is the rise in assortative mating, particularly an increase in the fraction of marriages in which both partners share the same educational level ([Greenwood et al. \(2016\)](#)). The main two underlying forces considered by the literature are technological progress in household production and changes in the labor market that began in the 1960s, such as educational attainment and female labor force participation. ([Stevenson and Wolfers \(2007\)](#); [Greenwood and Guner \(2009\)](#); [Greenwood et al. \(2014\)](#); [Greenwood et al. \(2016\)](#)). Some other drivers include technological improvement in contraceptives and changed social perception towards sex outside wedlock ([Greenwood and Guner \(2010\)](#)).

The purpose of this paper is to investigate the impact of two specific economic factors on recent marriage patterns in the United States; factors that have not been extensively explored by the existing literature. Specifically, this study focuses on the effects of changes in the wage structure and working hours on household formation. To this end, I utilize data from the U.S. Census and the American Community Survey (ACS) from 2000 to 2021, including the 1% ACS and 5% Census samples provided through IPUMS-USA ([Ruggles et al. \(2024\)](#)). I divide my data into two income groups for each gender, using the aggregate median income specific to each gender as the threshold to separate the groups. For example, men are divided into those falling below and those above the median income for men, and the same approach is applied to women. This method ensures that individuals are compared within their own gender. I then compute the median wage, the average hours worked, and the marriage fraction for each group.

This paper offers two main contributions. First, it presents new stylized facts about marriage patterns in the United States, highlighting how different income groups within each gender experienced divergent marriage trends. Second, it develops a general equilibrium model of marriage that incorporates exogenous changes in the wage structure and working hours. This model allows us to assess the extent to which these economic factors influence the observed new marriage patterns.

I document four important facts, three of which are established in the literature and one that is a novel stylized fact. First, I show a reduction in the gender wage gap and an increase in wage gap within gender. Second, I find a decrease in the men's work hours while an increase in the women's work hour. Third, I document an increase in couples in which both partners are high earners indicative of positive assortative mating in income. Fourth, I show that the defined groups do not all experience the same decline in marriage rates. Notably, and contrary to the existing literature, while marriage fractions for all men and low-income women are declining, the fraction of high-income women who are married is increasing. This divergence becomes even more apparent when we divide the population into more groups by gender.

I then build a model of marriage featuring agents with different wage and hour levels. I calibrate the model to replicate the observed marriage fraction and marital sorting in the baseline year 2000. Subsequently, I test the model's performance in accounting for changes in the marriage rates of the different groups in the year 2021. Then I run a decomposition exercise to assess the two channels i.e. changes in the wage structure and changes in the work hours. I find that although changes in the wage structure contribute to the declining marriage rates across groups, only the changes in hours worked explain why high-income women experience an increase in marriage rates.

This paper is broadly connected to the economic literature on marriage, which has gained significant traction since Becker's seminal works ([Becker \(1973\)](#) and [Becker \(1974\)](#)). More specifically, it is closely related to research focusing on marriage trends and their respective driving factors. A particularly relevant study in this field is [Greenwood et al. \(2016\)](#), which develops a model to explain how technological advancements in home production and shifts in wage structure explain the drop in marriage rates from 1960 to 2005. As technology reduces household labor needs, more married women enter the workforce. This, accompanied with rising education returns and a narrowing gender wage gap, promotes higher education, results in an increase of positive assortative mating and reduces the incentive for marriage. However, our analysis argues that while this mechanism successfully explains most marriage patterns from 1960 to 2005, it falls short in explaining why high-income women are marrying more today. Technological progress in home production, rather than increasing the incentive to marry, may instead enhance the appeal of remaining single.

Several studies have also identified shifts in the wage structure as a mechanism to

explain the decline in marriage rates. [Regalia and Ríos-Rull \(2019\)](#) , for instance, links third of the observed change in the share of single women and half the observed change in the share of single mothers between the mid 1970’s and the beginning of the 2010’s, to changes of relative wages within and between sexes.

Contrary to changes in wages, changes in work hours have not received serious attention when analyzing factors that shape marriage patterns<sup>1</sup>. Conversely, several recent papers suggest the potential impact that the decline in marriage rates might have on the reduction of hours worked by men. A recent hypothesis proposed by [Binder and Bound \(2019\)](#) postulates that declining marriage rates may contribute to the decrease in male work rates. Based on this, [Blandin et al. \(2023\)](#) suggests that recent declines in marriage rates, if exogenous, can account for a sizable share of the overall decline in prime-age male hours over recent decades.

In contrast to this hypothesis, my analysis delves into how shifts in the quantity of work hours influence marriage formation in the last two decades, and not the other way around. To the best of my knowledge, this paper is the first to emphasize the critical role of work hours in such a context, marking a significant contribution to the existing literature on the economic determinants of marriage and household dynamics.

Additionally, other papers link structural change to declining marriage rates, suggesting that these shifts alter labor market stability and income expectations, which in turn influence marriage decisions. [Anelli et al. \(2021\)](#) find that in regions where the gender gaps in income and labor force participation are reduced due to exposure to robots, the relative economic status of men declines, as does the number of marriages. [Autor et al. \(2019\)](#) argue that rising international manufacturing competition has reduced employment and earnings of young adult males (in comparison to young adult females), consequently having a negative impact on marriages. These studies are among the few that emphasize the impact of men’s economic outlook on marriage, which aligns with the narrative developed in this paper. We contribute to this line of research by demonstrating how a reduction in men’s working hours positively impacts marriage rates of high income women.

One notable paper by [Newman \(2018\)](#) documents the reversal in U.S. divorce rates, showing a negative correlation between female labor force participation and divorce rates. They argue that this trend is driven by high-income women forming more stable marriages, as dual-earner couples can compensate each other with *money and kind* (balanced basket of market-procured and household-produced goods) an option less available to

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<sup>1</sup>Among papers focusing on the intersection of research on marriage and time allocation are [Knowles \(2012\)](#) and [Jones et al. \(2015\)](#). [Knowles \(2012\)](#) examines intra-household bargaining and its effect on U.S. married men’s labor supply from the mid-1970s to 2001. Using U.S. time-use data, it shows that bargaining slightly increased married men’s weekly labor supply by 2.1 hours and decreased married women’s by 2.7 hours. [Jones et al. \(2015\)](#) suggest that even slight decreases in gender wage disparities largely explain the increased work hours for married women, while technological gains in home production were less impactful.

single earners or low-income couples. Building on this idea, we introduce the dimension of time, proposing that the time available to men, alongside financial stability, makes marriage more attractive to high-income women, thus reinforcing the trend of increased marriage rates within this group.

The remainder of the paper is structured as follows: the second section presents the empirical findings, the third sets the model, the fourth discusses the calibration, the fifth details the counterfactual exercises, and the sixth concludes the discussion.

## 2 Empirical findings

In this section, I present the empirical facts alongside a discussion of their relevance, specifically focusing on aspects overlooked in previous research. One missing piece in the literature on marriage trends relates to changes in the wage structure and work hours. Indeed, while many studies consider the reduction in the gender wage gap and its impact on marriage decisions, they overlook that this reduction was due not only to the sharp increase in female labor participation and subsequent gains in female wages, but also to widening inequality among men. I demonstrate this using IPUMS data from 2000 to 2021.<sup>2</sup> I then divide my data into two income groups by gender. I define the aggregate median wage separately for men and women, using it as a threshold to categorize each gender into two distinct income groups: those earning below the median and those earning above it. For each group, I calculate the median wage, providing a central measure of income for individuals within each category. I then compute the wage ratio for each group, which is calculated as the group's respective median wage divided by the aggregate median wage of the gender. This approach allows for a meaningful comparison of wage dynamics within each gender over time, revealing variations in income growth or decline across different income groups of the male and female populations. Table 1 displays the ratio of the group to the aggregate median wage by gender for 2000 and 2021. Note that the only group performing slightly well for men is the second, with a 0.07% increase and a negative fall of 12% for group 1. For women, however, changes were positive with the highest increase of more than 5% corresponding to group 2.

In Table 2, we compute the female-to-male wage ratio using the median of each half and its corresponding counterpart from the opposite gender. We observe contrasting reductions in the wage gap, which might initially suggest that women have fared well in the labor market between 2000 and 2021. However, considering the results in Table 1, it becomes clear that this is not the entire story. This begs the question: Are these contrasting changes in the gender wage gap significant in analyzing the marriage market? Particularly, does it matter to marriage patterns if some men are underperforming in the

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<sup>2</sup>I use the 1% American Community Survey and 5% samples from 2000 to 2021.

Table 1: Wage Ratio for Men and Women by Income Group

	2000	2021	Change (%)
<b>Men</b>			
Group 1 (poor)	0.647	0.567	<b>-12.36%</b>
Group 2 (rich)	1.416	1.417	<b>+0.07%</b>
<b>Women</b>			
Group 1 (poor)	0.546	0.548	<b>+0.36%</b>
Group 2 (rich)	1.512	1.595	<b>+5.89%</b>

*Note:* The wage ratio is computed as the median wage of each group divided by the total median wage for each gender. Percent changes are calculated between the years 2000 and 2021.

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Table 2: Female-to-Male Wage Ratio for Income Quartiles

	2000	2021	Change (%)
$\alpha_1$	0.558	0.676	<b>+21.15%</b>
$\alpha_2$	0.706	0.788	<b>+11.61%</b>

*Note:*  $\alpha_1$  and  $\alpha_2$  represent the wage ration between poor women to poor men, and rich women to rich men respectively. Percent changes are calculated between the years 2000 and 2021.

I see if elements of these structural changes are tractable at the aggregate level. Using IPUMS data, I plot the married fractions (Figure 1) for two income groups for each gender<sup>3</sup>. It should be noted that the married fraction in Figure 1 and Figure 2 are for the population between 25 and 55 years of age<sup>4</sup>.

As can be seen in Figure 1, the results are striking. Initially, richer men married more in 2000 while poorer men married less. By 2021, the ranking remained similar although the marriage rates decreased for both groups, with a higher decline for the poorest. Conversely, for women, the opposite trend was observed; poorer women married more in 2000 while richer women married less. By 2021, this pattern reversed, with poorer women experiencing a decrease in marriage rates contrary to richer women, who had a marriage rate in 2021 higher than that in the first period. I add another graph with the same analysis with four quartiles of income for each gender. The output in figure 2 is even clearer. The married fraction of the top quartile of women has been increasing sharply

<sup>3</sup>I add as well, singlehood and cohabitation rates for four groups representing quartiles of income from the year 1960 to 2021 (Figures A3 and A4 respectively)See Appendix

<sup>4</sup>In the Appendix, for the graphs with four groups of income for each gender and longer period 1960-2021, we follow Chiappori et al. (2020) in selecting a sub-sample of individuals observed at or past 35 years of age and capping the age range at 44. This procedure minimizes the bias stemming from the fact that marriage takes place over a long age period and is most likely in later years of life, and we consider this as a robustness check.

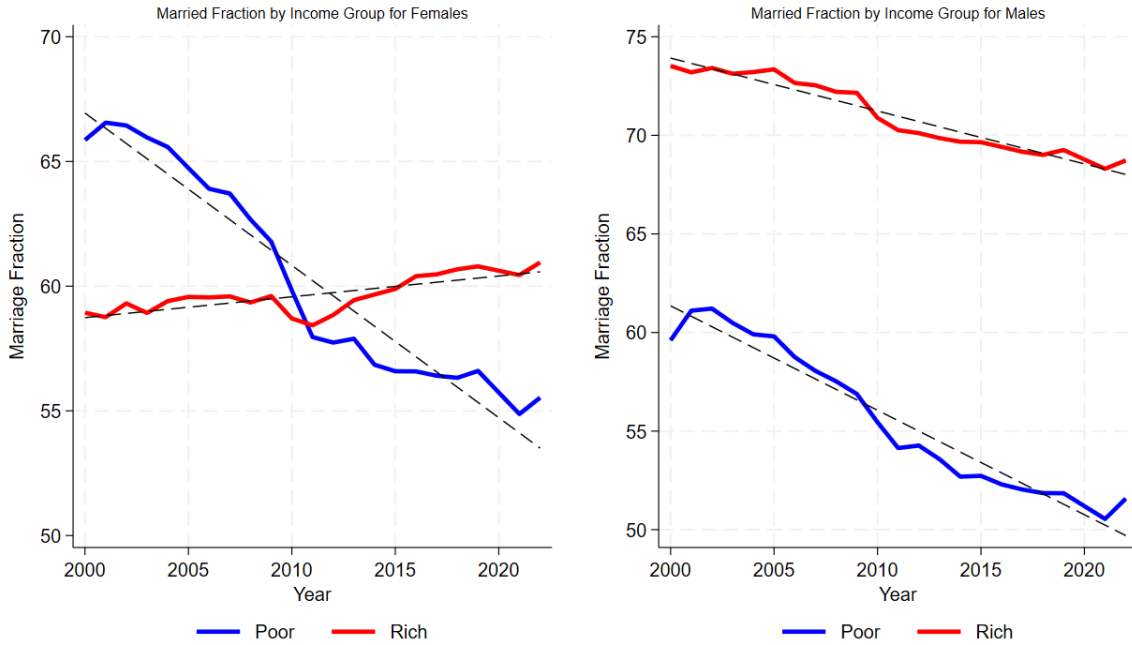


Figure 1: Married fraction by 2 Income Group for Females and Males

from 2000 to 2021 while the married fraction of all remaining groups has been declining. For men, the richer the group the lower the decline. This observation represents a novel contribution to the existing body of literature.

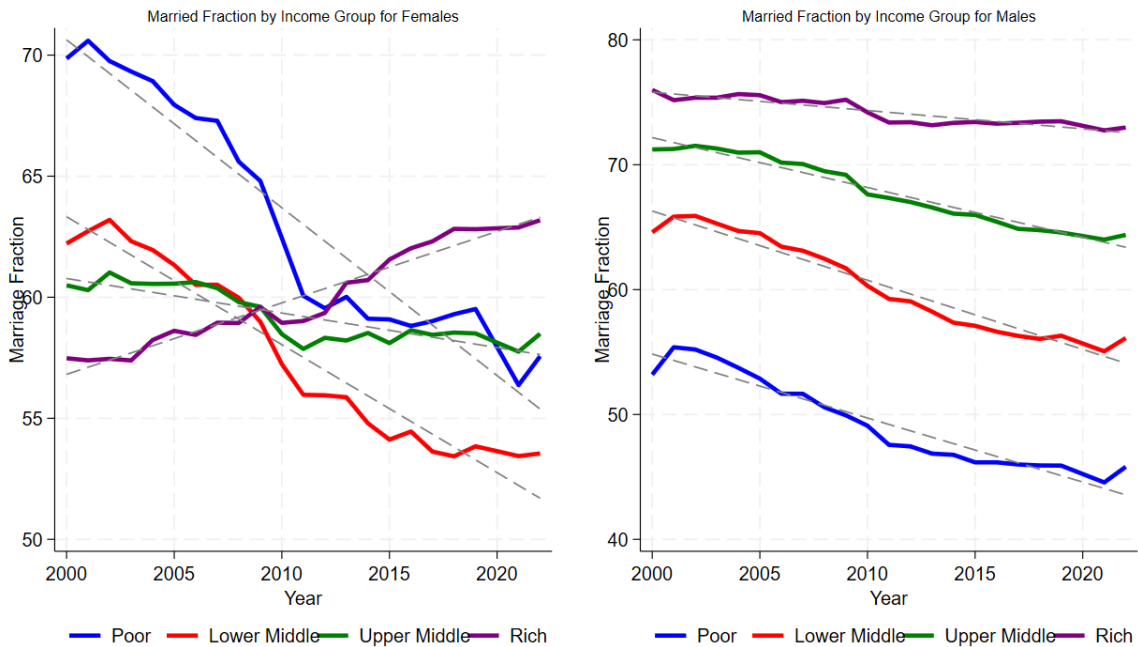


Figure 2: Married fraction by 4 Income Group for Females and Males

I also analyze the patterns of sorting with the data since it includes unique identifiers

for individuals and their spouses, which allows me to link married couples. Table 3 in contains the percentage of each combination possible in the economy based on respective gender income groups<sup>5</sup>.

Table 3: Fraction of Couples Targeted Over the Years

Year	Group (1,1)	Group (1,2)	Group (2,1)	Group (2,2)
2000	0.2612	0.1826	0.2528	0.3034
2021	0.2129	0.1733	0.2363	0.3775

*Note:* Each group (i,j) represents the pairing of individuals from income groups i and j in a given year.

What is clear from Table 3 is that in the 2000s, marriages in which the husband is rich and the wife is poor accounted for 26 percent, whereas marriages with both rich husbands and wives represented 30 percent of the couples formed. In 2021, the first rate decreased by almost 5 percentage points and the second rate increased by almost 7 percent. To demonstrate that this trend started well before the 2000s, I include in the Appendix a contingency table of couple formation for the years 1960 and 2021 by income quartiles. Table A1 shows that in 1960, marriages in which the husband earns a higher income and the wife is a stay-at-home mom were the most prevalent, representing 19.8 percent of all couples that year. It should also be noted that groups 3 and 2 of men, who were predominantly married to non-working wives, represented 15.2 and 12.7 percent respectively. However, in 2021, the sorting patterns changed drastically with a more prevalent positive assortative mating in income. The highest percentage of couples involves rich men marrying rich women, comprising 11.6 percent of the total marriages, which is almost five times the rate in 1960. There is also an increase in the percentage of marriages on the diagonal. However, this table only indicates and does not prove assortative mating<sup>6</sup>.

One intriguing point is the clear match between the results in Tables 1 and 2 and the patterns of marriage for women. The group that suffered the highest reduction in marriage rates (Group 2) is the same group that saw the most significant reduction in the gender wage gap. In fact, the ranking of women’s marital rates aligns perfectly with the ranking in 2. While this connection does not constitute conclusive proof, it may suggest certain trends within the marriage market. The literature primarily focuses on educational levels to define assortative mating and study changes in marriage, but there may be more nuanced factors at play. Notably, while educational attainment is closely related to income levels, relying solely on education can be misleading. Over the last

<sup>5</sup>The sum of all numbers in each year equals one.

<sup>6</sup>I add a table for conditional probabilities in the Appendix for a better picture.



few decades, women have surpassed men in educational attainment, which has led to a larger share of women marrying men with lower education levels but higher incomes. Qian (2017) finds that educational assortative mating has reversed from a tendency for women to marry up in terms of education to a tendency for women to marry down, while the trend for women to marry men with higher incomes has persisted.

This is evident in the data from 1960, 2000, and 2021, showing that women indeed marry men with similar or higher incomes (see Tables 3 and A2). Therefore, it is not unreasonable to suggest that the wage gap between these groups is a crucial determinant of marriage. This lends more credibility to the structural change narrative. Between 1950 and 1960, manufacturing served as the driving engine of growth and a major employer for men, especially those in the middle-income bracket. In contrast, women’s participation in the labor force was relatively modest. With the decline of manufacturing and the rise of the service sector, a polarization of the labor force began (Autor and Dorn (2013); Cerina et al. (2019)), which disadvantaged men in manufacturing industries relative to women in the service sector.

Table 4: Average Hours Worked Per Week by Income Quartile and Gender, 2000 and 2021

	2000	2021	Change (hours)
<b>Men</b>			
Group 1 (poor)	43.02	40.80	<b>-2.22</b>
Group 2 (rich)	46.92	45.25	<b>-1.67</b>
<b>Women</b>			
Group 1 (poor)	33.02	33.20	<b>+0.18</b>
Group 2 (rich)	41.55	41.99	<b>+0.44</b>

*Note:* This variable is defined in the census as the number of hours per week that the respondent usually worked, if the person worked during the previous year.

The other hypothesis concerns the reduction in hours of work. In Table 4, I list the average hours worked per week for each gender by group. A surprising result is the reduction in work hours for men from the year 2000 to 2021. To put these numbers in perspective, the yearly reduction is more pronounced. Since the year comprises almost 52 weeks, we can observe that poorer and richer men are working 115.44 and 86.84 fewer hours, respectively, in 2021 than in 2000. This reduction is not insignificant, given the importance of “time” in household production. Figure 3 illustrates how this variable changes for both men and women, with an increase in the average hours worked for both poor and rich men, and a slight increase for women from the year 2000 to 2021. This variation could also impact marital decisions, as time is a crucial component of household utility. Consider this scenario: a man and a woman, both active in the labor market, decide whether to marry. If one partner reduces their work hours, it could significantly

increase their likelihood of marrying, as the partner working less can contribute more to household duties or childcare, thereby offering more time to the family. If it is the man who reduces his work hours, then the likelihood of the woman wanting to marry him increases, and similarly, if the woman works less, the likelihood of the man wanting to marry her increases, assuming that wage levels remain constant<sup>7</sup>.

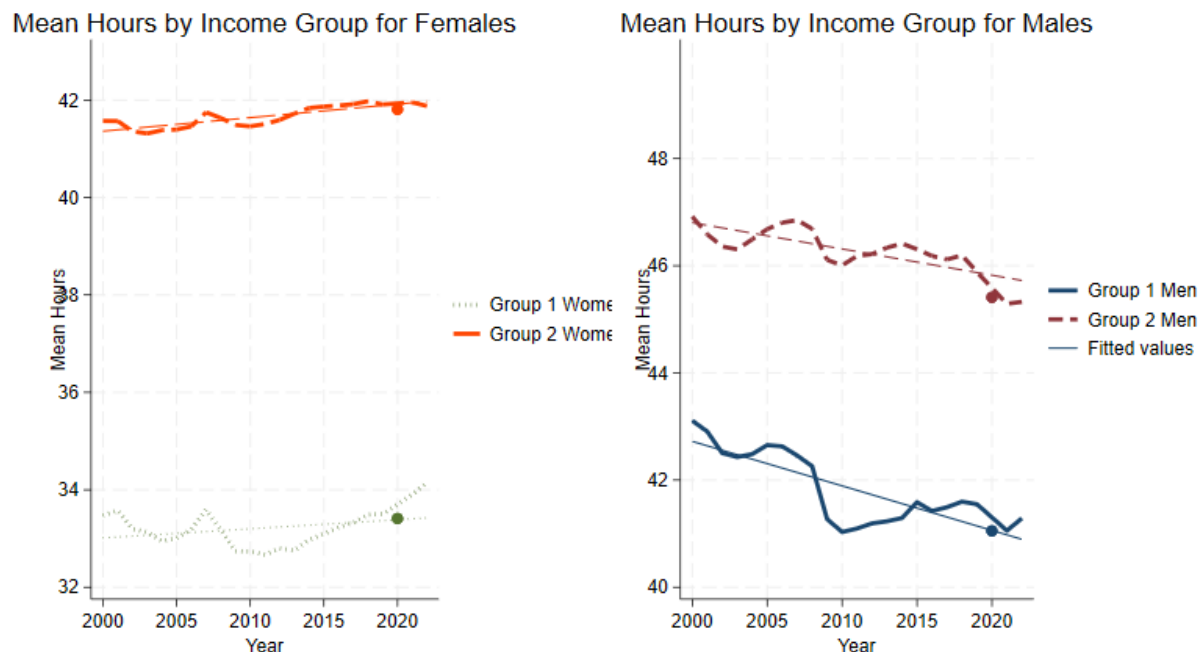


Figure 3: Mean Hours by Income Group for Males and Females

In this context, and reflecting the observations in the data, a reduction in men’s work hours could lead to an increased probability of women desiring to marry. This explanation is supported by [Doepke et al. \(2022\)](#) which assert that traditional notions about fertility are evolving, with the negative relationship between women’s labor force participation and fertility becoming positive in the developed world. They identify cooperative fatherhood as a likely factor in this shift. This aligns closely with our argument that men working fewer hours could be more appealing to women in the marriage market, assuming that a reduction in work does not equate to lower earnings.

As the main purpose of this paper is to determine which of these two channels, wage and time, better explains the recent marriage trends observed in the US over the last 22 years, in the next section we construct a marriage model that incorporates wage and time as the principal components influencing the decision to marry, calibrated to the year 2000. Maintaining all other variables constant, we conduct the first counterfactual exercise using the 2021 hours structure, and the second using the 2021 wage structure. The results more strongly support the time hypothesis, as changes in average hours worked align closely

<sup>7</sup>I add the same graph for four quartiles in the Appendix (Figure A1)

with the trends. Conversely, alterations in the wage structure do explain the decrease in the marriage rates for all groups they do not not predict the increase for affluent women.

### 3 Model

We focus on two economic factors: wage disparities within and between genders, and changes in working hours. For wages, the notable shifts are the reduction of the wage gap between men and women and the widening wage gap between rich and poor men. These shifts lead to two significant outcomes. First, the reduction in the gender wage gap makes women less likely to pursue marriage, as the value of remaining single increases. Second, the increasing wage gap between rich and poor men negatively impacts the marriage prospects for poorer men. Consequently, we observe fewer marriages and more assortative matching, where richer men are more likely to marry richer women. Additionally, a reduction in working hours for men makes them more attractive to women, as it allows for more time for activities both within and outside the household.

Two key components are needed to formalise the discussion above. First, a model of marriage is essential. Second, there must be heterogeneity in wages and working hours among individuals. This forms the basis for the following setup.

Let us assume an economy with a unitary mass of male and female agents. We also assume that men and women belong to two income groups (rich and poor). In this model a person can only get married or remain single as we assume "happy ever-after" marriages without divorce. Every individual faces a constant probability of dying,  $\delta$ , each period. Following [Greenwood et al. \(2016\)](#), any dead individual is replaced by a single doppelganger of the same type. We include the probability of dying, in each period to ensure a stationary distribution of agents over time. This simplifies the analysis by allowing us to focus on steady state equilibrium without worrying about population growth or decline that could be caused from the lack of fertility mechanism.

Agents search for partners while being single, and a couple is only formed if both parties mutually agree to marry. We assume that couples derive utility solely from pooled income and non-working time. The significance of non-working time in marriage decisions is supported by the findings of [Aguilar et al. \(2013\)](#), who demonstrate that adjustments in time use in response to changes in market work differ significantly between married individuals and singles. Specifically, within the married group, approximately 42 percent of the hours not spent on market work are redirected to non-market activities and child care. This indicates that married individuals place substantial value on non-market time, utilizing it for home production and family-related activities. Although our model does not explicitly include fertility decisions or child-rearing activities, incorporating non-working hours into the utility function effectively captures their impact on marriage decisions. By valuing non-market time, we acknowledge that individuals derive utility

not only from consumption but also from activities outside of market work, such as leisure, home production, and family care. This inclusion allows the model to reflect observed behaviors where reductions in working hours can increase the attractiveness of marriage for women (or otherwise for men), by enabling partners to allocate more time to shared non-market activities. Therefore, the utility derived from non-working time plays a crucial role in influencing individuals' decisions to marry, as it encompasses the benefits of spending time together, raising children, and engaging in household production.

We base our model on some elements of [Greenwood et al. \(2016\)](#). Mainly, we assume that the total non-working time available for non-market activities is given by:

$$n = \begin{cases} 1 - h_{g,i}^s, & \text{for } \textit{singles}, \\ 2 - h_{g,i}^m - h_{g^*,i^*}, & \text{for } \textit{married}, \end{cases} \quad (1)$$

where  $h_{g,i}^k$  and  $h_{g^*,i^*}^k$  are the total amount of time spent on the labour market for gender  $g(g^*)$  with income level  $i(i^*)$  and marital status  $k = \{s, m\}$ . It is important to note that labor market participation is treated as an exogenous variable in this model. Each group is assigned the corresponding hours based on marital status. The variable  $n$  represents everything that can be produced by non-worked time, including home production, leisure, child care, and other non-market activities.

We depart from [Greenwood et al. \(2016\)](#) by abstracting from the home goods production function and focusing solely on non-working hours in the market. This simplification is intentional, as we argue that the impact of household durables prices on marriage dynamics has diminished since the 2000s. [Greenwood et al. \(2016\)](#) found that the price of household durables relative to other goods decreased by about 60 percent between 1960 and 2005, significantly influencing marriage decisions during that period. However, this trend has not continued at the same pace in recent decades. Specifically, in the National Income and Product Accounts (NIPA), the price index for "furnishings and durable household equipment" relative to the price index for "personal consumption expenditures" dropped by about 35 percent between 2000 and 2020, which is still significant but a smaller decline compared to earlier periods. Moreover, as highlighted by [Church \(2014\)](#), over the last three decades, consumer expenditures have shifted from commodities, including durable goods, to services, particularly housing. The analysis shows a significant increase in the quantity of housing due to factors such as higher homeownership rates and larger home sizes, while the quantity of durable goods has increased modestly. This shift indicates that the role of household durables in influencing marriage decisions might have become less significant in the modern context<sup>8</sup>.

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<sup>8</sup>We do not explore the role of services or the potential impact of rising service prices on marriage dynamics within this model. However, the increase in service prices could help explain positive assortative matching in income, as couples may require a high combined income to afford these services, especially housing.

Instantaneous utility depend on the consumption  $c$ , and non-worked time  $n$ :

$$u_s(c, n) = \frac{1}{1-\zeta}(c - \mathbf{c})^{1-\zeta} + \frac{\alpha}{1-\xi}n^{1-\xi}, \quad (2)$$

$$u_m(c, n) = \frac{1}{1-\zeta} \left( \frac{c - \mathbf{c}}{\chi} \right)^{1-\zeta} + \frac{\alpha}{1-\xi} \left( \frac{n}{\chi} \right)^{1-\xi}, \quad (3)$$

with

$$c = \begin{cases} w_{g,i}^s, & \text{for } \textit{singles}, \\ w_{g,i}^m + w_{g^*,i^*}^m, & \text{for } \textit{married}, \end{cases} \quad (4)$$

where  $\mathbf{c}$  is the minimum consumption requirement and  $\chi$  is the household equivalence scale. The parameter  $\zeta$  determines the curvature of the utility function with respect to market goods consumption ( $c$ ). Specifically, it reflects the degree of diminishing marginal utility for market goods. Similarly, the parameter  $\xi$  determines the curvature of the utility function with respect to non-market time ( $n$ ).

Next, we denote the value of being single as  $V_{g,s}(w_{gi}^s)$ , and the value of being married with the assumption of no divorce as  $V_{g,m}(w_{gi}, w_{g^*,i^*})$ . Each agent draws a match-specific shock  $\epsilon_k$  drawn from cumulative density function (CDF)  $F^\epsilon$  which has a continuous domain and is a Type I extreme value distribution. If a couple  $(w_{g,i}, w_{g^*,i^*})$  meets, and given the extreme value shocks, the probability of that agent  $g$  wants to marry is<sup>9</sup>:

$$D_g(w_{gi}, w_{g^*,i^*}) = \frac{\exp\left(\frac{V_{g,m}(w_{gi}, w_{g^*,i^*})}{\sigma_\epsilon}\right)}{\exp\left(\frac{V_{g,m}(w_{gi}, w_{g^*,i^*})}{\sigma_\epsilon}\right) + \exp\left(\frac{V_{g,s}(w_{gi})}{\sigma_\epsilon}\right)} \quad (5)$$

where  $\sigma_\epsilon$  is the scale parameter of the extreme value shock. This can be seen as the love parameter<sup>10</sup>. The expression in 5 represents the probability of the utility from marrying exceeds the utility from remaining single. A couple is formed if both individuals want to do it. That is, two individuals will get married only if their corresponding utility when married are higher than when single. Hence, the probability of a couple marrying is given by the product of both probabilities  $D_g$  and  $D_{g^*}$ . We denote this product by:

$$\Lambda_{gg^*}(\cdot) = \text{Probability of marriage} = D_g(\cdot) \times D_{g^*}(\cdot) \quad (6)$$

Now that we have the The matching rule  $\Lambda_{gg^*}$ , we derive the value of being single as:

<sup>9</sup>The derivation of  $D_g$  can be found in Appendix A.1.

<sup>10</sup>Note that when  $\sigma$  goes to 0,  $D$  goes to 1 if  $V_{g,m} > V_{g,s}$  and zero otherwise, translating purely the models power. On the other hand, when  $\sigma$  goes to 1, the probability goes to 0.5.

$$V_{g,s}(w_{gi}^s) = u_s(w_{gi}^s) + \beta \left\{ p \left[ \sum_{w_{g^*i^*}^s \in W} \frac{M_{g^*,s}(w_{g^*i^*}^s)}{M_{g^*,s}} \tilde{V}_{g,m}(w_{gi}, w_{g^*i^*}) \right] + (1-p)V_{g,s}(w_{gi}) \right\} \quad (7)$$

with

$$\tilde{V}_{g,m}(w_{gi}^m, w_{g^*i^*}^m, w_{gi}^s) = [\Lambda_{gg^*}(w_{gi}, w_{g^*i^*})]V_{g,m}(w_{gi}^m, w_{g^*i^*}^m) + [1 - \Lambda_{gg^*}(w_{gi}, w_{g^*i^*})]V_{g,s}(w_{gi}^s) \quad (8)$$

with  $\beta$  representing the discount factor,  $p$  representing the odds of a single individual meeting a potential partner in a given period,  $M_{g^*,s}(w_{g^*i^*})$  representing the measure of single agents of the opposite gender  $g$  with wage  $w_{g^*i^*}$  and  $M_{g^*,s}$  representing the total measure of single agents of the opposite agents  $g^*$ . Thus, the ration of  $M_{g^*,s}(w_{g^*i^*})$  to  $M_{g^*,s}$  is the probability that a potential partner from the opposite gender has a wage ( $w_{g^*i^*}$ ). Equation 8 is the expected value of transitioning from being single to being married, accounting for the probability to marry  $\Lambda_{gg^*}$ . The intuition behind 7 mirrors the timing of events in the model. A single individual goes to the marriage market, he remains single with a probability of  $(1-p)$ , as such the expected value if the individual does not meet a potential partner is  $(1-p)V_{g,s}(w_{gi})$ . There is a probability  $p$  that he finds a potential partner. Moreover since partner of opposite gender could either be rich or poor, the probability of finding anyone of them will depend on the measures of these groups. For the sake of simplicity, let us assume that the individual is a poor woman, she finds a poor man. This does not necessarily mean they will end up marrying. Depending on the matching rule, she might marry, with probability  $\Lambda_{fm}(w_{fp}, w_{mp})$ , or choose to remain single with probability,  $1 - \Lambda_{fm}(w_{fp}, w_{mp})$ .

As for the value of being married, we have:

$$V_{g,m}(w_{gi}^m, w_{g^*i^*}^m) = u_m(w_{gi}, w_{g^*i^*}) + \mu_{i^*}^g + \beta V_{g,m}(w_{gi}, w_{g^*i^*}) \quad (9)$$

where  $\mu_{i^*}^g$  is a parameter that represents the preference of agents of the same gender towards the income group  $i$  of the opposite gender.  $\mu_r^m$  is men's preference towards marrying rich women... etc

A preference parameter capturing the additional utility or disutility that an individual of gender  $g$  derives from being married to a partner of income group  $i$  of the opposite gender. This reflects social preferences and can be interpreted as status considerations.

The measure of singles is:

$$M_{g,s}(w_{gi}) = (1 - \delta)M_{g,s}(w_{gi}) \left\{ p \left[ \sum_{w_{g^*i^*} \in W} \frac{M_{g^*,s}(w_{g^*i^*})}{M_{g^*,s}} [1 - \Lambda_{gg^*}(w_{gi}, w_{g^*i^*})] \right] \right. \\ \left. + (1 - p) \right\} + \delta M_{g,m}(w_{gi}, w_{g^*i^*}) \quad (10)$$

As equation 10 describes, the number of singles today depends on surviving singles from the previous period who did not marry and doppelgangers replacing dead married individuals.

The measure of married agents is:

$$M_{g,m}(w_{gi}, w_{g^*i^*}) = (1 - \delta)M_{g,s}(w_{gi})p \frac{M_{g^*,s}(w_{g^*i^*})}{M_{g^*,s}} \Lambda_{gg^*}(w_{gi}, w_{g^*i^*}) \quad (11)$$

similarly, equation 11 describes the dynamics of the married measure. The number of married individuals today depends on the surviving singles who get married.

*A stationary matching equilibrium is a set comprising the value function for single agents  $V_{g,s}(w_{gi}^s)$ , the value function for married agents  $V_{g,m}(w_{gi}^m, w_{g^*i^*}^m)$ , a decision rule  $D_g(w_{gi}, w_{g^*i^*})$ , a matching rule  $\Lambda_g(w_{gi}, w_{g^*i^*})$ , and stationary distributions for the measures of singles and married couples  $M_{g,s}(w_{gi})$  and  $M_{g,m}(w_{gi}, w_{g^*i^*})$ , for each gender  $g = \{f, m\}$  and income group  $i = \{poor, rich\}$ .*

- (I) The value function  $V_{g,s}(w_{gi}^s)$  solves the single's recursion (Equation 7), taking as given the instantaneous utility function for singles  $u_s(w_{gi}^s)$  from Equation 2, the value function for married individuals  $V_{g,m}(w_{gi}^m, w_{g^*i^*}^m)$  from 9, the matching rule  $\Lambda_g(w_{gi}, w_{g^*i^*})$  6, and the stationary distribution for the measure of singles  $M_{g,s}(w_{gi})$  in 10.
- (II) The value function  $V_{g,m}(w_{gi}^m, w_{g^*i^*}^m)$  solves the married person's recursion (Equation 9), taking as given the indirect instantaneous utility function for married individuals  $u_m(w_{gi}^m, w_{g^*i^*}^m)$  from Equation 3.
- (III) The decision rule  $D_g(w_{gi}, w_{g^*i^*})$  solves the marriage decision problem (Equation 5), taking as given the value functions  $V_{g,s}(w_{gi}^s)$  and  $V_{g,m}(w_{gi}^m, w_{g^*i^*}^m)$ .
- (IV) The matching rule  $\Lambda_g(w_{gi}, w_{g^*i^*})$  is solved based on Equation 6, taking as given The decision rules  $D_g(\cdot)$  and  $D_{g^*}(\cdot)$ .
- (V) The stationary distributions  $M_{g,s}(w_{gi})$  and  $M_{g,m}(w_{gi}, w_{g^*i^*})$  solve Equations 10 and 11, taking as given the matching rule  $\Lambda_g(\cdot)$ .

## 4 Calibration

We fit the described model to the 2000 US data. Most of the parameters are chosen and assigned based on a priori information. The  $\mu$ 's (the preferences of a person to carry an income type of the other gender),  $\sigma$  the scale parameter of the extreme value shock, the weight associated with the non-worked time  $\alpha$ , and the parameter determining the curvature of the utility function with respect to non worked time ( $\xi$ ), are on the other hand calibrated.

We assume that a period is one year. We set  $\delta = 0.033$  as our population is for individuals aged 25 to 55. Consequently, the discount factor  $\beta = 0.960 \times (1 - 0.033)$ . We assign the value for the work week by taking the average hours worked for each group from the data and dividing it by 112 which represents non-sleeping hours in a week. The equivalence scale is set at  $X = 0.70$  from the (OECD). Finally,  $\{\zeta, \bar{c}\}$  are taken from [Greenwood et al. \(2016\)](#). Table 5 summaries the parameters.

The parameters to calibrate are  $\{\mu_p^m, \mu_r^m, \mu_p^f, \mu_r^f, \sigma, \alpha, \xi\}$ . These parameters are estimated such that the model matches 8 data moments for the year 2000. The data targets are the fraction of the population that has ever-been married by gender and income group,

$$\frac{M_{g,m}(w, w^*)}{M_{g,m}}$$

and the fraction of couples for each combination of the income types for both the husband and wife.

$$\frac{\sum M_{g,m}(w, w^*)}{\sum M_{g,s}(w^*) + M_{g,m}(w, w^*)}$$

Table 6 reports the parameter estimates. The set of moments and the corresponding results for the benchmark model for the year 2000 are displayed in Table 7. The fitted parameter values match the data very closely.

nonmarket time is calibrated to have a weight of  $\alpha = 2$  in the utility. This is equivalent to a weight of leisure amounting to 0.9, in a typical macro model with a consumption weight equal to 0.45 ( $0.9/0.45 = 2$ ). In [Greenwood et al., 2016](#),  $\alpha$  is 1.20, which in this context translates to a weight of 0.55 being applied to leisure. Note that our estimate is higher and this is consistent with the idea that couples care more about leisure in the 2000s than they did in 1960, and thus it is not unreasonable. Our utility function for "nonmarket time" is less concave than [Greenwood et al., 2016](#) ( $\xi_{our} = 2.06 < \xi_{2016} = 3.11$ ) but still greater than the utility's degree of curvature of market goods ( $\zeta = 1.78$ ). This implies that more household wealth leads to more allocation toward market goods, though with a lesser degree than it would have with [Greenwood et al. \(2016\)](#)'s estimate.

The type preferences  $\mu$  capture gender's heterogeneity with respect to marriage. What is striking is that we get clear different preferences when it comes to groups. Comparing



Table 5: Parameters: A Priori Information

Category	Parameter values	Criteria
Preferences	$X = 0.70$	OECD scale
	$\beta = 0.96$	Prescott (1986)
	$\zeta = 1.782$	<a href="#">Greenwood et al. (2016)</a>
	$\bar{c} = 0.068$	<a href="#">Greenwood et al. (2016)</a>
Death probability	$\delta = 1/30$	A 30-year lifespan
Hours	$h_{m1,m,2000} = 0.3842$	Data
	$h_{m2,m,2000} = 0.4209$	Data
	$h_{f1,m,2000} = 0.2969$	Data
	$h_{f2,m,2000} = 0.3713$	Data
	$h_{m1,s,2000} = 0.3669$	Data
	$h_{m2,s,2000} = 0.4131$	Data
	$h_{f1,s,2000} = 0.3286$	Data
	$h_{f2,s,2000} = 0.3810$	Data
Wages	$w_{f2,s,2000} = 1$	(normalization)
	$w_{m1,m,2000} = 1.000$	Data
	$w_{m2,m,2000} = 2.114$	Data
	$w_{f1,m,2000} = 0.512$	Data
	$w_{f2,m,2000} = 1.463$	Data
	$w_{m1,s,2000} = 0.858$	Data
	$w_{m2,s,2000} = 2.033$	Data
	$w_{f1,s,2000} = 0.569$	Data
	$w_{f2,s,2000} = 1.455$	Data

the estimated values, we get that men prefer to marry rich to poor women ( $\mu_{m2} > \mu_{m1}$ ) whereas women prefer poor to richer men ( $\mu_{f2} < \mu_{f1}$ ). These parameters water down the impact of the mechanism and when we calibrate the model without these preferences the marriages rates are way higher than the targets.

Going back to Table 7, the model matches most of the targets with ease. It is worth noting however that the model is less effective in matching two moments. the fraction of rich husbands married to poor wives and the fraction of poor husbands married to rich wives. The data sets the first moment at 25.62 percent whereas the model predicts to be 27.49 percent. For the second moment, the data has it at 18.26 percent, whereas the model underestimates it at 16.05 percent.

Table 6: Parameters: Estimated

Category	Parameter	Value
Preferences	$\mu_{m1}$	-0.354754119334353
	$\mu_{m2}$	-0.212772033060683
	$\mu_{f1}$	-0.453297033494276
	$\mu_{f2}$	-0.526434406793840
	$\sigma$	1.300231463477392
	$\alpha$	2.100429049320298
	$\xi$	2.065317083422249

Table 7: Data and Benchmark Model, 2000

	Data				Model			
	Fem 1	Fem 2	Males 1	Males 2	Fem 1	Fem 2	Males 1	Males 2
<b>Marriage</b>								
Rates	0.6582	0.5894	0.5951	0.7348	0.6564	0.5937	0.5976	0.7307
<b>Sorting</b>								
		Wife				Wife		
Husband		Poor	Rich			Poor	Rich	
Poor		0.2612	0.1826			0.2562	0.1605	
Rich		0.2562	0.3033			0.2749	0.3083	

## 5 Moving to 2021

For the purpose of simulating the model for the year 2021, we use the 2021 wages and hours worked.<sup>11</sup> In this section we assess the model's fit to the US data for the year 2010. In the next section we execute a decomposition exercise to assess the importance of the two mechanisms at hand: the change of the wage structure and the change in the hours worked. Running the model with the wage structure and hourly work of the year 2021, we get the result in Table 8.

<sup>11</sup>2021 Wages are deflated to be comparable to the 2000 dollar values. Wages are divided by 2021 consumer price index then multiplied by 2000 consumer price index. We normalise by the wage of poor men in 2000. After this process we note a decrease in the wage of poor married and single men and a growth for the rest of the groups. We also notice a widening gap between married and single rich women in 2021 compared to 2000.

Table 8: Data and Benchmark Model, 2000 and 2021

	2000								2021								
	Data				Model				Data				Model				
	Fem 1	Fem 2	Male 1	Male 2	Fem 1	Fem 2	Male 1	Male 2	Fem 1	Fem 2	Male 1	Male 2	Fem 1	Fem 2	Male 1	Male 2	
<b>Marriage Rates</b>	0.6582	0.5894	0.5951	0.7348	0.6562	0.5937	0.5937	0.7307	0.5487	0.6045	0.5055	0.6829	0.6070	0.6093	0.5291	0.7172	
<b>Sorting</b>																	
Husband	<u>Wife</u>							<u>Wife</u>							<u>Wife</u>		
	Poor	Rich						Poor	Rich						Poor	Rich	
Poor	0.2612	0.1826						0.2562	0.1605						0.2131	0.1808	
Rich	0.2562	0.3033						0.2749	0.3083						0.2410	0.3649	

The main result is that the model successfully reproduces the trends observed in the data, specifically a decrease in marriage rates for all groups except for rich women. This is a new and relevant finding. To the best of my knowledge, this is the first paper to provide a model that manages to explain the contrasting differences in marriage trends across different groups.

With regards to marriage rates, the model manages to capture a sizable fraction of the change from the year 2000 to 2021. The model explains 47 percent of the decrease in the marriage rate of poor men, 74 of the decrease in the marriage rates of the poor women, and 34 percent of the decrease in the marriage rates of the rich men. As for rich women, the model overestimates slightly the marriage rates explaining 131 percent of the change.

Looking at the sorting contingency tables, two noticeable weaknesses arise. First, the model does poorly when it comes to predicting the fraction of rich husbands to poor wives. This moment decreases in the data from 0.2562 in the 2000 to 0.2410 in 2021, whereas it increases in the model from 0.2749 in 2000 to 0.2931 in 2021. The second, is the fact that the model overestimates to some extent the fraction of poor husbands to poor wives. This moment decreases in the data from 0.2612 in 2000 to 0.2131 in the 2021, whereas it decreases in the model from 0.2562 in 2000 to 0.1569 in 2021. This is due to the strength of the wage mechanism. Poor men had a decline in the wage from 2000 to 2021 in comparison, which reduced their value function and the value function of women who marry with their type.

## 6 Decomposition

In this section we will inspect our two main mechanisms. The change in the wage structure and the change in the hours worked. In this context, I consider two experiments. First, I attempt to see the impact of the change in the wage structure while keeping hours worked at the 2000 level. Second, I turn off the shifts in the wage structure and apply the changes of the hours worked. For this purpose we use the results in Table 8 as the benchmark for the experiments.

First, we consider the situation in which wages by gender and marital status are fixed to the 2000 levels and change only hours worked <sup>12</sup>. We see the results of this exercise in Table 9 under the Exper1 column. We can clearly distinguish that the marital rate for rich women increases compared to the 2000 levels. On the other hand we get a modest decrease in the rate of poor women and a week decrease in the marital rates of poor men. Rich men also had a very small increase.

Second, we consider the situation in which the hours by gender and marital status are fixed to the 2000 levels, and apply the wage structure corresponding to the year 2021. We see the results of this exercise in the Table 8 under the Exper2 column. Interestingly, we get a decrease in the marital rate of rich women (0.5937 in the benschmak versus 0.5875 when only wage is changing). This is expected as wage gap between rich men and women decreased which makes marriage less beneficial for women with this mechanism. One worthnoting point is that the impact of the closing gap between rich men and women is not offset by the widening gap between rich and poor women. As for the other marital rates we see a sharper decrease for poor men and women and a week decrease for rich men.

Table 9: Data and Benchmark Model, 2000 and 2021

	Benchmark		Experiments (2021)	
	2000	2021	Exp 1	Exp 2
<b>Fem 1</b>	0.6562	0.6070	0.6279	0.6329
<b>Fem 2</b>	0.5937	0.6093	0.6049	0.5794
<b>Male 1</b>	0.5937	0.5291	0.5767	0.5593
<b>Male 2</b>	0.7307	0.7172	0.7312	0.7262

## 7 conclusion

This paper investigates the recent trends in marriage rates in the United States from 2000 to 2021, focusing on the roles of wage structure and work hours. Utilizing IPUMS data, the study highlights that while changes in the wage structure can explain the decrease in marital fractions, a significant reduction in work hours for men across all income groups, contrasted with a slight increase for women, played a crucial role in influencing marriage trend.

The analysis reveals that reductions in male work hours may increase the probability

<sup>12</sup>Note that we only change the wage structure and hours in this counterfactual exercise. We keep population counts for each group at their 2000 level. Although this paper is not concerned by explaining the increase in the assortative matching, changing the population distribution across the different groups can indeed explain the phenomenon. This mirrors the increase of the stock of educated and working females in other papers of the literature

of marriage, underscoring the importance of time availability in household dynamics. A calibrated marriage model tested with 2021 data supports the hypothesis that changes in work hours better explain recent marriage trends than changes in wages.

Through counterfactual exercises, the study demonstrates that the 2021 wage structure does not align with observed trends in marriage rates, particularly for rich women. In contrast, the model incorporating 2021 hours worked explains why rich women marry more.

These findings contribute to the understanding of the economic determinants of marriage, emphasizing the critical role of work hours alongside wage considerations. The study suggests that policies aimed at addressing work-life balance may have significant implications for marriage patterns, especially in light of evolving labor market dynamics. Future research could further explore the interplay between work hours, wage structures, and other socio-economic factors to provide a more comprehensive understanding of marriage trends.

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# Appendices

## Appendix A Additional On The model

### A.1 Utility Maximization and Choice Probabilities

In this section, we explain how an agent’s probability of marrying arises from utility maximization within the discrete choice framework. We derive the expression for  $D_g$  by modeling agents’ decision-making processes under uncertainty due to unobserved preference shocks.

Each agent  $g$  faces a choice between two alternatives, marrying a potential partner denoted by  $m$ ) or remaining single(denoted by  $s$ ).

The utility associated with each choice has two components represented by the deterministic utility component which depends on observable characteristics such as ( $w_{gi}$ ) and work hours ( $h_{gi}$ ) in our model, as well as a random utility component which captures unobserved factors affecting the agent’s preferences such as *love*.

The utility functions that the agent  $g$  seeks to maximize are specified as:

$$U_{g,m} = V_{g,m}(w_{gi}, w_{g^*i^*}, h_{gi}, h_{g^*i^*}) + \epsilon_{g,m}, \quad (\text{A1})$$

$$U_{g,s} = V_{g,s}(w_{gi}, h_{gi}) + \epsilon_{g,s}, \quad (\text{A2})$$

where  $V_{g,m}$  is the deterministic utility of marrying.  $V_{g,s}$  is the deterministic utility of remaining single.  $\epsilon_{g,m}$  and  $\epsilon_{g,s}$  are the random utility components (preference shocks).

We assume that the preference shocks  $\epsilon_{g,m}$  and  $\epsilon_{g,s}$  are independently and identically distributed (i.i.d.) according to a Type I Extreme Value distribution (Gumbel distribution):

$$\epsilon_{g,m} \sim \text{Type I Extreme Value}, \quad (\text{A3})$$

$$\epsilon_{g,s} \sim \text{Type I Extreme Value}. \quad (\text{A4})$$

This assumption facilitates the derivation of a closed-form expression for the choice probabilities.

Agent  $g$  will choose to marry if the utility from marrying exceeds the utility from remaining single:

$$\text{Choose to marry if } U_{g,m} > U_{g,s}. \quad (\text{A5})$$

The probability that agent  $g$  chooses to marry is then:

$$D_g = \Pr(U_{g,m} > U_{g,s}). \quad (\text{A6})$$

Substituting the utility functions:

$$\begin{aligned} D_g &= \Pr(V_{g,m} + \epsilon_{g,m} > V_{g,s} + \epsilon_{g,s}), \\ &= \Pr(\epsilon_{g,s} - \epsilon_{g,m} < V_{g,m} - V_{g,s}). \end{aligned} \quad (\text{A7})$$

Since  $\epsilon_{g,m}$  and  $\epsilon_{g,s}$  are i.i.d. Type I Extreme Value, the difference  $\epsilon_{g,s} - \epsilon_{g,m}$  follows a logistic distribution. The cumulative distribution function (CDF) of the logistic distribution is:

$$F(z) = \frac{1}{1 + \exp\left(-\frac{z}{\sigma_\epsilon}\right)}, \quad (\text{A8})$$

where  $\sigma_\epsilon$  is a scale parameter.

Therefore, the probability that agent  $g$  chooses to marry is:

$$\begin{aligned} D_g &= \Pr(\epsilon_{g,s} - \epsilon_{g,m} < V_{g,m} - V_{g,s}), \\ &= F(V_{g,m} - V_{g,s}), \\ &= \frac{1}{1 + \exp\left(-\frac{V_{g,m} - V_{g,s}}{\sigma_\epsilon}\right)}, \\ D_g &= \frac{\exp\left(\frac{V_{g,m}}{\sigma_\epsilon}\right)}{\exp\left(\frac{V_{g,m}}{\sigma_\epsilon}\right) + \exp\left(\frac{V_{g,s}}{\sigma_\epsilon}\right)}. \end{aligned} \quad (\text{A9})$$



The choice probabilities reflect the likelihood that the utility from marrying exceeds that of remaining single. An increase in the deterministic utility of marrying ( $V_{g,m}$ ) relative to remaining single ( $V_{g,s}$ ) increases the probability  $D_g$  that the agent chooses to marry. As for the scale parameter  $\sigma_\epsilon$  influences the impact of the random utility components. A smaller  $\sigma_\epsilon$  implies less variance in the unobserved preference shocks, making choices more deterministic. Whereas, a larger  $\sigma_\epsilon$  increases the randomness in choices due to greater influence from unobserved factors.

## A.2 Additional: Model

$$m(M_{ms}, M_{fs}) = \frac{M_{ms} \cdot M_{fs}}{(M_{ms}^p + M_{fs}^p)^{\left(\frac{1}{p}\right)}} \quad (\text{A10})$$

where  $M_{ms}$  is the mass of single males in the marriage market, and  $M_{fs}$  is the mass of single females in the marriage market. The matching function,  $m(M_{ms}, M_{fs})$ , represents the effective or "matched" mass when single males and females interact in the marriage market. The numerator,  $M_{ms} * M_{fs}$ , suggests that the matched mass increases with both the mass of single males and single females. The denominator introduces a non-linearity, controlled by the parameter  $p$ . This parameter determines the sensitivity of the matching function to changes in the masses of single males and females. If  $p = 1$ , the matching function simplifies to the geometric mean of  $M_{ms}$  and  $M_{fs}$ .  $p$  increases, the function becomes more sensitive to the smaller of the two masses, emphasizing the importance of balance in the market

$$p_m(M_{ms}, M_{fs}) = \frac{m(M_{ms}, M_{fs})}{M_{ms}} \quad (\text{A11})$$

This function calculates the proportion of the matched mass attributed to single males. It provides insight into the relative "influence" or "contribution" of single males to the overall matched mass in the marriage market.

$$p_f(M_{ms}, M_{fs}) = \frac{m(M_{ms}, M_{fs})}{M_{fs}} \quad (\text{A12})$$

Similarly, this function calculates the proportion of the matched mass attributed to single females. It offers a perspective on the relative "influence" or "contribution" of single females to the overall matched mass in the marriage market.

## Appendix B Algorithm

In the model, the process of finding the general equilibrium involves several key steps:

1. For a given guess of parameters.

2. Guess measures  $M_{g,s}(w, w^*)$ .
3. Iterate value functions and  $D$ , obtain  $V_{g,s}(\cdot)$  and  $D_g(\cdot)$ .
4. Iterate laws of motion and obtain a new  $M_{g,s}(\cdot)$ . Compare with the one guessed initially.

These steps are iterated until convergence, ensuring that the model's equilibrium is consistent with the initial assumptions and parameter guesses.

## Appendix C Data

Variables as defined in IPUMS-USA ([Ruggles et al. \(2024\)](#)):

- **MARST** indicates each person's marital status (Married, spouse present; Married, spouse absent; Separated; Divorced; Widowed; Never married/single).
- **UHRSWORK** reports the number of hours per week the respondent usually worked in the previous year, based on different reference periods in census surveys. It's a two-digit variable, with codes for missing, edited, or not applicable data, adjusted per census year and sample.
- **SEX**: Indicates the respondent's gender (male or female).
- **INCWAGE**: Reports total pre-tax wages and salary income from the previous year, excluding payments-in-kind or reimbursements.
- **HHINCOME**: Total income of household members aged 15+ from the previous year, expressed in contemporary dollars. Household income includes all members, while family income (FTOTINC) includes only related members.
- **PERWT**: Weights each person to represent the U.S. population for accurate person-level analysis.
- **SERIAL**: A unique household identifier; combines with SAMPLE and PERNUM to uniquely identify each person in the database.

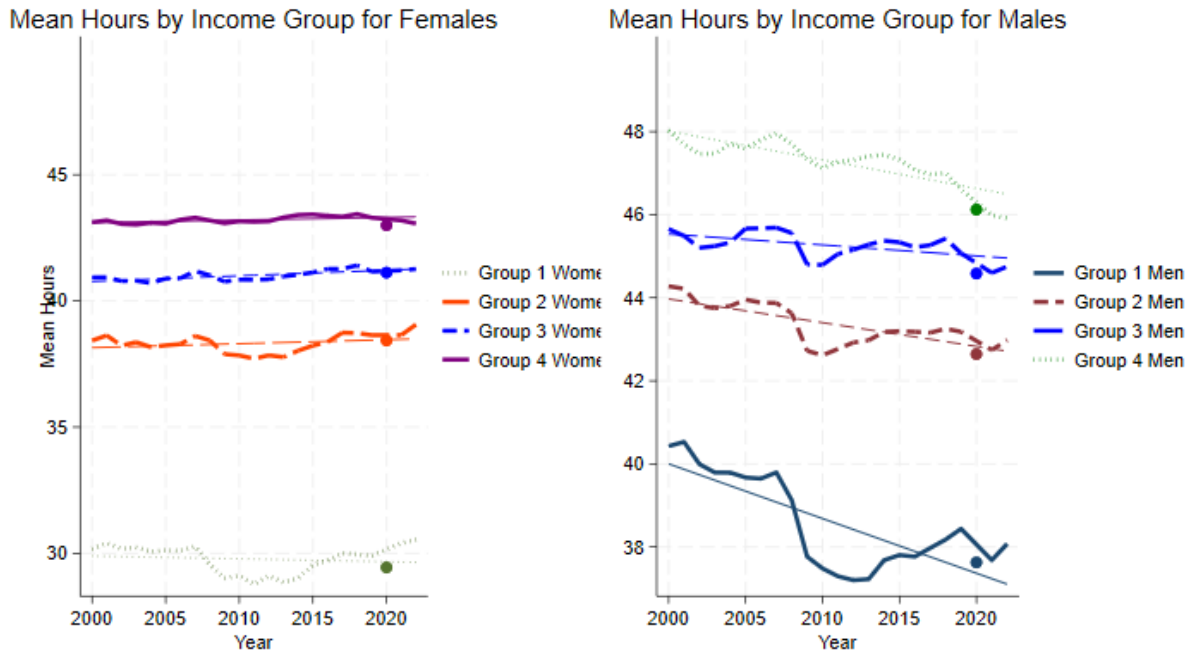


Figure A1: Mean hours by 4 income groups for genders

## Appendix D Additional statistics

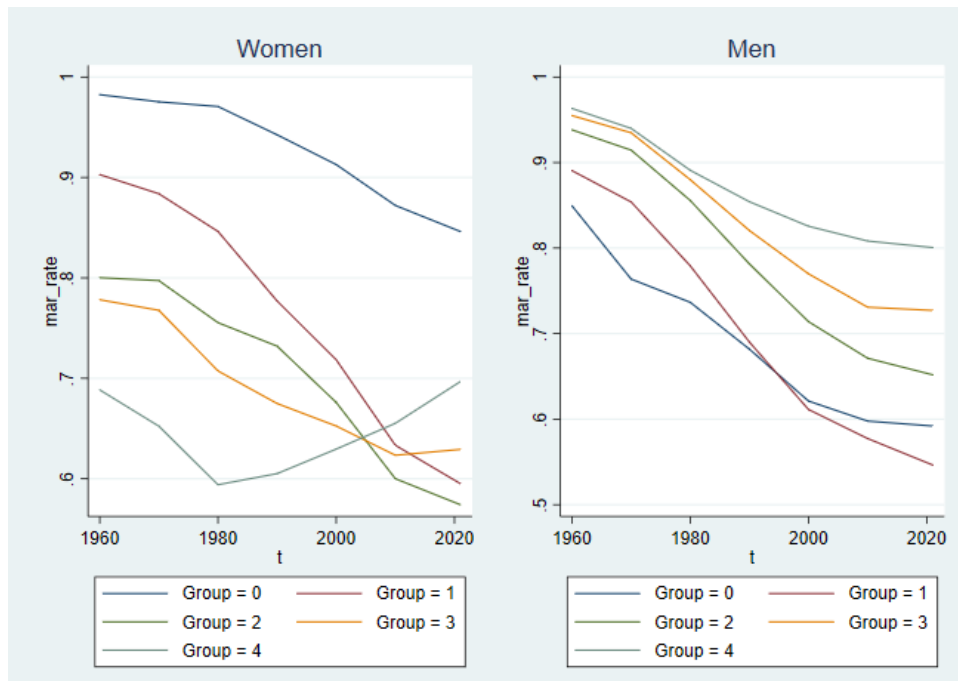


Figure A2: Marital rates among 35-44 years old over time by income group.

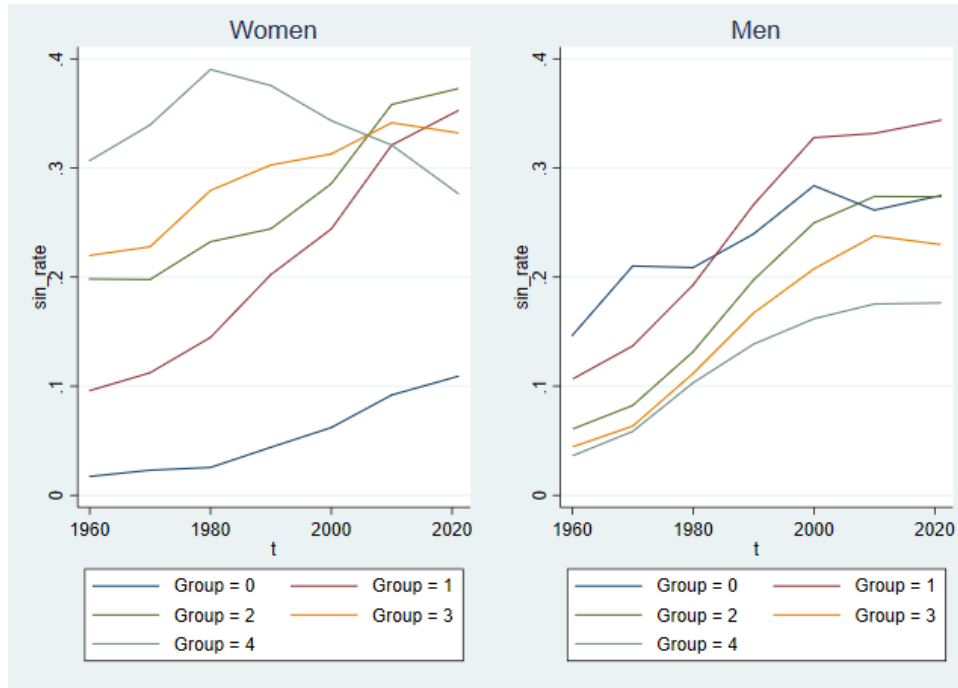


Figure A3: Singlehood rates among 35-44 years old over time by income group.

Wife's income group	husband's income group			
	Group 1	Group 2	Group 3	Group 4
Age cohort 35-44 in 1960				
Group 1	<b>0.140</b>	0.063	0.044	0.027
Group 2	0.566	<b>0.300</b>	0.214	0.130
Group 3	1	0.600	<b>0.443</b>	0.300
Group 4	1.748	0.913	0.701	<b>0.500</b>
Age cohort 35-44 in 2021				
Group 1	<b>0.649</b>	0.239	0.138	0.049
Group 2	1.44	<b>0.745</b>	0.441	0.235
Group 3	2.765	1.155	<b>0.758</b>	0.428
Group 4	6.666	2.075	1.271	<b>0.795</b>

Table A1: Wife's to husband wage gap

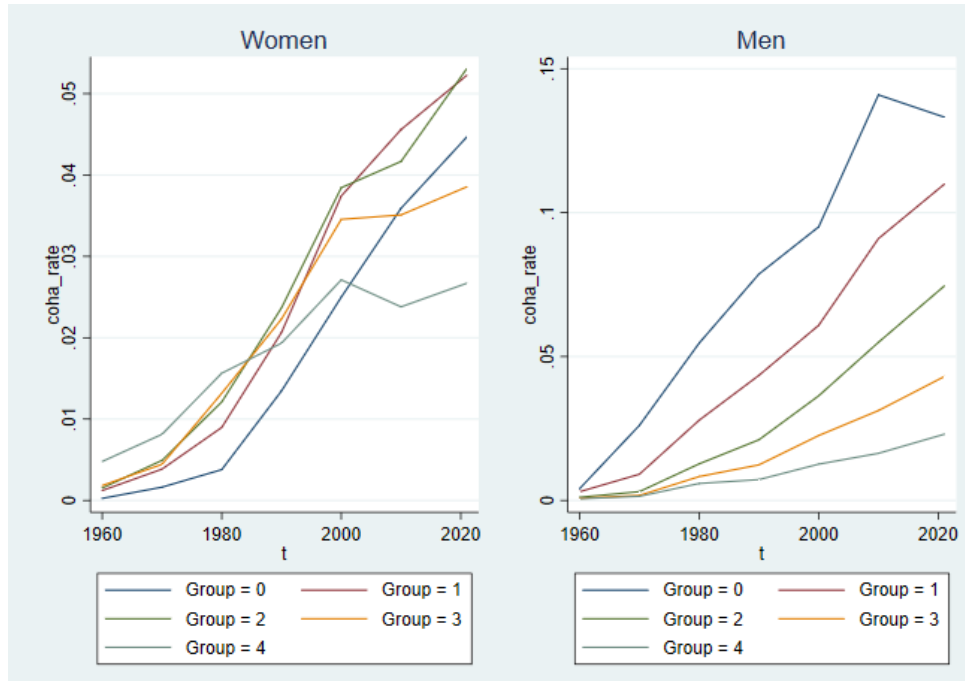


Figure A4: Cohabitation rates among 35-44 years old over time by income group.

wife's income group	husband's income group				
	Group 0	Group 1	Group 2	Group 3	Group 4
Age cohort 35-44 in 1960					
Group 0	0.5	9.5	12.7	15.2	19.8
Group 1	0.09	2.8	2.9	3.3	3.5
Group 2	0.1	2.8	3.2	2.9	2.1
Group 3	0.1	2.1	3.0	2.5	1.4
Group 4	0.1	1.1	2.4	2.7	2.1
Age cohort 35-44 in 2021					
Group 0	0.3	2.9	3.9	4.1	7.04
Group 1	0.5	4.25	4.34	4.35	5.1
Group 2	0.5	3.5	5.5	4.7	3.9
Group 3	0.5	2.5	5.1	6.6	5.3
Group 4	0.7	2.1	3.5	6.4	11.6

Table A2: Sorting patterns by income group and Age cohorts, IPUMS data

Gender	Income Group	Mean
1	1	43.02973247397176
1	2	47.14369023493617
2	1	33.24870552543015
2	2	41.58751660956846

Table A3: Married - Year 2000

<b>Gender</b>	<b>Income Group</b>	<b>Mean</b>
1	1	41.09009027007127
1	2	46.26401800772462
2	1	36.80292590089455
2	2	42.66683717226666

Table A4: Singles - Year 2000

	<b>Income Group 1</b>	<b>Income Group 2</b>
<b>Married Male</b>	1.000	2.183
<b>Married Female</b>	0.516	1.429
<b>Single Male</b>	0.905	2.024
<b>Single Female</b>	0.556	1.429

Table A5: Wage Rates - Year 2000

<b>Gender</b>	<b>Income Group</b>	<b>Mean</b>
1	1	40.82876601205336
1	2	45.477141640055
2	1	33.48136521995662
2	2	41.99393929212777

Table A6: Married - Year 2021

<b>Gender</b>	<b>Income Group</b>	<b>Mean</b>
1	1	38.89426246884116
1	2	44.92787574329627
2	1	35.61329658168626
2	2	42.42494547195188

Table A7: Singles - Year 2021

	<b>Income Group 1</b>	<b>Income Group 2</b>
<b>Married Male</b>	0.917	2.324
<b>Married Female</b>	0.594	1.808
<b>Single Male</b>	0.806	2.067
<b>Single Female</b>	0.607	1.653

Table A8: Wage Rates - Year 2021