What Women Want: Family Formation and Labor Market Responses to Marriage Incentives

JOB MARKET PAPER

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Abstract

Family structure in the United States has shifted substantially over the last three decades, yet the causes and implications of these changes for the well-being of family members remains unclear. This paper exploits task-based shifts in demand as an exogenous shock to sex-specific wages to demonstrate the role of relative female to male wages in the family and labor market outcomes of women. I show that increases in relative wages lead to a decline in the likelihood of marriage for those on the margin of a first marriage, and present suggestive evidence that these effects are concentrated among less-desirable matches. Higher relative wages also cause women to increase their hours of work, reduce their dependence on a male earner, and increase the likelihood of taking guardianship over their children. These findings indicate that improvements in relative wages have facilitated women's independence by reducing the monetary incentive for marriage, and can account for 20% of the decline in marriage between 1980 and 2010.

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1 Introduction

One of the most striking social trends in the United States is the decline in marriage. Between 1980 and 2010 the marriage rate among prime-age women declined from 73% to 56%.[1] Simultaneous with this decline, the fraction of births to unmarried women doubled from 20% to 40% and the share of prime-age women in single female earner households increased by 12 percent, to 23%. Further, recent evidence suggests that this demographic shift may be linked to a decline in academic achievement among at-risk populations of children, which could have long-term implications for labor market outcomes (Autor and Wasserman, 2013; McLanahan and Percheski, 2008).

The shift in family structure has been substantial, yet the causes and implications of these changes for the well-being of women and families remains unclear. Descriptive works suggest that the increase in women's education and labor force attachment, advances in reproductive technology, and the declining cost of home work may have contributed.[2] Meanwhile, a growing body of theoretical and empirical work implies that the increases in women's outside options relative to men's[3] over this period – a reduction in the pecuniary gains to marriage – may have influenced women's decisions over a wide set of family outcomes, including marriage and fertility (Becker, 1973; Qian, 2008). Figure 1 highlights the similar timing of these trends. Nonetheless, to date there is little evidence that improved relative wage opportunities affect women's matching decisions or the outcomes of families.

In this paper, I provide a detailed analysis of the effect of relative wage options, "relative wages", in the United States on the outcomes of families over this period. I measure outside options by constructing a sex-specific proxy for potential wages in each demographic group and geographic area, which I define as the relevant "marriage market." This proxy captures the portion of wages that is driven by national task-based shifts in demand that occurred between 1980 and 2010. These shifts provide a plausibly exogenous source of wage convergence between men and women due to women's comparative advantage in cognitive and people-oriented occupations, which experienced substantial wage growth over this period (Bacolod and Blum, 2010; Beaudry and Lewis, 2014). Utilizing this proxy, I estimate the impact of the shift in women's relative earnings power over

[1] Author's calculation using the 1980-2000 Censuses and 2010 ACS. I define prime-age women as women between ages 22 and 44. These women are of child-bearing age and are likely to have competed their education.

[2] See Stevenson and Wolfers (2007) for an overview.

[3] Outside options here refer to potential wages that one could earn outside of marriage.

this period on the likelihood of marriage. Moreover, I examine where in the distribution of match "quality" the effects of relative wages are concentrated. Additionally, I provide the first evidence of the effects of better outside options on the fertility of women, the family structure of households with children, and the family income of women.

The contributions of the paper are threefold. First, I construct a proxy for sex-specific potential wages that draws on insights from a recent literature on the role of task-specialization in the wage convergence between sexes. Second, I provide evidence that the decline in marriage induced by higher relative wages was among less-desirable marriage matches. Third, I show that the reduction in the gender wage gap over this period contributed to two important social phenomena, the decline in marriage and the rise in single mothers, and also led to greater financial independence of women.

I develop the sex-specific wage proxies using a variation on shift-share method (e.g. Bartik, 1991; Blau et al., 2000; Aizer, 2010; Bertrand et al., 2015). To better capture task-based shifts in demand, I take advantage of national changes in wages at the industry *and* occupation level. This is an adaptation of a relatively new literature that uses occupations as proxies for tasks performed (Autor et al., 2003; Beaudry and Lewis, 2014). I also innovate on prior approaches by allowing systematic updating of the initial employment shares to increase the precision of the wage proxy. These adjustments increase the power of the proxy without compromising its validity. Importantly, I show that the proxy is highly correlated with observed wages, but not correlated with trends in education, incarceration, immigration, or other observables in the marriage market that might be correlated with unobserved preferences for family formation or labor supply.

I find that increases in women's relative wage have a significant impact on family formation decisions, particularly for women on the margin of a first marriage. A 10% increase in relative wages leads to a 4.7 percentage point decline in marriage, which corresponds to a 7% effect relative to the mean. I show that the reduction in marriage is nearly entirely explained by a lower propensity to enter into a first marriage. I also provide suggestive evidence that the decline in marriage is among women that would have married lower quality spouses, measured by an improvement in the relative educational attainment and age of spouses in the stock of married couples.

Additionally, I show that higher outside options cause women to separate from men through other channels, including reductions in income pooling and shared child-rearing. In particular, increases in the relative wage increase women's likelihood of being the sole-earner in a household and to taking on greater hours of work. They also induce women to take guardianship of their children. I estimate that a 10% increase in the relative outside option leads to a 20% increase in the likelihood that a woman is a single parent, and a greater likelihood of receiving child support. I do not find an effect of higher relative wages on women's fertility. This set of results suggests that a higher relative wage leads to a broad independence of women.

However, one manifestation of this increased financial independence is that higher outside options cause an increase in the probability of being under the poverty threshold. This increase is concentrated among low-skilled women, who also increasingly participate in safety net programs when relative wages increase. While these findings may not be immediately intuitive, I argue that this pattern of results is easily reconciled with a model of marriage that incorporates non-pecuniary costs to marriage, and where women have a willingness to pay to remain independent from potential partners.

This paper contributes to several literatures. First, it adds to a growing literature that relates sex-specific labor market opportunities to family formation decisions (Schaller, 2015; Blau et al., 2000; Autor et al., 2014). These studies find that improved employment options for women (men) lead to reductions (increases) in marriage and fertility; but find that these changes account for a modest share of the decline in marriage.[4] To date, that literature has not examined the effects of relative wages, however the distinction between the effects of employment and relative wages is important; the relative wage is arguably the more relevant measure of bargaining power as a measure of relative well-being outside of marriage (Pollak, 2005); and shocks to employment may not necessarily correspond to strong changes in wages if, for example, labor supply is relatively elastic.

I also provide new evidence of the influence of relative wages on family outcomes, which builds on existing work that links increases in relative income to changes in violence towards women (Aizer, 2010; Munyo and Rossi, 2015), marriage (Bertrand et al., 2015), the fraction of girls born (Qian, 2008), household decision making (Attanasio and Lechene, 2002), investments in children (Duflo, 2003; Lundberg et al., 1997), household assets (Thornqvist and Vardardottir, 2013), and

[4] Blau et al. (2000) find that employment conditions from 1980-1990 account for between 0 and 34% of the change in marriage among young women (age 16-24), and that these conditions explain a larger proportion of the change among whites relative to blacks. On the other hand, Autor et al. (2014) attribute less than 5% of the fall in marriage between 2000-2010 to the rise in import competition, which accounts for nearly half the decline in employment.

women's labor supply (Bertrand et al., 2015). My focus on marriage and family outcomes relates most closely to Bertrand et al. (2015), who use a similar empirical approach to show that an aversion to women earning more than men leads to a reduction in marriage, an increase in divorce, and a decline in women's labor supply. In contrast to Bertrand et al. (2015), I identify women's responses from variation throughout the entire distribution of relative wages, and therefore measure impacts across a broader population of women (many of whose wage opportunities are not within the range relevant for "aversion" effects.) I also document that bargaining has distinct effects from the aversion channel. Moreover, I examine where in the distribution of marriage matches relative wages have an impact, as well as the impact of relative wages on additional outcomes, including fertility.

My results also contribute to a smaller literature which considers the effects of changes in the bargaining position of men and women on the likelihood of marriage and spousal matching. Prior research has focused primarily on shocks to the relative supply of men in the marriage market, and indicates that a decline in the male to female sex ratio leads to a greater likelihood of a man marrying and of "upgrading" his spouse, as well as increases in women's labor force participation (Charles and Luoh, 2010; Angrist, 2002; Abramitzky et al., 2011). I present evidence of improvements in spousal quality consistent with this body of work, but, as expected, find different implications for marriage.

The paper proceeds as follows. Section 2 provides theoretical motivation. Section 3 provides background on the gender wage gap. Section 4 introduces the empirical strategy paired with a brief description of the data in Section 5, and followed by evidence on the validity of the empirical strategy in Section 6. The results are presented in Section 7. Section 8 addresses alternative specifications and the threat of reverse causation, and 9 concludes.

2 Theoretical Motivation

A relatively large theoretical literature beginning with the seminal work of Becker (1973) suggests that the ratio of women's to men's outside options serve an influential role in establishing the power dynamic, or bargaining power, between men and women by altering the incentives associated with coupling (see also Browning et al. (1994); Chiappori et al. (2002)). Here I discuss two channels by which higher outside options may alter the marriage decisions of women; selection and spousal matching.

Selection: A rise in the relative wage may reduce the stock of married individuals through two mechanisms, which separately target entry and exit from marriage. First, the canonical Becker model posits that increases in the relative wage reduces the pecuniary gains to marriage, and therefore will reduce entry into marriage (Becker, 1973). This holds as long as men have a comparative advantage in market work, i.e the male wage is greater than the female wage. Second, the decline in marital surplus may cause couples to divorce if marriage becomes absolutely less desirable relative to women's outside options (Browning et al., 1994; Chiappori et al., 2002).

While the literature provides precise predictions regarding the volume of marriage, there is little to be gleaned regarding *where* in the distribution of matches the relative wage matters. To gain intuition for this effect, consider the matching decision of heterosexual single women. When a match arises, women decide whether to commit to marriage or remain single based on whether there is a positive surplus associated with the match relative to being single: $\mathrm{U}^{marr} - \mathrm{U}^{single}$. This surplus derives from the pecuniary gain to specialization in marriage, $\psi^{pecuniary}$, which is monotonically decreasing with the relative wage, and the non-monetary gain to marrying spouse s, $\psi_{is}^{non-pecuniary}$ (such as joint consumption of leisure.) For tractability, I assume that marital surplus can be written as a linear combination of the two sources of gains: $\psi^{pecuniary} + \psi_{is}^{non-pecuniary}$.

For the majority of women, the pecuniary gains to marriage are non-negative[5], and therefore contribute to marital surplus (Bertrand et al., 2015). Given this assumption, the effects of the decline in relative wages will only be relevant for a subset of this population. In particular, for women in a match that has a positive non-pecuniary benefit, it will always be beneficial to marry. This can be considered a "marital bliss" effect. Instead, the women that are marginally affected by relative wages are those who experience a non-pecuniary cost to the match, $\psi_{is}^{non-pecuniary} < 0$. These women must be compensated ("bribed") for the disutility of the match, and thus the pecuniary gains form a substantial component of the matching decision. This is consistent with evidence that increases in women's relative pay leads to reduction in the incidence of emotionally and physically abusive relationships, which are likely to have important non-pecuniary costs for

[5] Husbands earn more than wives in nearly three-quarters of couples (Bertrand et al., 2015).

women (Aizer, 2010; Munyo and Rossi, 2015).[6]

I illustrate the marriage market for this subgroup of women in Figure 2, using "Benefit" to signify the pecuniary gains to marriage and "Cost" to represent the negative non-pecuniary gains to marriage, i.e $-\psi_{is}^{non-pecuniary}$. Here, I show one cost, but the results are generalizable to any positive cost. For simplicity, I assume that there is a single male wage, W^M, such that the pecuniary benefit to marriage is a decreasing function in female wages W^F.

I consider the effects of a rise in the relative wage - induced by a decline in the male wage - represented by a shift in the benefit curve from $Benefit_1$ to $Benefit_2$. This generates two effects, clearly shown in the graph. First, some marriages that previously were formed, are now foregone, as indicated by the shaded region. This is simply a visualization of the Becker result, with the modification that it is shown among women that experience non-pecuniary costs to marriage.

Second, women trade-off some positive pecuniary gains when they forego marriage. That is, there is a monetary "foregone benefit" or a "willingness to pay" to avoid marriage among this set of women. Intuitively, this is a result of the fact that the benefits of marriage, while positive, are not sufficient compensation for the disutility of marriage. In practice, this may manifest itself in a decline in consumption if there are not accompanying changes in women's wages or labor supply.[7]

Spousal Matching: A second channel by which relative wages may impact marriage matches is by altering the spouses that women marry. This may be caused either by selection out of marriage or by changes in matching among women that marry regardless of the relative wage. A decline in marriage primarily among matches that have a non-pecuniary cost - and are ostensibly lower in the distribution of match quality - will mechanically lead to a change in the "quality" of matches among married couples. In particular, it may lead to better matches on average. Besides selection, several other mechanisms may contribute to altered spousal matching. One avenue for such a change is if women's tastes for men change in response to declines in the pecuniary gains. For instance, women may place a greater emphasis on the gains from consumption complementaries, such as from shared leisure, than the gains from production complementarities (Stevenson and

[6]It also conforms to qualitative evidence that unwed mothers view having greater financial resources as a source of power against their potential spouses (Edin and Kefalas, 2005). Edin and Kefalas (2005) write that "[l]ow income women are waging a war of the sexes in the domestic sphere, and they believe their own earnings and assets are what buys them power." Supporting this claim, the authors provide evidence from interviews that women consider financial power necessary in order to validate a threat to leave the marriage in cases of domestic violence, infidelity, or otherwise.

[7]Intuitively, the foregone benefit is increasing with the cost.

Wolfers, 2007). However, if the supply of men is fixed, it is unclear that this response would have an effect on matching in equilibrium. Men may also respond to a change in women's tastes by altering their human capital investments (Angrist, 2002).[8] The predicted effect of this channel is unambiguously positive for spousal quality, but previous studies have not found strong responses along this margin. Lastly, selection out of marriage may increase the pool of "low-quality" men available for marriage. These men may remain unmarried; but they may also choose to pair with women that would have previously been unable to find a spouse. Due to the theoretical ambiguity, I will rely on the empirical results to detect the presence of this channel.

Summary: In summary, I have discussed three testable predicted effects of a rise in female to male potential wages: 1) The stock of married individuals declines. Never-married women have a lower probability of marrying and married women have an increased likelihood of divorce. 2) Some women may experience a decline in consumption as a byproduct of the decision to forego marriage. 3) Patterns of spousal matching may change, either due to selection out of marriage (improvement) and/or altered matching (ambiguous).

In order to test these predictions, I will require a measure of women's and men's potential wages to proxy for their outside options. Importantly, potential wages are distinct from observed or actual wages (Pollak, 2005). First, observed wages may be influenced by unobserved preferences for marriage: women may choose to pursue wage-increasing behavior, such as additional degrees or greater levels of experience, due to the lack of a suitable companion. Second, wages may be a reflection of unobserved skills. Mulligan and Rubinstein (2008) document that changes in the gender gap are partially driven by a change in the composition of the female labor force, as selection became increasingly positive between the 1970's and 1990's. The empirical strategy will therefore aim to develop an appropriate proxy for these options in order to assess the relevance of each of these predictions.

[8] I do not expect this to be an important channel; but it is worth noting that increases in educational attainment in response to relative wages pose a threat to my identification strategy, which conditions on categories of educational attainment. Even so, violations are likely to be small as the education categories are broad and switching between them is unlikely. I discuss this further in the empirical section.

3 Background: The Gender Wage Gap, 1980-2010

3.1 Trends in Wage Convergence Across Sexes

Figure 1 shows the reduction in the gender gap that began in in the 1980's and continued through the 1990's. After three decades of stagnation, male and female wages converged by 20% over two decades, with slower convergence following in the 2000's (Blau and Kahn, 2006).

The rise in high-skilled female wages and the notable decline in male low-skilled wages account for much of the convergence over this period (Blau and Kahn, 2006). To clarify the importance of these two sources of growth, Figure 3 plots average log female and log male hourly wages by skill group normalized by 1980 levels. Evident from the figure are the large differences in wage growth across men and women and the *sharp break* in gender wage trends that coincided with the introduction of the computer in 1980. For low-skilled workers, who have a high school education or less, the majority of the gain in the relative wage is driven by the decline in men's wages; while for high skilled workers, who have attended at least some college, relative wage increases are generated by large gains to women's wages. This is consistent with evidence that structural changes in the labor market in the early 1980's altered the course of wage growth across skill groups and that the impacts were also different across genders (Autor et al., 2008; Katz and Murphy, 1992; Blau and Kahn, 1997).

Importantly, these trends also vary substantially across states, due in part to the variation in the industrial composition across these areas (Bertrand et al., 2015). To examine these differences, Figure 4 presents the growth from 1980-2010 in the log of the relative wage (Panel A), log female wage (Panel B), and log male wage (Panel C). The variation in Panel A highlights the substantial span in the convergence of male and female wages across states, ranging from as low as 5% to as high as almost 30%. The majority of states experienced convergence above 18%, with higher rate of convergence seen in the Rust Belt and lower convergence primarily in the South and New England. Panels B and C show that while male wage growth trailed female wage growth over this period, the difference in male and female wage growth was less stark along the East Coast than elsewhere in the country.

To further illustrate the connection between this wage convergence and labor markets, consider the cases of Minnesota and South Carolina. In both states, men experienced real wage growth of approximately 15% from 1980 to 2010. Yet, the relative wage increased significantly more in Minnesota (25%) than South Carolina (9%) due to the high rate of wage growth for women in Minnesota (37%) relative to South Carolina (28%). Historical differences in occupations and industries across states likely contributed to the states' discrepancy in female wage growth. For example, 1970 Minnesota had substantially more women employed in the health sector, which experienced high wage growth over these three decades.

3.2 Tasks, Trends in the Return to Tasks, and Gender Implications

Although many factors can explain the increase in relative wages[9], a growing number of studies find that technologically-induced demand shifts account for the majority of the change (Black and Spitz-Oener, 2010; Beaudry and Lewis, 2014). This phenomenon can be traced back to the fact that women have traditionally held a comparative advantage in people- and cognitive-oriented occupations[10], which are relatively more complimentary to the adoption of computer technology (Weinberg, 2000; Beaudry and Lewis, 2014; Bacolod and Blum, 2010).[11] In contrast, men have historically tended towards physically-intensive occupations.[12]

As highlighted in Figure 5, in the three decades following the introduction of the computer, the tasks performed by workers shifted substantially.[13] This was accompanied by a substantial increase in the wage returns to cognitive- and people-oriented tasks, and a decline in the return to physical tasks (Bacolod and Blum, 2010).[14] Computer-induced shifts in demand together with

[9] Included among them are the rise in women's educational attainment and workplace experience (O'Neill and Polachek, 1993; Blau and Kahn, 1997; Goldin et al., 2006), the introduction of contraception technology (Bailey et al., 2012), the rise in females in professional and managerial occupations, reductions in discrimination (Black and Juhn, 2000; Black and Strahan, 2001; Black and Brainerd, 2004), increasingly positive selection into the workforce (Mulligan and Rubinstein, 2008), and changes in demand (Katz and Murphy, 1992).

[10] Occupations which are high in people-oriented tasks include teachers, lawyers, management, management support, and physicians/nurses; high in cognitive-oriented tasks are physicians/nurses, engineers, lawyers, technicians, and financial specialists.

[11] The explanation for this complementarity varies somewhat across studies. Black and Spitz-Oener (2010) suggest that women's relatively greater specialization in routine tasks made them more likely to experience computer adoption and shift towards non-cognitive tasks, while Beaudry and Lewis (2014) argue that women's concentration in cognitive and people-oriented occupations made them more likely to adopt computers. The results in this paper are robust to either interpretation.

[12] A simple illustration of the task specialization of men and women is seen in their historical occupational specializations (Appendix Tables A.6 and A.7); there is little overlap in the 10 most common occupations for men and women.

[13] This figure follows Beaudry and Lewis (2014) in constructing mean tasks for each gender in each survey year. See Appendix Section A. 1.1 for more details. See also Autor et al. (2003) for a detailed discussion of changes in tasks over this period.

[14] The return to cognitive and people tasks doubled between 1980 and 2000, while the return to physical work, declined by 60% (Bacolod and Blum, 2010).

task specialization across sexes has been found to account for at least 50% of the wage convergence over this period (Beaudry and Lewis, 2014; Black and Spitz-Oener, 2010).[15]

My empirical strategy returns to these occupational differences across sexes and geographic areas as an important source of variation that explains the ensuing wage convergence.

4 Empirical Approach

4.1 Identification of Impacts on Family Outcomes

I estimate the relationship between relative outside options and family outcomes, Y, observed for a local marriage market μ, and birth cohort c, in a given year t as follows:

$$\begin{aligned} Y_{\mu ct} =& \beta RelativeOutsideOption_{\mu t} + \alpha_{\mu} + \delta_{rt} \\ &+ \chi_{et} + \gamma_{st} + \xi_{ct} + X_{\mu t}\phi + \upsilon_{\mu ct} \end{aligned} \tag{1}$$

I define the marriage market as composed of men and women who share similar background characteristics and are located within the same geographic area. This conforms with evidence that men and women tend to marry assortatively. Following the literature, μ is defined by a common education level e, race r, and state s (Bertrand et al., 2015; Charles and Luoh, 2010; Loughran, 2002).

To account for the possibility that there may be unobserved variables that influence both outside options and family outcomes, I include a large number of fixed effects and control variables. The variable α_{μ} controls for constant differences across marriage markets which may contribute to initial differences in occupation choices, preferences for family, or expectations regarding labor market work. I include race-by-year δ_{rt} and education-by-year χ_{et} fixed effects to absorb national changes in labor market opportunities by race and education. State-by-year fixed effects, γ_{st}, control for time varying state policies that may target gender equity or family welfare as well as shocks to state labor markets. Cohort by year fixed effects, ξ_{ct}, account for differences in marriage and labor market participation across cohorts and ages. $X_{\mu t}$ is a vector of controls of marriage market characteristics. It includes the mean educational attainment for men and women and the sex ratio.

[15] See also Welch (2000), which presents a theoretical model that suggests that variation across skill groups in task specialization led to an increase in women's relative wages due to the increase in the male wage inequality. This explanation was later disputed in Bacolod and Blum (2010).

All regressions are weighted by population. In the analyses, I cluster standard errors at the state level.

The parameter of interest, β, takes on a causal interpretation under the assumption that the variation in relative outside options is exogenous conditional on the included covariates. As discussed in Section 2, observed wages do not meet this condition (Pollak, 2005). Therefore, I introduce a proxy[16] for relative potential wages in the market.[17]

4.2 Proxy for Relative Wage Options

My measure of potential wages is a weighted average of national occupation and industry-specific wage returns in the spirit of Bartik (1991) and recent adaptations (Aizer, 2010; Bertrand et al., 2015; Schaller, 2015; Diamond, 2015), where the weights are defined as share of the marriage market and sex employed in an occupation and industry in 1970:

$$w^g_{\mu t} = \sum_o \sum_j \frac{E^g_{oj\mu,1970}}{E^g_{\mu,1970}} \times w_{ojt,-s} \tag{2}$$

Here, $\frac{E^g_{oj\mu,1970}}{E^g_{\mu,1970}}$[18] is the share of sex g in marriage marriage μ employed in occupation o and industry j and w is the average log hourly wage[19] (Diamond, 2015). To avoid introducing a mechanical correlation between the prediction and observed wages in μ, the wages in the state where μ is located are excluded from these national returns, as indicated by $-s$ in $w_{ojt,-s}$.

The variation in the sex-specific wage proxy across marriage markets and sexes is given by the initial differences in occupations and industries across men and women and across local labor

[16]Unlike an instrument, which is used as a correlate of an observed outcome (e.g. quarter of birth and education), a proxy acts as a stand-in for an unobserved variable of interest (e.g ability) (Wooldridge, 2012).

[17]In addition to allowing me to test the theoretical predictions, β will also give the estimated impact of a policy which alters the relative wage offerings in the market, such as a mandate which supports equalizing wages in the workplace. Recent efforts include the Lilly Ledbetter Fair Pay Act of 2009, although I am not aware of any evidence that this policy has had any actual effect on wages. To my knowledge, this would be the first available evidence of the spillovers of such a policy to family decisions.

[18]Shares are determined in the 1970 1% census. See Section 5 for more detail. Unfortunately, the industry-occupation-state cells in the 1970 census are quite small, so I use national industry-occupation shares in order to minimize the amount of noise in the shares. In particular $\frac{E^g_{oj\mu,1970}}{E^g_{\mu,1970}} = \frac{E^g_{ojers,1970}}{E^g_{ers,1970}}$ is approximated as $\frac{E^g_{jers,1970}}{E^g_{ers,1970}} \times \frac{E^g_{oj,er,national,1970}}{E^g_{jer,national,1970}}$. I show that the shares observed in the Census in each occupation and industry, $\frac{E^g_{ojerst}}{E^g_{erst}}$ are highly correlated with the prediction in Appendix Figure A.1, a density of the difference between the measures with a large mass at 0.

[19]Average annual wages are calculated from the March CPS. See Section 5 for more detail.

markets. These differences are generated primarily from historical specializations across sexes and geographic locations. The segregation of men and women across occupations arises from patterns of comparative advantage in tasks, discussed in Section 3.2. The idiosyncratic location of industries across states produces additional variation in employment conditions across marriage markets (Bartik, 1991).

In the empirical specification, I rely on variation in log relative wage options, $w^f_{\mu t} - w^m_{\mu t}$, which limits the identifying variation. In particular, the relative wage proxy varies due to the segregation of men and women in occupations and industries *within* a marriage market. Therefore, marriage markets experience more growth in the relative wage proxy when men and women in the market have less overlap in their occupations (and industries) and when the occupations (and industries) that women are in experience relatively more growth in wages. I provide the derivation of this relationship in Appendix A. 1.2.

The validity of the proxy relies on the fact that national wages by occupation are unlikely to be correlated with shocks to labor supply in a marriage market. I provide evidence in favor of this assumption and discuss other threats to identification in Section 6.

4.3 Case Study

We can build further intuition for the variation in relative wages by returning to the examples of South Carolina and Minnesota; this time focused on one skill group, low-skilled workers. In 1970 Minnesota, a much larger share of women were employed as nurses and health assistants than men (15% and 2%, respectively); and nearly twice as the share of women and men in South Carolina (9% and 1%, respectively). Therefore, when the wages of health assistants and nurses rose by 15% and 50% respectively over this period, Minnesota would be expected to have greater wage convergence between men and women. I observe this in the data: Minnesota experienced over 35% wage convergence among low-skilled workers while wages converged by just 10% in South Carolina.

4.4 Novel Extensions

4.4.1 Occupational Variation

My focus on occupational wage returns marks a departure from previous approaches to proxy for wages and has several advantages.[20] First, it connects this methodology to a recent literature on task-based demand. This body of work draws a direct link between the occupation of a worker and the tasks she performs to the likelihood of technological adoption, which in turn has been used to explain the majority of wage convergence across sexes (Autor et al., 2003; Black and Spitz-Oener, 2010; Beaudry and Lewis, 2014). Second, the addition of occupation variation produces a proxy that is more powerful than one that relies on industry variation (measured by the correlation with observed relative wages.) Appendix A. 1.4 discusses these results. This allows me to abstract from more detailed sources of variation in wages utilized in earlier work, such as industry variation in demographic-specific wages and in hours of work, which risks the introduction of labor supply decisions.

4.4.2 Over-Time Updating

To further increase the precision of the wage proxy, I allow systematic updating of the weights in Equation 2 to account for the large changes in the distribution of employment over this period.[21] In particular, I allow the within-industry share of a demographic group - the share of the group within an industry employed in a particular occupation - to evolve following the national trend in within-industry growth, which was the source of the majority of the growth in occupations during this period (Acemoglu and Autor, 2011).[22] This adjustment allows the weights for each marriage market to evolve over time to more realistically reflect the contemporaneous local employment conditions without compromising the validity of the proxy.

Denoting the within-industry share of employment as ${\lambda_{ojt}}^W$, I define the national growth in the within-industry shares outside state s, $\pi^W_{ojt,-s}$, as:

[20] Less recent papers such as Katz and Murphy (1992) and Blau et al. (2000) also take advantage of occupational variation (in those cases, to instrument for employment growth).

[21] This is in contrast to two alternatives: (1) Fixed weights, which may suffer from lack of power; or (2) Defining the weights as the share employed in each sector using information from the previous decennial census, at $t-10$ (see, e.g. Autor et al. (2013)), which may raise concerns about introducing trends in labor supply.

[22] In Appendix A. 1.3, I confirm the results from Acemoglu and Autor (2011) using the full set of occupations utilized in the present analysis.

$$\pi^W_{ojt,-s} = \frac{\lambda^W_{ojt,-s}}{\lambda^W_{oj1970,-s}}$$

$$\text{and } \lambda^W_{ojt,-s} = \frac{E_{ojt,-s}}{E_{jt,-s}}.$$

Using this growth measure to update the weights would arguably introduces less supply-driven variation than other dynamic weighting schemes that utilize local variation. However, if the growth in occupations is correlated with unobserved preferences, the within-industry portion of this variation may also raise concerns of endogeneity.[23] Therefore, I instead rely on the relative growth of occupations across industries, which is more likely to reflect industry-productivity or industry-technology than labor supply decisions. Specifically, I scale the within-industry growth by the growth in the national share of the occupation, π_{ot}, to produce an adjusted within-growth measure, $\pi^{W*}_{ojt,-s}$[24]:

$$\pi^{W*}_{ojt,-s} = (\pi^W_{ojt,-s})(\frac{1}{\pi_{ot,-s}}),$$

$$\text{and } \pi_{ot} = \frac{E_{ot}}{E_{o,1970}}.$$[25]

Adding this dynamic updating to Equation 2, and normalizing the weights to sum to one,[26] produces:

$$\widehat{w^g_{\mu t}} = \sum_j \underbrace{\lambda^g_{j\mu,1970}{}^B}_{\substack{\text{Between-industry} \\ \text{exposure, 1970}}} \times \sum_o \underbrace{\lambda^g_{oj\mu,1970}{}^W (\pi^{W*}_{ojt,-s})}_{\substack{\text{Within-industry} \\ \text{exposure, t}}} \times w_{ojt,-s}$$

where

$$\lambda^g_{j\mu,1970}{}^B = \frac{E^g_{j\mu 1970}}{E^g_{\mu 1970}} \text{ and } \lambda^g_{oj\mu,1970}{}^W = \frac{E^g_{oj\mu 1970}}{E^g_{j\mu 1970}}$$

[23] For example, Black and Juhn (2000) discuss that the increase in demand for professional occupations caused women to switch to these occupations, both from other occupations and from non-participation.

[24] To fix ideas, in Appendix Section A. 1.5 I illustrate the growth in π^W_t and π_{ot} across industries for two salient occupations, management and administrative assistant, in Appendix Tables A.3 and A.4. These examples make clear that there is substantial variation in the growth in employment across occupations as well as within occupations across industries.

[25] For example, if the growth of administrative assistants in manufacturing is 10 percent, and the growth of administrative assistants nationally is 5 percent, I set this within-industry growth factor equal to 2.

[26] Specifically, $\sum_j \lambda^g_{j\mu,1970}{}^B * \sum_o \lambda^g_{oj\mu,1970}{}^W * \pi^{W*}_{ojt,-s} = 1$

4.5 Evidence of Power

In Figure 6 I present preliminary evidence of the correlation between the wage proxy and observed wages from the Census. Visually, there is a positive correlation between the long change (1980–2010) in log relative, log female, and log male wages and the equivalent change in the proxy. I formally estimate the power of the resulting proxy using Equation 1 and observed male, female, and relative wages at the marriage market level from the 1980 to 2000 censuses and the 2010 ACS.[27] Table 3, columns (1)-(3), show the regression results. The coefficients are range from 0.565 to 0.592, and are highly significant at the 1% level.[28] The magnitude and precision of these estimates is evidence that the proxy has sufficient power to identify the desired effects.

5 Data

5.1 Wage Proxy

To create my wage proxy, I use data from the 1970 1% Census and the 1980 to 2011 March Current Population Survey (King et al., 2010; Ruggles et al., 2010). I restrict the sample to individuals between 18 and 64 years old who have positive reported income for the previous year and are not self-employed. I drop imputed wage observations. Individuals are classified into three race-ethnicity groups: white non-Hispanic, black non-Hispanic, and Hispanic; and two education levels: less than or equal to high school and at least some college.[29] The 1970 Census is used to measure the share of each gender and in each marriage market that is employed in each of 17 industries, and 28 occupations.[30]

Annual measures of average hourly wages are calculated for each industry and occupation using

[27] In particular, I estimate:

$$w_{\mu t} = \beta \widehat{w_{\mu t}} + \alpha_\mu + \delta_{rt} + \chi_{et} + \gamma_{st} + X_{\mu t}\phi + \upsilon_{\mu t} \tag{3}$$

[28] To explore the sensitivity of these results, Appendix Table A.9 shows estimates from a series of regressions estimated adding in one set of fixed effects at a time. The coefficients are relatively stable beginning from the correlation in column (1) to the final estimates in column (6), which match the coefficients shown in Table 3.

[29] Individuals that do not identify as one of these race-ethnicity groups, a small percentage of the sample, are classified as "other" and are not included in the analysis.

[30] The industries and occupations are defined by the broad groupings in the IPUMS. Manufacturing is disaggregated into three industries as Katz and Murphy (1992) do. Specifically, the industries are: 1. Agriculture, forestry, and fishing 2. Mining 3. Construction 4. Low Tech Manufacturing 5. Basic Tech Manufacturing 6. High Tech Manufacturing 7. Transportation 8. Communication 9. Utilities 10. Wholesale Trade 11. Retail Trade 12. Finance 13. Business and Repair 14. Personal Services 15. Entertainment and Recreation 16. Professional Services 17. Public Administration. Occupation groupings are listed in Appendix Table A.8.

the March CPS from 1980 to 2011.[31] I define the hourly wage as the earnings reported from the previous year divided by weeks worked times usual hours worked.[32] Wages are averaged using CPS sample weights multiplied by hours worked as in Autor et al. (2008).

5.2 Family Outcomes

I obtain data on family structure and family income from the 1980, 1990, and 2000 censuses and the 2010 American Community Survey (ACS). I focus on a sample of women ages 22 to 44, who are likely to be on the margin of marriage[33]. I observe individual marriage and employment for the individuals in the sample as well as their family structure, income in the household and a summary measure of welfare receipt[34].

I also obtain measures of household participation in means-tested public programs including Food Stamps, or the Supplemental Nutrition Assistance Program (SNAP), AFDC/TANF, Supplemental Security Income (SSI) and subsidized school lunch from the March CPS. I also use these data to generate an indicator variable for participation in Disability Insurance (DI), and for receipt of a child support payment in the last year.

5.3 Sample Descriptive Statistics

Table 1 reports sample descriptive statistics. In the first two columns I present the mean and standard deviation for the whole sample period (1980-2010), while in the following columns, I include the corresponding statistics for 1980 and 2010, respectively, to highlight the changes over time. The statistics are weighted by census-provided weights to make the sample representative of the population.

The primary analysis sample consists of 4,915,368 women age 22 to 44 years old observed in the 1980, 1990, or 2000 Census or 2010 ACS (Panel A). I exclude women not classified as white

[31] Due to the structure of the survey, these responses correspond to earnings from 1979 to 2010.

[32] Top coded earnings are multiplied by 1.5 and hourly earnings are set not to exceed top coded income multiplied by 1.5 divided by 1400 hours (Autor et al., 2008).

[33] The lower age limit is set at 22 to ensure that I can classify individuals into the correct education group, completed some college or not. See Appendix Figure A.2 for visual justification for this cutoff. The upper limit is set by the end of child bearing (Bailey, 2006).

[34] In 1980 and 1990, the Census included a combined measure of whether the household received SSI or AFDC/TANF, which later became separate reports of SSI and AFDC/TANF in 2000 and the subsequent ACS surveys. To be consistent with the earlier years, I create a harmonized variable which reports whether the household received SSI or AFDC/TANF in each year.

non-Hispanic, black non-Hispanic, or Hispanic, as I can not construct reliable wages for the group. The remaining sample is 76% white, 11% black and 12% Hispanic over all years, with significant growth in the Hispanic representation between 1980 to 2010. The average education for the sample is 13.2 years, increasing from 12.6 to 13.6 years from 1980 to 2010.

Over this period, the percent married declines from 17 percentage points, from 73% in 1980 to 56% in 2010. This pattern corresponds to the rise in never-married females, which climbed from 16% to 34%. Concurrently, the percent of single mothers nearly doubled from 8.7% to 14.8%, and the percent of households with a sole female earner increased from 20.8% to 23.3%. The share of divorcees, on the other hand, is fairly stable at 9.5 percent throughout.

Spousal matches have also evolved in the last three decades. For instance, women are 50 percent more likely to marry a younger spouse in 2010 than 1980, although over 70 percent still marry older men. Additionally, the share of women with spouses more educated than themselves declined, matching the rise in education levels of women.

Panel B shows summary statistics for the outcome variables from the March CPS. Program receipt is generally increasing over the period from 1980 to 2010, which reflects both the change in the state of the economy at the end of the sample and the increasing trend in participation.

6 Validity of Identification Approach

My proxy serves a similar role to an instrumental variable, and like an instrument, it must satisfy two key identifying assumptions. First, the wage proxy must be correlated with the potential wages in the marriage market. This assumption is not directly testable since potential wages are unobserved; however, it is conditionally testable under the fairly weak assumption that potential wages are correlated with observed wages. Under this premise, the evidence in Section 4.5 is a clear indication that the proxy satisfies this correlation.

Second, the wage proxy must be plausibly exogenous to marriage decisions in the marriage market. In practice, this assumption requires that the wage proxy be uncorrelated with unobserved changes in local labor supply. I address potential violations of this assumption in a couple of ways. Chiefly, in the empirical specification, I include fixed effects that control for national yearly variation in labor and marriage preferences by education, race, and cohort and fixed differences across marriage markets. Importantly, these fixed effects absorb any group-level variation that is correlated with national wages by industry and occupation. Therefore, the identification assumption is that the deviation in the proxy from national trends and the marriage-market average is uncorrelated with the deviation in unobserved labor supply behavior.

In Table 4 I show the coefficients from regressions of the *observable* characteristics of women (men) in the marriage cell, including the incarceration rate, share immigrant, share college graduates, share high school graduates, and the log population, on the male and female wage proxies. I include the same fixed effects and controls as Equation 1. I find no correlation between any of these variables with female wage options and only a weak correlation between the share of high school graduates and male wage options, which also has an unintuitive sign. The absence of a correlation here is supportive of the validity of this assumption.

I also run a falsification test, adding the proxy for the opposite sex to the regression together with the sex-specific wage proxy. While observed male and female wages may be correlated due to similar market conditions, the male (female) observed wage should not be correlated with the female (male) proxy if the proxies are driven by exogenous national variation. I show the results for the regressions in columns (4) and (5) of Table 3. Reassuringly, only the coefficient on the same-gender proxy is significant and of a substantive magnitude. Moreover, the coefficient on female (male) wages is relatively unchanged by the addition of the proxy for male (female) wage options, suggesting that there is little correlation between the two proxies.

Finally, I show that the proxy is not correlated with unobservable trends over time in Section 8 (Autor et al., 2013; Peri et al., 2014). This is reassuring evidence that the empirical strategy is unlikely to be subject to omitted variable bias or reverse causation.

7 Results

7.1 The Decision to Marry

Panel A of Table 5 presents my main marriage results. Column (1) shows that a 10% increase in the relative wage, roughly the change that occurred between 1980 and 2010, leads to a 5.3 percentage point decline in the probability that a woman is married.[35] This corresponds roughly to an 8% decline in marriage relative to the mean value over this period, which is approximately equivalent to the increase in the fraction of never-married women that has been previously attributed to the introduction of the birth control pill[36] (Goldin and Katz, 2002). My estimate implies that approximately 20 percent of the reduction in marriage during the last three decades is attributable to the increase in relative outside wage options.

I separate this estimated effect into its components in the subsequent columns.[37] The results indicate that the reduction in marriage is not driven by exit from marriage, but rather lack of entry. In column (2), relative outside options have an insignificant (though positive) effect on the likelihood of divorce. The estimated impact on the likelihood of being never married, on the other hand, is large and positive, nearly accounting for the entire effect on marriage. Specifically, a 10% increase in the relative wage leads to a 4.4 percentage point decline in the likelihood of being never married. This is a 16% increase relative to the mean, and indicates that the margin of entry into marriage is more sensitive to changes in outside options than exit from marriage.

The relationship between relative wages and the share married and never-married is robust to alternative sample definitions, and does not appear to be driven by one subgroup. These results are described in further detail in Section 7.4.

7.1.1 Competing Hypotheses

These estimates suggest that the decline in monetary gains to marriage is influential in women's marriage decisions. I now analyze whether the results can be explained by alternative, competing hypotheses.

First, recall from Figure 3 the co-movement between relative wages and absolute wages within skill groups. If relative potential wages are also correlated with absolute earnings in the marriage market, the estimates reported from the regressions above may reflect the combined effect of these

[35] Note that since I estimate these regressions at the marriage market level, these outcomes are measured as the share of the marriage market in each of the marriage states.

[36] Goldin and Katz (2002) find that the availability of the pill led to a 6 percentage point increase in the likelihood of being never-married, although it had little effect on the overall marriage rate due to the coinciding decrease in divorce rates.

[37] I omit the results from regressions of the likelihood of being widowed on outside options because this is unlikely to be a relevant channel. Consistent with this, I find an insignificant effect of relative outside options on the probability of being a widow.

two channels.[38] Therefore, in Panel B of Table 5, I examine the sensitivity of my results to the inclusion of a measure of the mean potential earnings in the market, $Average\widehat{Outside}Option_{erst}$, defined as $\frac{\widehat{w^f_{erst}}+\widehat{w^m_{erst}}}{2}$.[39] In addition to allowing for interpretation of β as the pure effect of a decline in gains to specialization, the coefficient on average wage is of interest as there is little empirical evidence on the effect of earnings on marriage.[40]

The estimated coefficient on relative wage is essentially unaffected by the introduction of this control variable. In column (1), the effect of a 10% increase in relative wages is 4.7 p.p. Similarly, the estimated effect on the probability of having never married remains large and significant. The relatively small change in the point estimates indicates that there is substantial variation in the relative wage measure independent of the average wage measure.[41] Nevertheless, moving forward, I adopt the model which includes the control for average wages in the market for ease of interpretation.[42]

I also find a substantial, positive effect of earnings on the likelihood of marriage. A 3% increase in the average potential wage, roughly the increase over this period, leads to a 5 percentage point increase in the probability of marriage. This is consistent with the theory that income has a "stabilizing" effect on marriage (Bitler et al., 2004).

I also consider whether changes in cross-state migration alter the composition of the marriage market. Such migration may occur if a higher relative wage is viewed by women as an amenity, or higher relative wages create local externalities such as more supportive workplaces for women. In Appendix A. 1.6 I find that increases in relative wages do increase migration; however, I show that this channel accounts for one quarter of the estimated increase in never-married women. This implies that increased relative wages alter marriage primarily by influencing women's marriage decisions, rather than their migration decisions.

Finally, an aversion to women earning more than men, the "identity effect", may also generate

[38]Since an increase in the relative wage may be caused by either a decline in male wages or an increase in the female wage, the direction of the influence of income on the coefficient on relative wages is ambiguous.

[39]Potential wages have been transformed to 2012 constant dollars.

[40]This specification also allows for the interpretation of relative wage holding average wage constant, i.e a "compensated" wage increase in which the combined output of the single households is kept constant. This nicely corresponds to the thought experiment used as a proof for the theoretical predictions in Becker (1973).

[41]To reinforce this point, in Appendix Figure A.3, I plot the correlation between average options ($2012) and relative options in a marriage market. Visually, there is little correlation between the variables, which is confirmed by a regression analysis which produces a coefficient of -0.004 with a standard error of 0.012.

[42]The results are similar when this control is not included. Tables available on request.

declines in marriage as relative wages increase (Bertrand et al., 2015). In particular, this theory predicts declines in marriage when the relative wage exceeds one. I look for the role of this channel by estimating differential effects of relative wages along the distribution of relative wages (at each quantile).[43] If the identity effect is the only, or primary, channel for the effects of relative wages, the estimated effects should be concentrated at the highest quantile of relative wages.

Figure 7 shows the percentage effect of a 10% increase in relative wages at each quartile of the relative wage distribution. For marriage, I find little heterogeneity in the impacts of relative wages. On the other hand, I find that relative wages have a slightly larger impact on the likelihood of being never married for women with lower relative wages. This may be due to the fact that women with *lower* relative wages have the least credible threat to leave marriage, and therefore benefit most from increases in their bargaining power (Thornqvist and Vardardottir, 2013). Importantly, I do not find that increases in relative wages have larger effects for women at the upper end of the relative wage distribution. This suggests that the identity effect is not the primary channel (Bertrand et al., 2015). It is also worth noting that the identity effect has been shown to have strong impacts on divorce, unlike the results presented earlier, reinforcing the distinction between the "gains to marriage" channel and the identity effect. (Bertrand et al., 2015).

7.2 Spousal Matching

In addition to documenting the relationship between marriage and outside options, I examine where these effects take place in the distribution of marriage matches.

I consider two dimensions of women's spouses, spousal education and age, which have been shown to respond to changes in marriage preferences (Rossin-Slater, 2014; Charles and Luoh, 2010). Table 8 indicates that higher relative wages cause women to be more likely to be married to spouses that are more educated and younger than themselves.[44] A 10% increase in the relative wage leads to a 10% increase in the probability of marrying a partner more educated than oneself relative to the mean, and decreases the probability of marrying a partner less-educated than oneself by a

[43] Quantiles are defined separately for each survey year.

[44] This regression follows the specification used in Charles and Luoh (2010) in analyzing the probability of "marrying down" or "marrying up" rather than the absolute level of women's spouse's education. I have also studied the impacts on the years of education and age of women's spouses, controlling for the level of education of married women, which produces similar though more noisy results. I find an insignificant, but 0.3 year increase in spousal education and a significant 0.9 year decline in spousal age.

similar amount. Additionally, an increase in relative wages causes women to be less likely to marry an older spouse and more likely to marry a partner of the same age or younger than themselves.

Charles and Luoh (2010) argue that marrying a spouse with higher education is a signal of "marrying up," due to the fact that normal patterns of assortative mating would predict matching with a mate of the same education level. Moreover, Mansour and McKinnish (2013) present empirical evidence that spousal quality is maximized among men who are the same age as their spouse. They show that, relative to men who are either younger or older than their wife, men that are married to women of the same age tend to have higher earnings, be more attractive, and have lower BMI. My estimates therefore suggest that a higher relative wage leads to improvements in spousal quality.

My estimates also provide speculative evidence of women's preference of women for younger spouses. Statistically, women in the sample tend to marry older men (over 70%); however it is difficult to disentangle whether this reflects a preference for older men or for other characteristics that are correlated with age, such as financial stability. Since relative wages are not correlated with observed income, the effects of relative wages provide a unique insight into women's preferences when the financial incentive for marriage is relaxed. The increase in the prevalence of women married to younger men provides initial, suggestive evidence that there is a preference for younger spouses. It also suggests that part of the matching with older men observed in the data is due to the correlation between age and financial well-being, although I do not place much emphasis on this point.

I am unable to distinguish whether the estimated effect results from selective entry and exit into and out of marriage or whether they reflect changes in matching among among those who would have married regardless of their earnings power.[45] If averting low-quality marriages has different implications than improving the quality of matches among the married, understanding which of these channels is present may be desirable from a policy perspective . In the following section, I

[45] Using a potential outcomes framework, and simplifying relative wages to a binary outcome, we can more clearly illustrate these separate effects (Angrist and Imbens, 1995):

Let Y_i be a dummy variable for the partner choice of an individual and M_i a dummy variable for marital status. Potential partner choices $Y(1)_i, Y(0)_i$ and potential marital statuses $M(1)_i, M(0)_i$ denote the outcomes in a "high relative wage" market, and "low relative wage" market, respectively.

The estimated effect on matching can then be written as: $E[Y(1)_i \mid M(1)_i = 1] - E[Y(0)_i \mid M(0)_i = 1]$. Then, $\underbrace{E[Y(1)_i - Y(0)_i \mid M(1)_i = 1]}_{\text{Bargaining effect}} + \underbrace{[Y(0)_i \mid M(1)_i = 1] - E[Y(0)_i \mid M(0)_i = 1]}_{\text{Selection}}$

look for further evidence of selective reductions in marriage. In particular, I check whether there are reductions in income accompanying the decline in marriage, which could be indicative of selection out of matches that have negative non-pecuniary costs.

7.3 Other Margins of Women's Independence

In what follows, I examine the implications of higher relative wages for women's labor market behavior, financial outcomes, and childbearing and child-rearing.

7.3.1 Financial Independence

To the extent that the marriage commitment encourages specialization, it may also reduce women's attachment to the labor force. Therefore, I investigate whether higher relative wages cause women to be less reliant on a partner's income and whether this increases women's hours of work. In Table 6[46] I show that a 10% increase in relative wages leads to a 2 percentage point decline in the probability that a woman is financially dependent on a man, a 20% increase relative to the mean, accompanied by an equivalent increase in households where a woman is the sole earner.[47] This may be a particularly important margin of independence if women are more susceptible to emotional or physical abuse as a financial dependent (Edin and Kefalas, 2005).

To complement these findings, Table 7 analyzes women's employment outcomes. I show that a 10% increase in the relative wage causes women to work 0.85 additional hours per week, a relatively small increase. I also estimate positive statistically insignificant impacts on income. The noise in the estimates may be generated by the opposing effects of relative wages on the labor supply of married women, however, who have been shown to exercise greater bargaining power to withdraw from the labor force (Angrist, 2002). Taken together, I interpret this as suggestive evidence that higher relative wages cause women substitute towards working to support their independence.

[46] The table presents coefficients from a series of regressions using indicators for the following scenarios as outcomes: (1) being in single earner household, further disaggregated as (2) male or (3) female earner, or in a (4) multiple earner household.

[47] Appendix Table A.10 decomposes this result further to find that, as expected, the results are driven by a move from a married household with the husband as primary earner to a single-earner female-headed household.

7.3.2 Financial Implications

While I estimate an increase in financial independence resulting from higher relative outside options, the financial implications of remaining single are ambiguous. If, as discussed in Section 2, the women impacted by higher outside options have a "willingness to pay" to delay marriage, then this may result in a reduction in women's realized income.[48]

To test this hypothesis, I analyze the effect of relative wages on the ratio of family income relative to the poverty threshold. This measure of income has the advantage of adjusting for the number of individuals in the family, the number of children, and the age of the family head. Since there may be differential effects of relative wages across the distribution of income relative to poverty, I use a slightly different estimation approach to capture these richer effects. In particular, I estimate a series of regressions where the outcome variable is a dummy for whether the ratio of family income relative to the poverty threshold[49], F, is less than or equal to a pre-specified value.[50] The resulting estimate can be interpreted as the impact of relative wages on the CDF of income relative to poverty at F (Duflo, 2001; Almond et al., 2010).

The coefficient estimates are scaled to reflect the percent effect (relative to the mean) of a 10% increase in relative wage, and are shown together together with a 95% confidence interval in Figure 8. Superimposed on the figure is a histogram depicting the fraction of individuals in the sample at each level of income relative to poverty. The figure shows that a 10% increase in the relative wage leads to an increase in the probability that women live in families between 100% and 250% of the poverty threshold.

I quantify the shift in the distribution in Table 10. The estimated coefficients imply that a 10% increase in the relative wage leads to a 2 percentage point increase in the probability of being poor. Further, in Appendix Table A.15, I show that the shift in income relative to poverty is concentrated among low-skilled women. The effect size is equivalent to a 10% increase in the likelihood of being

[48] Empirically, while many works present evidence of a positive correlation between marriage and family income, studies using more credible identification strategies have presented mixed evidence (McLanahan and Percheski, 2008; Bedard and Deschnes, 2005; Autor et al., 2014).

[49] I multiply these ratios by 100 to be expressed in percentage terms.

[50] An additional motivation for this approach is the fact that the income relative to poverty variable is truncated at 500% of the poverty threshold. I replicate the analysis using a non-truncated version of the variable, and find the same pattern (included in Appendix Figure A.4), but show the results using the publicly-available variable for ease of exposition.

poor relative to the mean among low-skilled women.[51]

Although these results may not be immediately intuitive, they can be reconciled by a perceived disutility to marriage among low-skilled women. As discussed previously, women who experience a distaste for marriage may require a minimum level of pecuniary gains to compensate for their disutility. If the monetary gains fail to meet this threshold, then the remaining gains below that threshold may be left "on the table" by women in order to avoid entering into marriage. The decline in income relative to poverty is therefore consistent with a willingness to pay to remain single. It also indicates that non-pecuniary costs are disproportionately concentrated among low-skilled women.

Next, I look to see whether higher relative wages also lead to changes in women's participation in government programs. In column (6) of Table 10 I find that a 10% increase in relative wages leads to a 2 percentage point increase in participation in a bundle of means-tested programs, including AFDC/TANF and SSI, or a 25% increase relative to the mean participation rate of low-skilled women.[52]

To gain a better understanding of these impacts, I move to the March CPS supplement, which has more detailed measures of program participation. The results from this series of regressions are in columns (1)-(6) of Table 11.[53] I find that higher relative wages lead to increased receipt of food stamps, SSI, and school lunch, but find no effect on the probability of taking up AFDC/TANF[54] or DI. Relative to the mean participation rate of low-skilled women, the estimated impacts of a 10% increase in the relative wage range from a 30% to an 100% increase in program participation. The largest effects are for SSI which has a low mean participation rate and has grown immensely in the last three decades (see, e.g. Autor and Duggan (2003))[55][56] These estimates suggest that

[51] I check the sensitivity of these estimates to using family income as an alternative measure of financial well-being in Appendix Table A.16. Consistent with the estimated effects on income relative to poverty, the estimates indicate that relative wages exert a strong positive effect of on the probability of being in the first quartile of income. Moreover, Appendix Table A.17 shows that the declines in income are entirely concentrated among low-skilled women.

[52] The best available measure of public program participation available in the Census is a combination of income from AFDC/TANF programs as well as SSI.

[53] In unreported results, I also look at impacts on poverty in the CPS and find coefficients of a similar, but smaller magnitude, and less precisely estimated relative to those from the Census.

[54] While AFDC has been widely recognized for having disincentives for marriage, TANF has greater eligibility for two parent families; therefore while the change in marital status may affect participation in AFDC, it is primarily the income changes that would be relevant for TANF (Bitler et al., 2004).

[55] Among low-skilled women, participation in SSI grew 300% between 1980 and 2010, from 1.2 to 4.8 percentage points.

[56] Although both SSI and DI provide benefits to disabled adults, SSI a means tested program, while DI is not. Therefore, finding effects on SSI and not DI further reinforces the fact that the effects are driven by changes in household income.

government programs provide an important stop-gap which acts as insurance for women against potentially bad marriage matches.

7.3.3 Decline in Male Income

Although I control for the average income in the market, a potential concern is that these estimates are biased by the presence of an unobserved income effect. In particular, if potential wages for men are more influential for realized family income, the relative wage may capture the effect of declining male income. I test for this in two ways. First, I analyze the question directly by testing whether the impacts on income relative to poverty are larger in markets in which men experienced the least growth in potential wages. In practice, I estimate Equation 4[57], and include an interaction between the change in relative wage and indicators for the quartile of the change in male income, where a lower quartile indicates less growth in potential wages. Appendix Table A.19 shows that the effects on the distribution of income relative to poverty are present and significant at least at the 10% level for nearly all quartiles of the distribution of male growth, suggesting that the shift in the distribution of women's family income documented earlier does not reflect the decline in male income.

I also look at the role of manufacturing, a persistent source of declines in male employment and wages over this period. In Appendix Table A.20 I show the robustness of these results to the exclusion of the states with the largest share of men employed in basic manufacturing (Michigan, Ohio, Indiana, Wisconsin, Pennsylvania, Illinois).[58] Although the estimates are somewhat less precise, the magnitude of the estimates are similar. Therefore, these findings support the interpretation that women experience declines in family income due to a "willingness to pay" to avert marriage, rather than the decline in male income.

[57] In order to estimate differential effects by the size of growth in potential wages, it is necessary to use a differences specification. The baseline results for women's income relative to poverty using this specification are provided in Appendix Table A.18, and are fairly similar to the estimates using the levels specification with the exception that significant increases are now found in the probability of being at the higher end of the distribution.

[58] Each of these states had over 30% of men employed in basic manufacturing in 1970, ranging from 31% to 44% of men.

7.3.4 Childbearing and Child-rearing

Traditionally, marriage and fertility have been intrinsically linked, which makes childbearing a natural margin which may be affected by the decline in the incentive for marriage. To proxy for women's fertility, I look at whether there is an infant (under 1 year old) present in the household.[59] The results in the first column of Table 9 indicate that higher outside options do not lead to a statistically significant change in women's fertility.[60] This suggests that women on the margin of marriage make their childbearing decisions independent of marriage. For low-income women, this is consistent with the strong preference for having children, regardless of marital status, which has been previously revealed in qualitative interviews (Edin and Kefalas, 2005). In Section 7.4 I look for whether these effects vary across skill levels.

While I show that the decision to have children is not impacted by relative wages, the reduction in marriage incentives may increase the probability that women raise children on their own. In Table 9 I show that a 10% increase in the relative wage leads to a 2.2 percentage point increase in the share of women who are single mothers, measured by the presence of a child under 18 in the household. This amounts to a 20% increase relative to the mean.[61] Moreover, I find an accompanying 50 percent increase in the likelihood of receiving child support, consistent with women having sole or majority guardianship over their children. This evidence suggests that higher relative wages enable women to maintain custody of their children even as they remain independent from potential, low-quality partners. This pattern is also consistent with the recent finding that marriage is increasingly limited to couples where both partners have a preference for high investments in children (Lundberg and Pollak, 2013).

[59]The National Vital Statistics System, which provides the full census of births for the majority of the years between 1978 and 2004, only collected information on the education of the mother for 16 states from 1978 to 2004, while for the majority of the remaining states this information is available only from 1989-2004. This limits the external validity and power of the analysis using this data. Nonetheless, consistent with the results shown here, I find no statistically significant effect of relative outside options on the number of births, or the birth rate in a state. Results available from author on request.

[60]There is a potential for a mismatch in timing here since the contemporaneous relative wage is unlikely to be able to influence the birth of a child, although it may influence the fertility decision in the current year. However, since the relative wage is likely to evolve continuously over time, the contemporaneous relative wage is likely to be highly correlated with that of the prior year, when the decision for the observed birth was made (Furtado, 2015).

[61]To verify the interpretation of these results, in Appendix Table A.11, I rule out the possibility that these estimates are driven by migration patterns, as they are concentrated among women that have resided in the same state for at least the past 5 years.

7.4 Heterogeneous Responses and Sensitivity of Estimates

In this section, I examine the heterogeneity in women's responses across skill levels and races, as well as the sensitivity of the estimated effects to changes in the sample. In Table 12, I show estimates of the interacted effect of relative wages with dummies for education level or race for the main outcomes of interest. Overall, I find that the results hold across subgroups, which suggests that they are not a feature of a specific marriage market. The exception to this is the effect of relative wages on fertility. While I do not find a significant effect of relative wages on fertility *on average*, I find that relative wages have a significant, positive effect on fertility for low-skilled women and a significant, negative effect for high-skilled women. This is consistent with evidence that low-skilled women place little value on childbearing within marriage (Edin and Kefalas, 2005). Conversely, high-skilled women place greater emphasis on marriage, as it is seen as a commitment device for men to secure investment in their children (Lundberg and Pollak, 2013).

Second, I test the sensitivity of the estimates to the omission of salient subgroups. Appendix Table A.13 shows that the estimated coefficients are similar when I omit black low-skilled women, black high-skilled women, white low-skilled women, or white high-skilled women. Finally, in Appendix Table A.14 I check whether there is a decline in the probability of being ever married within a population for whom I would *not* expect to find a strong effect of relative wages: older women between the ages of 50 and 70. Reassuringly, I do not find a statistically significant effect on the share married, or on the share never married. I do find an increase in the share divorced, which is reasonable given the high incidence of divorce among this population (15% are divorced and not remarried at the time of survey.)

8 Reverse Causation

To bolster the findings, I now turn to address a remaining threat to identification: the potential for reverse causation in the model. In my context, reverse causation may result from the presence of an unobserved variable in the marriage market that is correlated with trends in employment and preferences for marriage. I follow Autor et al. (2013) and Peri et al. (2014), and begin by revisiting estimation with a first-differenced (10-year differences) specification. Specifically, I estimate:

$$\begin{aligned}\Delta Y_{cerst} =& \beta_1 \Delta Relative\widehat{Outside}Option_{erst} + \beta_1 \Delta Average\widehat{Outside}Option_{erst} + \xi_{ct} \\ &+ \delta_{rt} + \chi_{et} + \gamma_{st} + X_{erst}\phi + \upsilon_{cerst}\end{aligned} \tag{4}$$

Appendix Table A.12 shows the results from this model. The estimated effects of relative wages on the likelihood of being married and the likelihood of never having been married are both within the tight confidence interval around my main estimate. This shows that the results are not sensitive to the empirical specification.[62]

Next, in separate regressions, I use the change in marriage outcomes between 1960 and 1970 as the dependent variable, and changes in relative wages between 1980-1990, 1990-2000, and 2000-2010 as independent variables. I present the results in the first and second columns of Table 13. Overall, there is little indication of a long term trend driving the results. Using the change in relative wage options from 1980-1990 as the independent variable - the decadal change in wages closest temporally to the observe outcomes - there is no statistically significant relationship between future wage options and lagged marriage outcomes. While the coefficient is reasonably similar to the main effects of marriage, the standard error is nearly four times as large, such that the 95% confidence interval includes an effect size of comparable magnitude in the opposite direction as the main estimate. Of the six marriage outcomes analyzed, the only statistically significant relationship is between lagged marriage and 1990-2000 wages. In the subsequent columns, I perform this check for the remainder of the key outcomes, and continue to find little evidence for reverse causation. The standard errors for the estimates are large throughout, however, and lead me to place little confidence in the interpretation of these results.

9 Conclusion

Family structure in the United States has undergone a substantial shift over the last three decades, yet the causes and implications of the decline in marriage remains unclear.

[62] A large difference between the estimated effects in the baseline model and of this model may indicate a violation of the identification assumption. In particular, the first difference estimator is consistent as long as the first-differenced error terms are uncorrelated with the first-differenced independent variables, a weaker assumption that the strong exogeneity required for the panel fixed effects estimator (Cameron and Trivedi, 2005).

This paper presents new evidence on the impact of the increase in relative earnings power on the likelihood of marriage, the family structure of households with children, and the family income of women in the United States. Taking advantage of plausibly exogenous shocks to the gains to marriage, I find that a 10% increase in relative wage options leads to a 7% decline in marriage. I show that the reduction in marriage is explained by a lower propensity to enter into a first marriage, with little impact on the likelihood of divorce. I also provide suggestive evidence that the reduction in marriage is among women that would have married lower quality spouses. These findings imply that the convergence in wages can explain 20% of the decline in marriage among women over the last three decades.

Additionally, I find that higher outside options lead to a broader independence of women from men. In particular, I show that women are more likely to be financially independent and work more hours when relative wages increase. Moreover, higher relative wages induce women to be more likely to take guardianship of their children and receive child support, although I find no effect on childbearing. However, one manifestation of this increased financial independence is that increased relative outside options lead to declines in income relative to poverty and greater participation in safety net programs among low-skilled women. This is indicative of a perceived disutility of marriage among this group, which creates a "willingness to pay" to avoid marriage.

These results suggest that relative earnings power is an influential factor in the family formation and labor market decisions of women. Moreover, this paper provides an important first step towards building an understanding of the welfare effects of the gender wage gap by highlighting empirical channels for improvements in welfare. Using the current research design, however, I am unable to quantify the welfare impacts for women and their families. This is not a simple question to answer given the multiple channels for impacts on children, but would be an important next step in the literature. I leave this question for future research.

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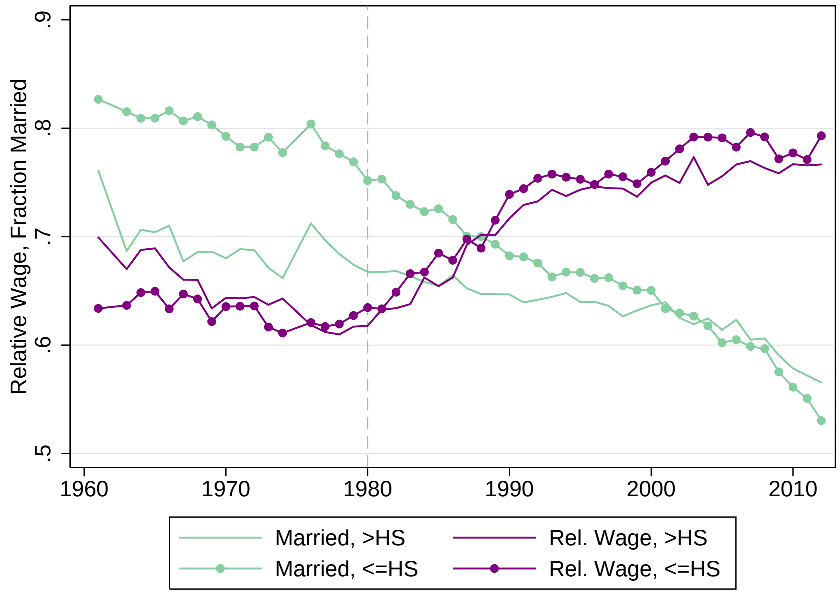
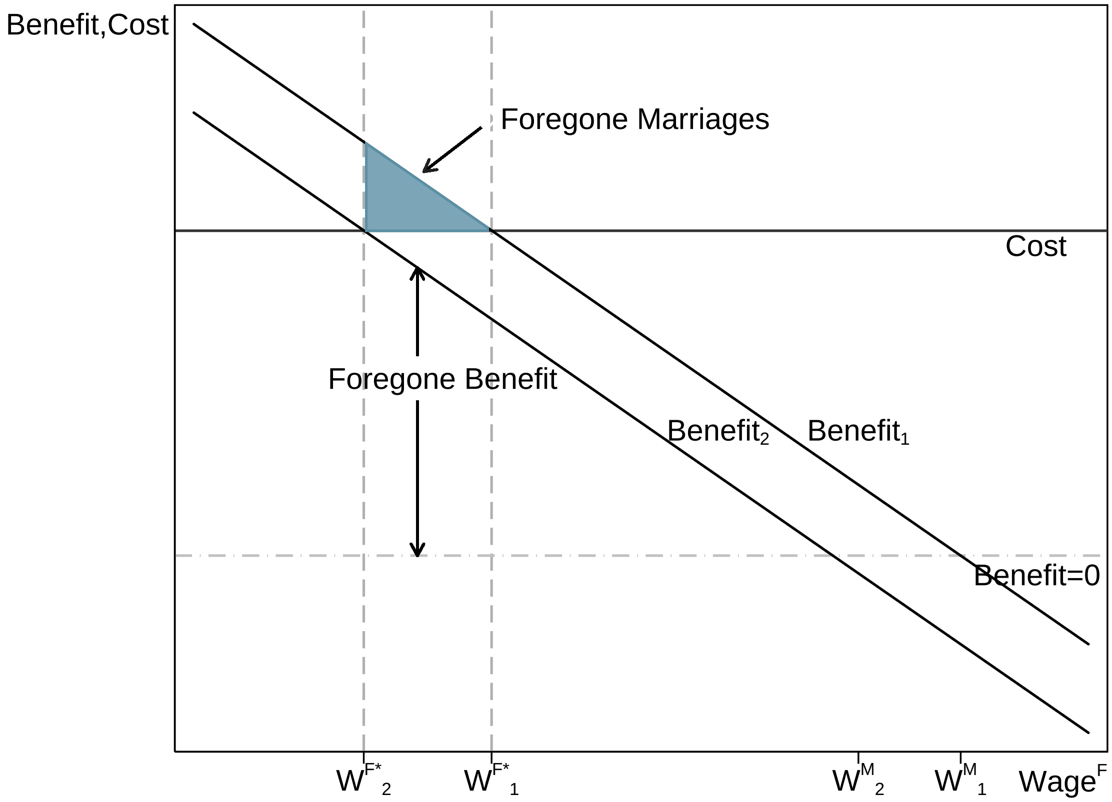
10 Figures

Figure 1: Women's Hourly Wage as a Fraction of Men's Wage, and Marriage Rates



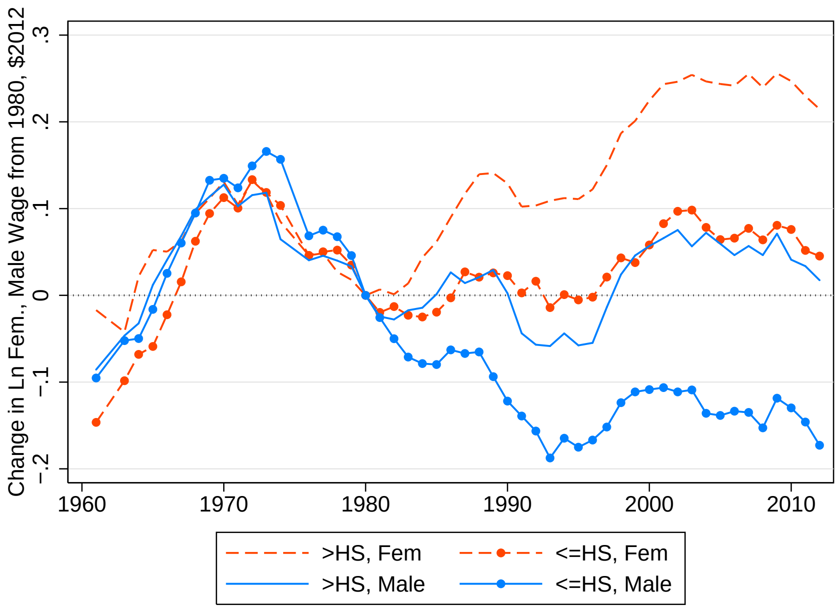
Notes: Relative wage is the ratio of average female hourly wage to average male hourly wage. Average hourly wages are calculated from the March Annual Demographic files (1962-2012) as annual earnings divided by total hours worked. Sample for wage calculation includes individuals age 18 to 64 with positive hours worked and positive earned income; for marriage includes women 22-44 years old.

Figure 2: Theoretical Predictions for Decline in Marriage Incentive



Notes: "Benefit" is the pecuniary gains to matching, which is decreasing in the female wage because male wages are assumed fixed. "Cost" is the negative non-pecuniary benefits to marriage. See text for more details.

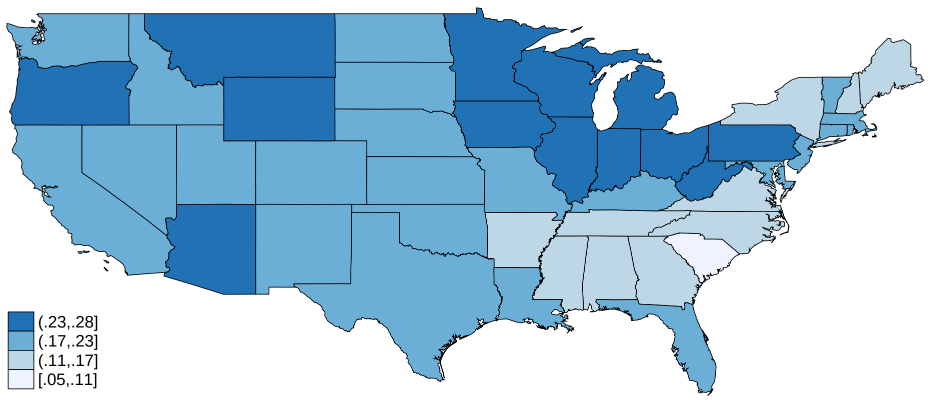
Figure 3: Change in Female, Male Ln Wage from 1980



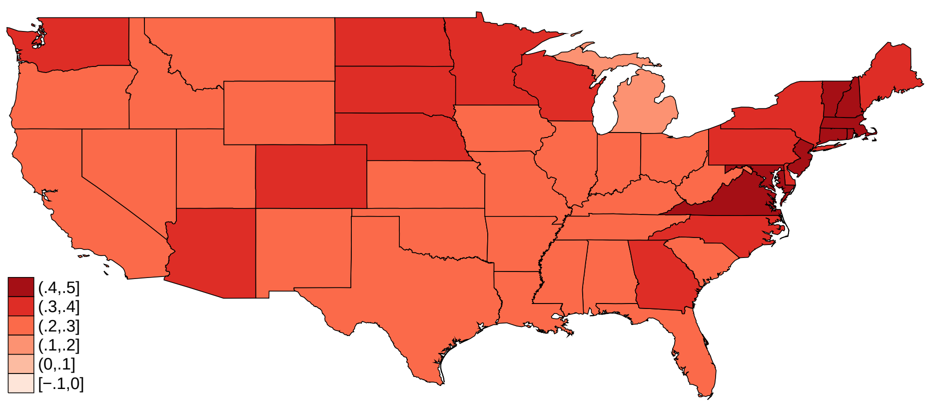
Notes: Log average female hourly wage and average male hourly wage depicted. Average hourly wages are calculated from the March Annual Demographic files (1962-2012) as annual earnings divided by total hours worked. Data include individuals age 18 to 64 with positive hours worked and positive earned income.

Figure 4: Variation Across States in Closing the Gap -
Change in log Female-Male, Female and Male Wages, 1980-2010

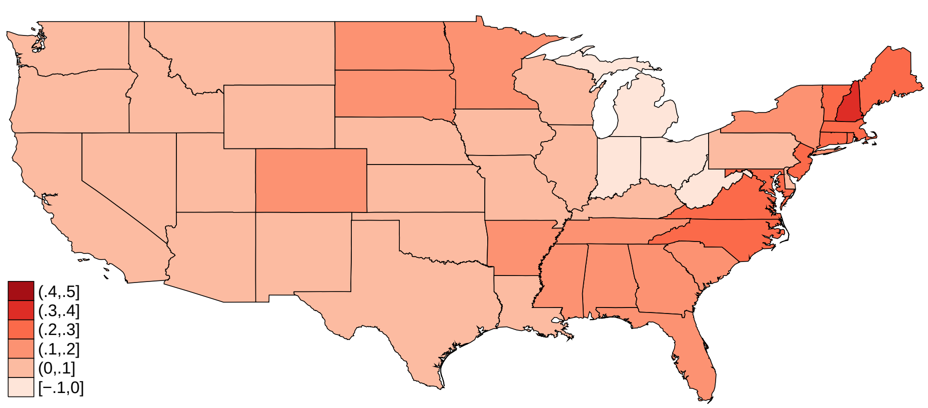
A. Log$\left(\frac{\text{female wage}}{\text{male wage}}\right)$



B. Log female wage ($2012)

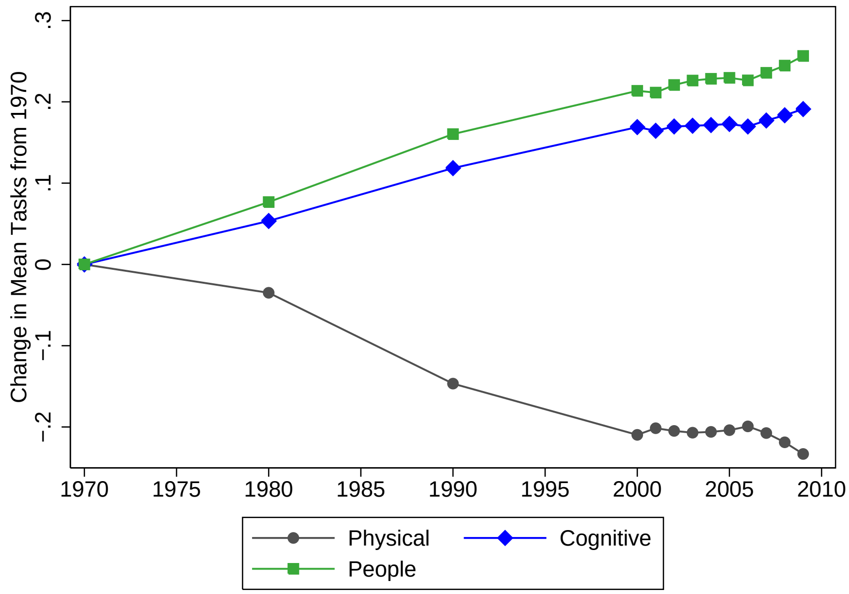


C. Log male wages ($2012)



Source: 1970-2000 decennial censuses, 2010 ACS; author's calculation.

Figure 5: Task Inputs over Time

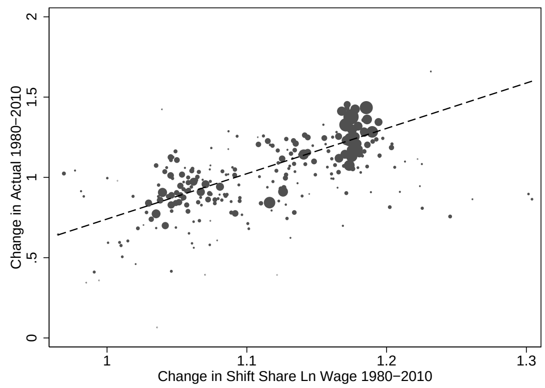


Sources: This figure plots the mean tasks in each year relative to the 1970 level. The tasks performed by each occupation are fixed at 1971 levels, and therefore the changes represent the change in the composition of occupations over time. See Appendix A. 1.1 for further detail regarding the construction of the task indices. 1971 CPS supplement with Dictionary of Occupational Titles, Fourth Edition; 1980-2000 censuses, 2001-2009 ACS.

Figure 6: Correlation between Proxy and Observed Wages (Long Difference), 1980-2010

(a) Relative

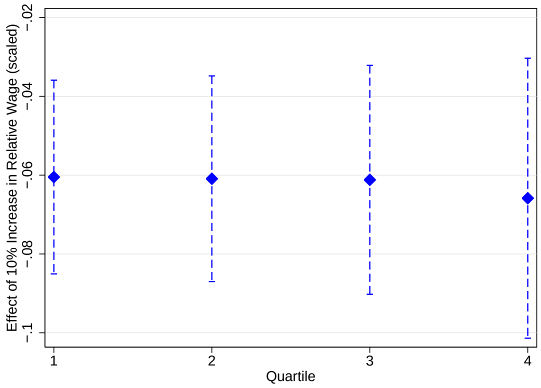
(b) Female



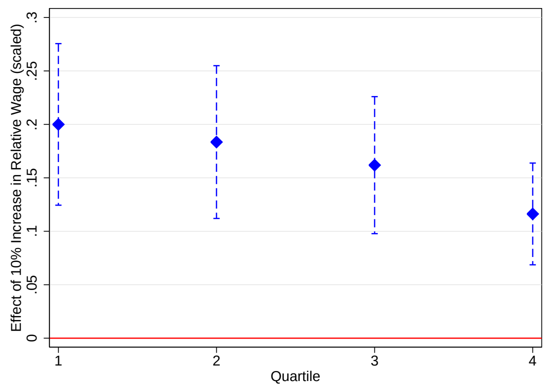
(c) Male

Note: Extremes omitted; full results available on request. Education x race x state, state x year, education x year, race x year, and year fixed effects included in all specifications. Sources: Proxy: 1970 decennial census, 1980 - 2011 March CPS, Observed wages: 1980-2010 decennial censuses.

Figure 7: Impact of Relative Wage on Marriage -
By Quartile of the Relative Wage Distribution



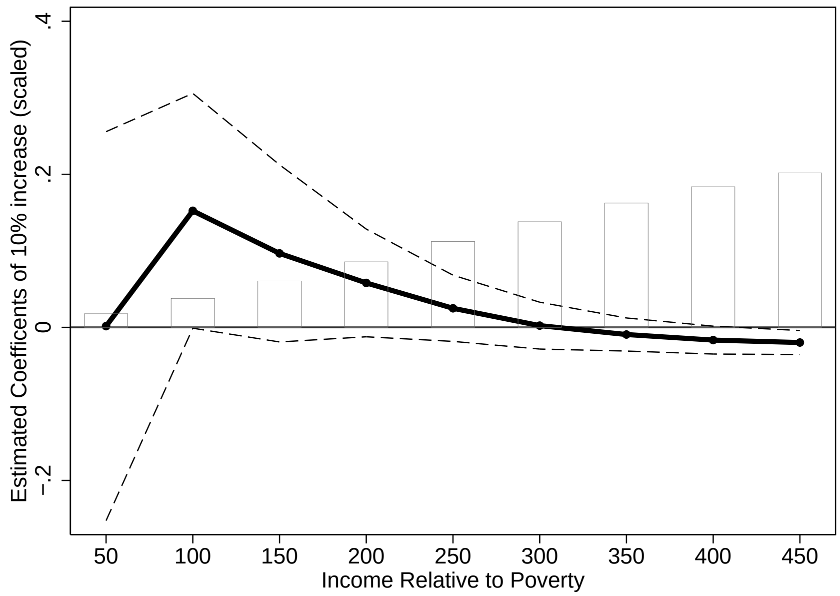
(a) Married



(b) Never Married

Notes: Includes control for average wage options. Coefficients from interaction between relative wage and the quartile of the distribution scaled by mean of the outcome variable and represent the effect of a 10% increase in relative wage options. Relative wage quartile defined separately for each census year. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for female and male educational attainment and the sex ratio at the cell level also included. Standard errors clustered at state level. Sources: Proxy: 1970 decennial census, 1980 - 2011 March CPS, Marriage: 1980-2000 decennial censuses and 2010 ACS.

Figure 8: Distributional Effects of Relative Wage Options on Family Income Relative to Poverty, Census



Notes: This figure shows the coefficients from a series of regressions of indicators of an income relative to poverty $\leq$ k (k $\in$ 50, 100, 150, 200, 250, 300, 350, 400, 450) on relative wage options and average wage options. Income relative to poverty ranges from 1 to 500. The coefficients have been scaled by the mean of the independent variable. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Sources: Proxy: 1970 decennial census, 1980 - 2011 March CPS, Marriage: 1980-2000 decennial censuses and 2010 ACS.

11 Tables

Table 1: Sample Composition, by Year

	All		1980		2010	
	Mean	SD	Mean	SD	Mean	SD
<u>*Data Source: Census*</u>						
Age	32.86	6.53	31.67	6.44	33.17	6.64
Year of Birth	1962.67	12.55	1947.58	6.45	1976.83	6.64
Years of Education	13.21	2.72	12.62	2.62	13.62	2.83
White (%)	76.10	42.65	83.47	37.14	67.07	47.00
Black (%)	11.83	32.29	10.36	30.47	13.26	33.92
Hispanic (%)	12.07	32.58	6.17	24.06	19.67	39.75
Married (%)	64.86	47.74	73.83	43.95	55.98	49.64
Never Married (%)	24.09	42.76	15.69	36.37	33.88	47.33
Divorced (%)	10.26	30.34	9.44	29.23	9.57	29.42
Widowed (%)	0.79	8.87	1.05	10.17	0.57	7.50
Spouse More Ed. (%)	33.35	47.15	39.22	48.82	27.54	44.67
Spouse Less Ed. (%)	31.06	46.27	26.89	44.34	38.17	48.58
Spouse Older (%)	70.08	45.79	73.54	44.11	68.04	46.63
Spouse Younger (%)	17.18	37.72	13.72	34.41	18.86	39.12
Single Mom (%)	11.60	32.02	8.74	28.24	14.84	35.55
Single Earner Female HH (%)	23.28	42.26	21.45	41.05	23.74	42.55
In poverty (%)	13.52	34.19	10.71	30.92	18.31	38.67
Any AFDC/TANF/SSI (%)	5.31	22.41	5.54	22.88	5.40	22.60
Ln(Family income) ($2012)	10.88	0.94	10.91	0.83	10.77	1.03
Sex Ratio	1.12	0.40	1.13	0.26	1.16	0.65
Log Rel. Wage (Proxy)	-0.22	0.06	-0.26	0.05	-0.18	0.06
Log Avg. Wage (Proxy, $2012)	2.85	0.13	2.81	0.10	2.90	0.14
Log Rel. Wage (Actual)	-0.30	0.11	-0.43	0.09	-0.22	0.07
Log Avg. Wage (Actual, $2012)	2.87	0.24	2.82	0.17	2.88	0.29
Observations	4915368		1401324		320493	
<u>*Data Source: March CPS*</u>						
Any Food Stamp (%)	11.12	31.44	10.20	30.27	16.64	37.25
Any AFDC/TANF (%)	4.73	21.23	6.25	24.21	2.58	15.86
Any SSI (%)	1.68	12.85	0.85	9.16	2.39	15.26
Free/Reduced Lunch (%)	36.89	48.25	31.71	46.54	44.90	49.74
Any Child Support (%)	8.05	27.21	.	.	7.39	26.15
Any DI (%)	0.52	7.18	.	.	0.40	6.34
Observations	113455		30214		25941	

Notes: Women ages 22-44. Weighted by census-provided weights. Source: 1980-2000 decennial censuses and 2010 ACS.

Table 2: Correlation with Observed Wages: Comparison of Proxy With and Without Occupation Variation

	(1)	(2)	(3)	(4)	(5)	(6)
A: Variation by demographic-industry						
ln Rel. Wage Option	0.862***	0.398***	0.291***	0.146	0.161	0.177*
	(0.039)	(0.066)	(0.039)	(0.092)	(0.099)	(0.093)
Partial R-Squared	0.636	0.092	0.079	0.010	0.013	0.017
Obs	1064	1064	1064	1064	1064	1064
B: Variation by occupation-industry						
ln Rel. Wage Option	0.980***	0.508***	0.424***	0.552***	0.559**	0.568**
	(0.087)	(0.106)	(0.055)	(0.111)	(0.235)	(0.215)
Partial R-Squared	0.300	0.073	0.084	0.159	0.025	0.026
Obs	1064	1064	1064	1064	1064	1064
StandYr FE	No	Yes	Yes	Yes	Yes	Yes
StEdRace FE	No	Yes	Yes	Yes	Yes	Yes
YrEd FE	No	No	No	No	Yes	Yes
YrRace FE	No	No	No	Yes	Yes	Yes
YrState FE	No	No	Yes	Yes	Yes	Yes
Controls	No	No	No	No	No	Yes

See Section A. 1.4 for further detail regarding the construction of these proxies. Sources: Proxy: 1970 decennial census, 1980 - 2011 March CPS, Wages: 1980-2000 decennial censuses, 2010 ACS. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01

Table 3: Correlation with Observed Wages: Final Proxy

	Corr. w/ Actual			Cross-Effects?	
	Relative	Female	Male	Female	Male
ln Rel. Wage Option	0.592***				
	(0.192)				
Female ln Wage Option		0.578***		0.546***	-0.062
		(0.155)		(0.152)	(0.188)
Male ln Wage Option			0.565***	0.051	0.597***
			(0.181)	(0.269)	(0.209)
Partial R-Squared	0.037	0.059	0.053		
Obs	1064	1064	1064	1064	1064

Notes: The dependent variable is shown in the column heading. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for female and male educational attainment and the sex ratio at the cell level also included. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01 Sources: Proxy: 1970 decennial census, 1980 - 2011 March CPS, Wages: 1980-2000 decennial censuses, 2010 ACS.

Table 4: Correlation with Marriage-Market Observables

	Share				Total
	Imprisoned	Immigrant	College Grad.	HS Grad.	ln(Pop)
A: Female					
Shift Share Female ln Hourly Wage	-0.009	-0.192	0.091	0.263	-0.641
	(0.042)	(0.344)	(0.107)	(0.175)	(0.582)
Adjusted R-Squared	0.230	0.922	0.984	0.948	0.994
Obs	1064	1064	1064	1064	1064
B: Male					
Shift Share Male ln Hourly Wage	0.118	-0.060	0.011	-0.260*	0.928
	(0.079)	(0.267)	(0.125)	(0.151)	(1.046)
Adjusted R-Squared	0.717	0.933	0.982	0.971	0.993
Obs	1063	1063	1064	1064	1064

Notes: The dependent variable is shown in the column heading. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for female and male educational attainment and the sex ratio at the cell level also included. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01 Sources: Proxy: 1970 decennial census, 1980 - 2011 March CPS, Wages: 1980-2000 decennial censuses, 2010 ACS.

Table 5: Impact of Relative Wage Options on Marriage
With and Without Controls for Average Wage Options

	(1)	(2)	(3)
	Married	Divorced	Never Married
A: Relative only			
ln Rel. Wage Option	-0.531***	0.086	0.447***
	(0.107)	(0.056)	(0.089)
Mean Y	0.644	0.103	0.246
R-Squared	0.868	0.666	0.903
Obs	23608	23608	23608
B: Relative controlling for Average			
ln Rel. Wage Option	-0.472***	0.058	0.423***
	(0.084)	(0.054)	(0.080)
Avg. ln Wage Option	0.643***	-0.307***	-0.257***
	(0.107)	(0.075)	(0.095)
Mean Y	0.644	0.103	0.246
R-Squared	0.868	0.666	0.903
Obs	23608	23608	23608

Notes: Women age 22-44. The dependent variable is shown in the column heading. Weighted by female population in cell. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for female and male educational attainment and the sex ratio at the cell level also included. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010.

Table 6: Impact of Relative Wage Options on Income Pooling

	Earner(s):			
	(1) Single	(2) Female, Single	(3) Male, Single	(4) Multiple
ln Rel. Wage Option	0.042	0.246**	-0.204***	0.042
	(0.103)	(0.109)	(0.055)	(0.096)
Mean Y	0.327	0.221	0.107	0.636
R-Squared	0.602	0.700	0.712	0.670
Obs	23608	23608	23608	23608
Average Wage	Yes	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable shown in the column heading is an indicator variable for the number and/or number and gender of earners in the household. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010.

Table 7: Impact of Relative Wage Options on Women's Labor Market Outcomes

	(1) Wkly Hrs	(2) ln(Wkly Inc)	(3) ln(Inc)	(4) Employed
ln Rel. Wage Option	8.541***	0.391	0.310	-0.056
	(2.508)	(0.240)	(0.290)	(0.130)
Mean Y	36.772	5.740	9.408	0.675
R-Squared	0.566	0.955	0.942	0.806
Obs	23289	23254	23255	23608
Average Wage	Yes	Yes	Yes	Yes

Notes: Women age 22-44. Hours of work and earnings are conditional on employment. The dependent variable is shown in the column heading. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010.

Table 8: Impact of Relative Wage Options on Spousal Matching

	Spouse Ed., Relative to Own			Spouse Age, Relative to Own		
	(1)	(2)	(3)	(4)	(5)	(6)
	Less	Same	More	Younger	Same	Older
ln Rel. Wage Option	-0.250**	-0.127	0.378***	0.211**	0.151*	-0.362***
	(0.105)	(0.126)	(0.106)	(0.102)	(0.078)	(0.119)
Mean Y	0.318	0.358	0.324	0.165	0.127	0.708
R-Squared	0.828	0.565	0.632	0.411	0.186	0.335
Obs	22663	22663	22663	22673	22673	22673
Average Wage	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.

Table 9: Impact of Relative Wage Options on Childbearing and Child-Rearing

	(1)	(2)	(3)
	Recent Birth	Single Mom	Child Support
ln Rel. Wage Option	0.036	0.221***	0.471**
	(0.035)	(0.075)	(0.194)
Mean Y	0.063	0.116	0.077
R-Squared	0.605	0.732	0.090
Obs	23608	23608	12791
Average Wage	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010; March CPS 1980, 1990, 2000, 2010.

Table 10: Impact of Relative Wage Options on Family Income Relative to Poverty Threshold

	Income Relative to Poverty					Safety Net
	(1)	(2)	(3)	(4)	(5)	(6)
	0-100	101-200	201-300	301-400	401-500	AFDC/TANF/SSI
ln Rel. Wage Option	0.207*	-0.029	-0.167**	-0.121**	0.109*	0.242**
	(0.104)	(0.054)	(0.079)	(0.059)	(0.061)	(0.095)
Mean Y	0.135	0.171	0.188	0.164	0.341	0.052
Mean Y - Low Skill	0.209	0.235	0.213	0.151	0.190	0.092
Mean Y - High Skill	0.082	0.125	0.170	0.173	0.449	0.023
R-Squared	0.845	0.744	0.531	0.555	0.923	0.760
Obs	23583	23583	23583	23583	23583	23608
Average Wage	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010

Table 11: Impact of Relative Wage Options on Receipt of Government Assistance

	(1)	(2)	(3)	(4)	(5)
	Food Stamps	AFDC/TANF	SSI	DI	Sch. Lunch
ln Rel. Wage Option	0.507**	-0.065	0.210***	0.000	1.066*
	(0.211)	(0.131)	(0.070)	(0.048)	(0.591)
Mean Y	0.089	0.036	0.014	0.005	0.294
Mean Y - Low Skill	0.152	0.066	0.025	0.006	0.408
Mean Y - High Skill	0.044	0.014	0.007	0.004	0.202
R-Squared	0.344	0.264	0.085	0.047	0.384
Obs	17035	17035	17035	12791	12876
Average Wage	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading; Food Stamps, SSI, AFDC/TANF, school lunch, and child pay are indicators for receiving any of those forms of payments in the last year. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.

Table 12: Heterogeneous Responses Across Subgroups

	(1) Marr.	(2) Nev. Marr.	(3) Sp. More Ed	(4) Hrs. Wrk	(5) Fert.	(6) Sngl. Mom	(7) Poverty
A: Interaction with Education							
Rel. Wage Option x Low Skill	-0.440***	0.475***	0.442***	9.805***	0.098**	0.169**	0.255**
	(0.094)	(0.100)	(0.128)	(2.674)	(0.046)	(0.076)	(0.116)
Rel. Wage Option x High Skill	-0.582***	0.283***	0.172	5.756	-0.135***	0.384***	0.122
	(0.124)	(0.105)	(0.174)	(3.717)	(0.040)	(0.095)	(0.153)
Mean Y	0.644	0.246	0.323	36.772	0.063	0.116	0.135
Obs	23608	23608	22715	23289	23608	23608	23583
B: Interaction with Race							
Rel. Wage Option x Black	-0.184	0.490***	0.462**	7.778**	0.154***	-0.129	0.009
	(0.123)	(0.135)	(0.187)	(3.511)	(0.051)	(0.128)	(0.129)
Rel. Wage Option x Hispanic	-0.191**	0.231**	-0.008	2.892	0.024	0.167**	0.226*
	(0.092)	(0.094)	(0.131)	(2.909)	(0.052)	(0.076)	(0.126)
Rel. Wage Option x White	-0.884***	0.582***	0.408***	12.719***	-0.047	0.504***	0.318**
	(0.099)	(0.098)	(0.145)	(2.779)	(0.040)	(0.077)	(0.124)
Mean Y	0.644	0.246	0.323	36.772	0.063	0.116	0.135
Obs	23608	23608	22715	23289	23608	23608	23583
Average Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.

Table 13: First Differenced Estimates, Pre-Exposure Outcomes

	Dep. Var: 60-70 Change in:				
	Marr.	Nev. Marr	Single Mom	Hours Work	Poverty
A: 1980-1990 Relative Wage					
D. Rel. Wage Option	-0.552	0.556	0.013	4.418	0.198
	(0.423)	(0.333)	(0.221)	(22.648)	(0.743)
Obs	2392	2392	2392	2104	2383
B: 1990-2000 Relative Wage					
D. Rel. Wage Option	-1.047***	0.512	0.202	28.603	0.948
	(0.305)	(0.351)	(0.221)	(27.208)	(0.753)
Obs	2392	2392	2392	2104	2383
C: 2000-2010 Relative Wage					
D. Rel. Wage Option	-0.351	0.515	0.442*	-9.908	-1.258*
	(0.450)	(0.481)	(0.224)	(27.963)	(0.675)
Obs	2392	2392	2392	2104	2383
Average Wage	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. State x year, education x year, race x year, cohort x year, and year fixed effects included. Controls for the changes in the average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.

A. 1 Appendix

A. 1.1 Construction of Task Measures

The construction of “cognitive”, “physical”, and “people” task indices by gender and year draws heavily on the discussion of the Data Appendix to Beaudry and Lewis (2014). Their approach draws on prior work on tasks by Bacolod and Blum (2010) and Autor et al. (2003), incorporating elements of the indices created in each of these studies in the indices produced here.

The core dataset for this work is a supplement to the 1971 April Current Population Survey which has occupational task characteristics for each individual using task definitions from the Fourth Edition Dictionary of Occupational Titles (DOT) (National Academy of Sciences, Committee on Occupational Classification and Analysis, 2006).

Following Beaudry and Lewis (2014), I focus on 16 task measures, which will enter into the indices; (1) the measure of strength requirements (entered as dummies for its five different levels); (2)-(3) indicators for whether the job requires “stooping” or‘climbing”; (4)-(7) the DOT aptitudes for “finger dexterity”, “eye-hand coordination”, “manual dexterity,” and “motor coordination”; (8)-(10) three “general educational development” scores (mathematics, reasoning, and language), (11)-(12) the “numerical” and “intelligence” aptitude scores, (13) the “data complexity” measure; (14)-(16) indicators for “dealing with people,” “influencing people,” and “direction, control, and planning.”

I begin transforming the task measures such that a higher value indicates greater aptitude at the task. Then, I collapse the data to occupation by gender cells, constructing the mean task of the cell using the CPS-provided weights.

Next, I standardize the task measures so that they can be more easily pooled. I take the approach of Beaudry and Lewis (2014) in creating percentiles of each task across the occupation-gender cells, weighted by the number of hours worked in the 1970 Census. Then, I transform the percentiles to a standard normal distribution as follows:

$$task^z_{pt} = \frac{task_{pt} - \overline{task_{pt}}}{sd(task_{pt})}$$

where $task_{pt}$ is the p^{th} percentile of the task distribution for t, and $\overline{task_{pt}}$ and $sd(task_{pt})$

represent the mean and standard deviation, respectively, of the task distribution.

Finally, I aggregate the individual tasks into 3 task indices, physical, people, and cognitive, using the factor weights from the analysis in Beaudry and Lewis (2014). The result is a measure of the three indices for each occupation by gender cell in the 1970 census.

The next stage focuses on merging these mean task values onto the 1980, 1990, and 2000 censuses, and 2001-2009 ACS in order to be able to measure changes over time. Unfortunately, I do not have access to the "Treiman file" typically used to crosswalk between 1970 and 1980 occupation codes, and instead used the crosswalk generated by IPUMS[63]. To convert from the 1980 occupation codes to the harmonized 1990 occupation codes, I make use of the occupation crosswalk provided by David Dorn on his website. Dorn also has crosswalks from the harmonized 1990 code to the 2000 and 2005 codes[64], which allow me to perform those conversions.

Now with all the proper crosswalks in place, I was able merge the mean task values from 1970 to 1980, and generate an average task measure by gender in 1980 using the 1980 census weights. Likewise for 1990, 2000, and 2005. Figure 5 plots the resulting means from this exercise.

[63]Available on https://usa.ipums.org/usa/volii/occ_ind.shtml

[64]The 2005 occupation codes map onto the 2001-2009 ACS.

A. 1.2 Intuition for Wage Proxy through a Thought Experiment

In this section, I use a simple thought experiment to introduce the intuition for how the segregation of men and women across occupations together with a shock to the return to tasks translates into exogenous variation in sex-specific wages and the relative wage across marriage markets. This is intended to provide intuition to understand the variation behind the proxy introduced in the empirical strategy in Section 4.

Consider a simplified economy with just two occupations; the first occupation, nursing, n, is highly cognitive, while the other, machine-operation, p, is primarily physical. Wages for a given group of men or women in a marriage market, μ, can then be written as a weighted average of the occupations the group is distributed across along with the marginal return to the task:

$$w^g_{\mu t} = \underbrace{\frac{E^g_{n\mu}}{E^g_{\mu}}}_{\text{Exposure to n}} \times \underbrace{w_{nt}}_{\text{MPL}_c} + \underbrace{(1 - \frac{E^g_{n\mu}}{E^g_{\mu}})}_{\text{Exposure to p}} \times \underbrace{w_{pt}}_{\text{MPL}_p} \tag{5}$$

where $w^g_{\mu t}$ is the log wage for gender $g \in \{m, f\}$ in μ at time t, $\frac{E^g_{n\mu}}{E^g_{\mu}}$ is the share of g in μ employed in occupation n, and w_{nt} is the log wage return to occupation o at t. For simplicity, I assume a single wage for each occupation, but the example can also be generalized to allow for heterogeneity in occupational wages across groups.

Now, introduce a shock to productivity for cognitive tasks, Δw_{nt}, which causes w_n to rise exogenously, while w_p is unaffected. The wage in the following period can be clearly decomposed as a function of three inputs; the initial wage prior to the shock (endogenous, assuming serial correlation of wages), the initial exposure multiplied by the exogenous shock (exogenous), and the change in exposure measure multiplied by the return to each occupation (endogenous), represented as $e^g_{\mu t}$.

$$w^g_{\mu t} = w^g_{\mu,init} + \underbrace{\frac{E^g_{n\mu,init}}{E^g_{\mu,init}} \times \Delta w_{nt} + (1 - \frac{E^g_{n\mu,init}}{E^g_{\mu,init}}) \times \Delta w_{pt}}_{\text{Exogenous}} + \underbrace{e^g_{\mu t}}_{\text{Endogenous}}$$

where

$$e^g_{\mu t} = \Delta\frac{E^g_{n\mu,t}}{E^g_{\mu,t}} \times \Delta w_{nt} + \Delta(1 - \frac{E^g_{n\mu,t}}{E^g_{\mu,t}}) \times \Delta w_{pt}$$

Since $\Delta w_{pt} = 0$, this reduces to:

$$e^g_{\mu t} = \Delta\frac{E^g_{n\mu,t}}{E^g_{\mu,t}} \times \Delta w_{nt}$$

Then the exogenous portion of relative wages resulting from Δw_n may be written as follows:

$$\Delta(w^f_{\mu t} - w^m_{\mu t})_{exog} = \underbrace{(\frac{E^f_{n\mu,init}}{E^f_{\mu,init}} - \frac{E^m_{n\mu,init}}{E^m_{\mu,init}})}_{\text{Segregation}_\mu} \times \underbrace{\Delta w_{nt}}_{\text{Shock}_t}$$

Writing the relative wage in this manner provides the key insight that the magnitude of the impact on the log relative wage resulting from an exogenous change in productivity will depend on the combination of two factors. The first, in parenthesis, is the degree to which women and men are involved in different occupations. This term, Segregation$_\mu$, will vary across marriage markets due to varying demand for occupations in a market, such as from industrial composition, as well as from historical supply decisions which may influenced by social networks, patterns of discrimination, and skill level. As a result, a given aggregate positive shock to productivity, Δw_n, will have different impacts on relative wages across μ, and will be maximized where women have the largest advantage in n. The second factor is the increase in the return to the n which results from the shock to productivity. This term is constant across μ, but varies over time, producing varying-sized shocks to relative wages.

Returning to the gender-specific proxy, I simplify notation by combining the initial exposure and exogenous shock terms into one group of terms which varies exogenously over time, which I denote below as Exogenous* to represent the term being exogenous conditional on initial conditions. This represents the portion of the current period wage which is driven by the national change in the demand for tasks, rather than group-level supply decisions. Note that the resulting term takes a functional form and interpretation similar to the shift-share instrument for employment in Katz and Murphy (1992) and adapted to wages in Aizer (2010).

$$w^g_{\mu t} = \underbrace{\frac{E^g_{n\mu,init}}{E^g_{\mu,init}} \times w_{nt} + (1 - \frac{E^g_{n\mu,init}}{E^g_{\mu,init}}) \times w_{pt}}_{\text{Exogenous*}} + \underbrace{e^g_{\mu t}}_{\text{Endogenous}}$$

This simplified form generalizes to the case of o occupations:

$$w^g_{\mu t} = \sum_o \underbrace{\frac{E^g_{o\mu,init}}{E^g_{\mu,init}} \times w_{ot}}_{\text{Exogenous*}} + \underbrace{e^g_{\mu t}}_{\text{Endogenous}} \tag{6}$$

The intuition for the exogenous portion of wages is also easily generalized from above.

The wage proxy I develop mimics the exogenously-varying wage term in Equation 6, but departs from this theoretical concept in four ways. First, I use employment in an occupation-industry as a proxy for the tasks performed by an individual. Occupations (o) map naturally to tasks, as mentioned previously. The addition of industries (j) allows me to take advantage of the disparity in wages within occupations across industries as an additional source of variation. Second, I define the marriage market μ as an education-race-state cell. Third, I hold constant the exposure to tasks at the level in 1970, prior to the period of analysis, in order to prevent introducing endogenous labor supply decisions to the wage proxy. If individuals dynamically update their occupation selection based on changes in preferences, allowing the exposure measure to reflect those decisions may introduce bias to the wage proxy. Instead, I rely on historical occupation patterns and geographic industry patterns to generate cross-sectional variation which is correlated with present employment, but not with evolving preferences and labor market opportunities.

A. 1.3 Decomposition of Employment Growth

Following Acemoglu and Autor (2011), I perform the following decomposition of the growth in occupations between 1980 and 2010, separating the growth of industries with high concentrations of particular occupations from the growth in the share of particular occupations in all industries.

$$\Delta E_{ot} = \sum_{j=1}^{17} (\Delta E_{jt}\lambda_{oj} + \Delta\lambda_{ojt}E_j) \tag{7}$$

$$= \Delta E_t^B + \Delta E_t^W$$

where E_{ot} is the share of employment in occupation o, E_{jt} is the share of employment in industry j, λ_{oj} is the average share of industry j employment in occupation o, E_j is the average share of employment in industry j. See Acemoglu and Autor (2011) for greater detail.

I present the share of growth accounted for by within-industry growth, i.e $\frac{\Delta E_t^W}{\Delta E_{ot}} * 100$, together with the share of employment accounted for by each occupation in A.1. The table indicates a large role for within-industry growth, consistent with Acemoglu and Autor (2011); for four of the five largest occupations in 1980, within-industry growth accounts for well over half of the employment growth during this time period.

Table A.1: Decomposition of Occupational Growth

	Within Share of Growth	Share of Total Emp., 1980
Admin. Support	1.24	0.19
Sales	0.85	0.09
Management	0.99	0.08
Teacher/Social Wkr.	0.15	0.06
Construction, Mover	0.57	0.05
Food Service	0.33	0.05
Construction Trades	0.71	0.04
Mechanical/Electronic Repair	0.71	0.04
Vehicle Operator	0.13	0.04
Assemblers	0.30	0.04
Misc. Operator	0.26	0.04
Metal/Wood Work	0.38	0.03
Cleaning Services	2.20	0.03
Health Asst.	0.20	0.03
Engineers and scientists	1.25	0.02
Physicians/Nurses	0.39	0.02
Other Technicians	-0.01	0.02
Textile Machine Operator	0.63	0.02
Protective Service	0.79	0.02
Other Personal Services	0.57	0.02
Financial Specialist	0.86	0.01
Management Support	0.99	0.01
Metal Work Operator	0.21	0.01
Entertainment	0.89	0.01
Farm/Forestry Work	0.93	0.01
Lawyers	0.59	0.00
Plant Operator	-0.13	0.00
Mining Extraction	-0.31	0.00
Total	0.59	0.04

Notes: "Within Share of Growth" refers to $\frac{\Delta E_t^W}{\Delta E_{ot}} * 100$ and "Share of Total Emp, 1980" is $E_{o,1970}$ in Equation 7. Source: Census 1980 - 2000, and ACS 2010.

A. 1.4 Comparison of Proxy Constructed with Industry and Occupation Variation

In this section, I create two additional, alternative, proxies which use variation slightly different from that used in the paper, which I will refer to as the dynamic occupation-industry proxy, in order to understand the importance of each source of variation.

In particular, the first alternative proxy, which I will refer to as the demographic-industry proxy, eliminates any variation in occupation in the fixed share of workers, but adds demographic by industry variation in wages. This approach is akin to that taken in Bertrand et al. (2015) to generate a wage proxy at the mean, with four important differences; (1) the marriage market is defined as education-race-state cells, instead of education-race-state-age cells; (2) national wages are defined in the CPS instead of the Census; (3) national wages are hourly rather than annual (4) the base year is 1970 instead of 1980.

$$\widehat{w^g_{\mu t}} = \sum_j \frac{E^g_{j\mu,1970}}{E^g_{\mu,1970}} \times w^g_{j,\mu,t,-s}$$

The second proxy, hereafter the static occupation-industry proxy, simply removes the dynamic updating of the shares, π^W_t from the instrument used in this paper:

$$w^g_{\mu t} = \sum_o \sum_j \frac{E^g_{oj\mu,1970}}{E^g_{\mu,1970}} \times w_{ojt,-s}$$

In Table A.2, I show the results of estimating Equation 3 for relative wages using the demographic-industry proxy (Panel A), or the static occupation-industry proxy (Panel B), together with the dynamic occupation-industry proxy (Panel C). To test the sensitivity of the correlations, I increasingly add more controls, and show the full specification in Column (6). Comparing estimates across panels, it is clear that conditional on national time varying race and education controls, the proxy which takes advantage of occupation variation is more highly correlated with observed relative wages than that which relies on industry and demographic variation in wages. In particular, when year by race fixed effects are added in column (4), the coefficient on the proxy in Panel A drops substantially in magnitude and the standard error doubles. The estimate does not recover when year by education group fixed effects or controls are added. This suggests that there may not be enough variation within race and education groups in wage growth by industry to be able to generate a significant correlation with observed relative wages net of the time-varying fixed effects. Another thing to note is that the coefficients are not very different between the dynamic occupation-industry proxy and the static occupation-industry. Nonetheless, the standard errors are lower (by 11%) and the coefficients are higher (by 5%) for the dynamic occupation-industry proxy, suggesting that adding the dynamic updating of shares is helping increase the correlation between the proxy and observed wages.

Table A.2: Correlation with Observed Wages: Bridge with Other Variation

	(1)	(2)	(3)	(4)	(5)	(6)
A: Variation by demographic-industry						
ln Rel. Wage Option	0.862***	0.398***	0.291***	0.146	0.161	0.177*
	(0.039)	(0.066)	(0.039)	(0.092)	(0.099)	(0.093)
Partial R-Squared	0.636	0.092	0.079	0.010	0.013	0.017
Obs	1064	1064	1064	1064	1064	1064
	(1)	(2)	(3)	(4)	(5)	(6)
B: Variation by occupation-industry						
ln Rel. Wage Option	0.980***	0.508***	0.424***	0.552***	0.559**	0.568**
	(0.087)	(0.106)	(0.055)	(0.111)	(0.235)	(0.215)
Partial R-Squared	0.300	0.073	0.084	0.159	0.025	0.026
Obs	1064	1064	1064	1064	1064	1064
C: Add dynamic shares						
ln Rel. Wage Option	0.897***	0.452***	0.409***	0.524***	0.592***	0.592***
	(0.074)	(0.099)	(0.050)	(0.100)	(0.201)	(0.192)
Partial R-Squared	0.252	0.069	0.094	0.172	0.038	0.037
Obs	1064	1064	1064	1064	1064	1064
StandYr FE	No	Yes	Yes	Yes	Yes	Yes
StEdRace FE	No	Yes	Yes	Yes	Yes	Yes
YrEd FE	No	No	No	No	Yes	Yes
YrRace FE	No	No	No	Yes	Yes	Yes
YrState FE	No	No	Yes	Yes	Yes	Yes
Controls	No	No	No	No	No	Yes

Sources: Proxy: 1970 decennial census, 1980 - 2011 March CPS, Wages: 1980-2000 decennial censuses, 2010 ACS. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01

A. 1.5 Employment Growth of Occupations Within Industries

This section expands upon the discussion of the over-time updating of the proxy in Section4 by providing a concrete example of the updating process. For illustration, I focus the discussion to the example of management, but the discussion is easily extended to other occupations. First, in Column (1) I present the share of the occupation in each industry in 1970. Focusing on management, this term varies from 4.7% in low-tech manufacturing to 30% in agriculture, reflective of the varying tasks across the industries. Columns (2)-(3) present $\pi^W_{oj,2010}$ and $\pi_{o,2010}$. Looking within column (2), it is apparent that management was increasing its share in most industries, which is reflected in the national average growth of 21% in column (3). Relating to the proxy, I define the final shock to an occupation as the ratio of columns (2) and (3). Mechanically, then the re-defined shock to employment in an occupation-industry cell, π^{W*}_{ojt}, is driven by the growth above the national average, which may be interpreted as the industry-specific shock to demand for the set of tasks encompassed by the occupation.

Table A.3: Growth Rate of Management across Industries

	Share (%)	Within Growth	Natl. Occ. Growth
Agriculture	29.8	1.4	1.2
Mining	4.9	2.0	1.2
Construction	7.9	1.5	1.2
Low Tech Manuf.	4.7	1.9	1.2
Basic Tech Manuf.	5.3	2.3	1.2
High Tech. Manuf.	6.4	2.2	1.2
Transportation	6.4	1.2	1.2
Communication	7.7	1.7	1.2
Utilities	5.4	2.1	1.2
Wholesale Trade	13.2	0.6	1.2
Retail Trade	12.7	0.5	1.2
Finance	17.4	1.2	1.2
Business and Repair	9.5	1.4	1.2
Personal Services	6.9	1.4	1.2
Entertainment	19.0	0.7	1.2
Professional Services	6.4	1.3	1.2
Public Administration	9.5	0.9	1.2
Total	10.2	1.4	1.2

Management was the occupation with the most males in 1970. The growth of the occupation (industry) is the percent growth in employment of the occupation-industry (industry) cell from 1970 to 2010. Net growth is the difference between occupational growth and industry growth. Share is the percent of the industry employed in that occupation. Weighted by census person weights. Source: Census 1970 - 2000, ACS 2010.

Table A.4: Growth Rate of Administrative Support across Industries

	Share (%)	Within Growth	Natl. Occ. Growth
Agriculture	3.8	1.6	0.8
Mining	9.7	0.8	0.8
Construction	7.0	0.9	0.8
Low Tech Manuf.	9.3	1.0	0.8
Basic Tech Manuf.	13.9	0.8	0.8
High Tech. Manuf.	16.7	0.6	0.8
Transportation	18.9	1.1	0.8
Communication	44.5	0.5	0.8
Utilities	19.3	0.9	0.8
Wholesale Trade	22.4	0.9	0.8
Retail Trade	11.9	1.0	0.8
Finance	50.0	0.7	0.8
Business and Repair	27.3	0.6	0.8
Personal Services	5.3	2.5	0.8
Entertainment	11.8	0.8	0.8
Professional Services	18.6	0.8	0.8
Public Administration	40.3	0.6	0.8
Total	19.4	0.9	0.8

Administrative support was the occupation with the most females in 1970. The growth of the occupation (industry) is the percent growth in employment of the occupation-industry (industry) cell from 1970 to 2010. Net growth is the difference between occupational growth and industry growth. Share is the percent of the industry employed in that occupation. Weighted by census person weights. Source: Census 1970 - 2000, ACS 2010.

A. 1.6 The Role of Migration

In Table A.5 I explore the relevance of migration in producing the estimated effects on marriage, beginning in Column (1) in which I analyze the binary outcome indicating having moved states in the last 5 years. Note that this variable is only available from 1980 to 2000 in the Census, so the number of observations is reduced.[65] The coefficient implies that a 10% increase in relative wages leads to a 1.7 percentage point increase in the share of women that have moved states in the last five years, a 13% effect relative to the mean. In the next column, I show the effect of relative wages on the probability of being never married among the population for which I have information about moving. The effect size is similar, albeit smaller, than the estimate for the whole sample.

In the subsequent columns, (3)-(5), I check how the marital status of the incoming women might contribute to the impact on marriage. To prevent concerns of endogenous stratification, the outcomes are a combination of migration status and marriage status, and therefore the coefficients should be interpreted as the combined effect on both outcomes. I find that higher relative wages leads to a greater probability of having moved in the last five years and never having married as well as a higher probability of having moved in the last five years and being divorced. The effects are large relative to the mean; for example, a 10% increase in relative wages leads to a 1 p.p. increase in never-married women that have moved, a 50% increase. Nonetheless, this channel accounts for only a quarter of the estimated effect on the probability of being never married, a similar proportion of the divorce estimate, and little of the overall effect on marriage.[66] In the final columns, I show the respective effects of relative wages on the probability of being married/never-married/divorced and not having moved. I find a large decline in marriage in rise in the probability of being never married among the "stayers," which is additional evidence that migration is not driving the effects.

[65] In 2010, the ACS asks respondents about migration in the last year, but not in the last 5 years.

[66] These proportions are calculated relative to the average coefficients for the sample for which there is information on migration in the last 5 years (i.e the 1980, 1990, and 2000 censuses). The coefficients are available on request.

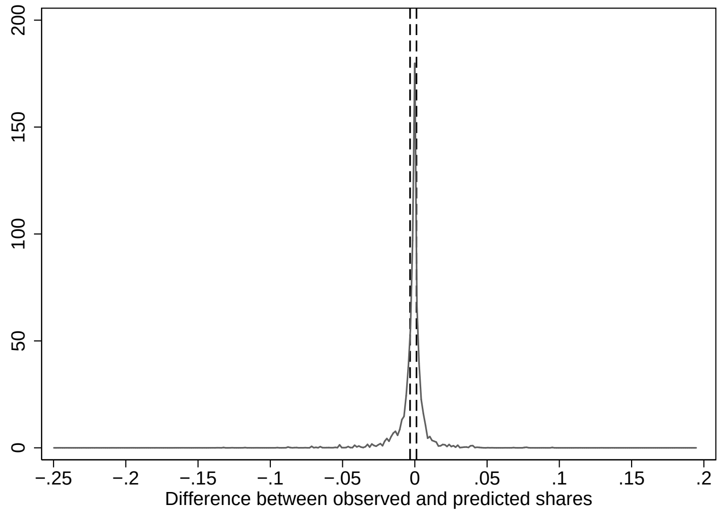
Table A.5: Impact of Relative Wage Options on Moving States

			Moved States in last 5 Yrs. and			Did Not Move States in last 5 Yrs. and		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Moved States	Never Married	Married	Never Married	Divorced	Married	Never Married	Divorced
ln Rel. Wage Option	0.182**	0.337***	0.022	0.117***	0.040**	-0.470***	0.221**	0.059
	(0.085)	(0.100)	(0.079)	(0.036)	(0.020)	(0.092)	(0.091)	(0.062)
Mean Y	0.126	0.210	0.083	0.029	0.013	0.594	0.181	0.091
R-Squared	0.814	0.899	0.763	0.650	0.375	0.884	0.898	0.708
Obs	17681	17681	17681	17681	17681	17681	17681	17681
Average Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading. Weighted by female population in cell. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010.

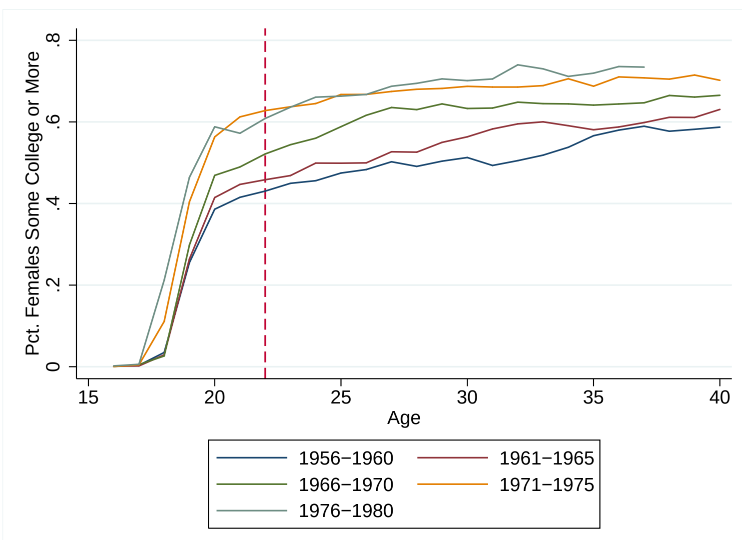
A. 1.7 Further Tables and Figures

Figure A.1: Difference between Actual $\frac{E^g_{oj\mu t}}{E^g_{\mu t}}$ and Prediction, 1970



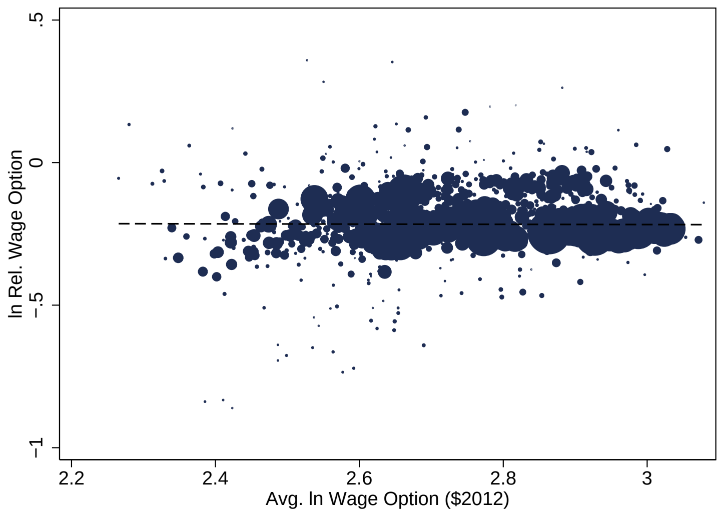
Notes: This figure presents the difference between the actual shares in each occupation and industry, $\frac{E^g_{oj\mu t}}{E^g_{\mu t}}$ and the prediction $E^g_{\mu t}{}^B * \widehat{E^g_{\mu t}{}^W}$, where $\widehat{E^g_{\mu t}{}^W} = \frac{E^g_{oj,\mu,national,1970}}{E^g_{\mu j,national,1970}}$. See text for details. Source: 1970 Census

Figure A.2: Check Some College Attainment: Females with some college or more, by cohort and age



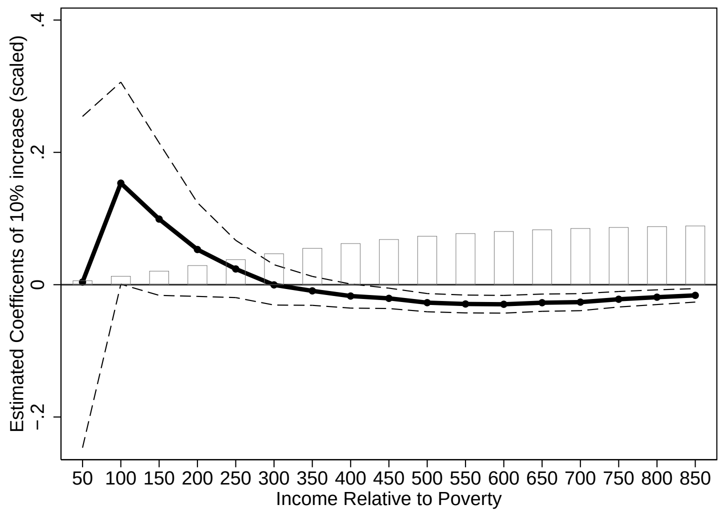
Notes: Population age 15-40. Source: March Annual Demographic files 1977-2012.

Figure A.3: Correlation between Average Outside Options and Relative Outside Options Across Marriage Markets, 1980-2010



Notes: This figure presents the correlation between the constructed proxy for average wage options and relative wage options in a marriage market from 1980 to 2010. The population of the cell is reflected in the cell size. The best fit regression line, weighted by cell size, is also included. In a regression analysis, the slope of the line is shown to be -0.004 with a standard error of 0.012. See text for details. Sources: 1970-2000 Censuses, 2010 ACS; 1980 - 2011 March CPS.

Figure A.4: Distributional Effects of Relative Wage Options on Family Income, Replication of Census



Notes: This figure shows the coefficients from a series of regressions of indicators of an income relative to poverty $\leq$ k (k $\in$ 50, 100...850) on relative wage options and average wage options. Income relative to poverty is constructed to replicate the Ipums-provided measure using family income, family size, and age of head, and ranges from 1 to 900. The coefficients have been scaled by the mean of the independent variable. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Sources: Proxy: 1970 decennial census, 1980 - 2011 March CPS, Marriage: 1980-2000 decennial censuses and 2010 ACS.

Table A.6: Growth of Occupations with the Highest Share of Males

	Share of Male	Growth 1970-2010
Management	11.9	131.0
Engineers and scientists	4.1	158.3
Sales	7.3	145.9
Admin. Support	8.2	59.5
Mechanical/Electronic Repair	7.2	26.9
Construction Trades	6.2	59.0
Metal/Wood Work	6.0	-26.1
Misc. Operator	7.1	-49.0
Vehicle Operator	6.4	48.5
Construction, Mover	7.0	43.1
Total	7.2	59.7

Share of male is calculated the number of females in the occupation relative to the total number of employed males in 1970. The growth of the occupation is the percent change in the total occupational employment from 1970 to 2010. Weighted by census person weights. These occupations account for the majority of workers, 71.4% of male workers in 1970. Source: Census 1970 - 2000, ACS 2010.

Table A.7: Growth of Occupations with the Highest Share of Females

	Share of Fem	Growth 1970-2010
Physicians/Nurses	3.7	300.1
Health Asst.	4.6	309.2
Teacher/Social Wkr.	9.1	192.9
Sales	9.5	145.9
Admin. Support	35.5	59.5
Cleaning Services	4.7	42.7
Food Service	6.7	182.7
Textile Machine Operator	5.5	-74.1
Misc. Operator	4.7	-49.0
Assemblers	3.5	-12.5
Total	8.8	109.7

Share of female is calculated as the number of females in the occupation relative to the total number of employed females in 1970. The growth of the occupation is the percent change in the total occupational employment from 1970 to 2010. Weighted by census person weights. These occupations account for the majority of workers, 87.4% of female workers in 1970. Source: Census 1970 - 2000, ACS 2010.

Table A.8: Occupation Groups in Census

1. Management
2. Engineers and scientists
3. Other technicians
4. Physicians/Nurses
5. Health assistants
6. Teachers and social workers
7. Lawyers and judges
8. Entertainment
9. Sales
10. Administrative support
11. Cleaning services
12. Other personal service
13. Protective services
14. Food service
15. Farm and forestry workers
16. Mechanical and electronic repair
17. Construction trades
18. Mining extraction
19. Metal or wood work or calibrators
20. Plant operator
21. Metal work operator
22. Textile work
23. Misc machine operator
24. Assemblers/fabricators
25. Vehicle operators
26. Construction, movers
27. Financial specialists
28. Management support

Table A.9: Correlation of Proxy with Observed Wages: Sensitivity to Controls

	(1)	(2)	(3)	(4)	(5)	(6)
A: Relative						
ln Rel. Wage Option	0.897***	0.452***	0.409***	0.524***	0.592***	0.592***
	(0.074)	(0.099)	(0.050)	(0.100)	(0.201)	(0.192)
Partial R-Squared	0.252	0.069	0.094	0.172	0.038	0.037
Obs	1064	1064	1064	1064	1064	1064
B: Female						
Female ln Wage Option	1.025***	1.710***	2.274***	2.189***	0.785***	0.578***
	(0.009)	(0.333)	(0.391)	(0.294)	(0.165)	(0.155)
Partial R-Squared	0.919	0.111	0.248	0.299	0.089	0.059
Obs	1064	1064	1064	1064	1064	1064
C: Male						
Male ln Wage Option	0.920***	1.951***	1.942***	1.932***	0.908***	0.565***
	(0.012)	(0.119)	(0.114)	(0.111)	(0.220)	(0.181)
Partial R-Squared	0.920	0.483	0.727	0.799	0.120	0.053
Obs	1064	1064	1064	1064	1064	1064
StandYr FE	No	Yes	Yes	Yes	Yes	Yes
StEdRace FE	No	Yes	Yes	Yes	Yes	Yes
YrState FE	No	No	Yes	Yes	Yes	Yes
YrRace FE	No	No	No	Yes	Yes	Yes
YrEd FE	No	No	No	No	Yes	Yes
Controls	No	No	No	No	No	Yes

Each panel shows the regressions from a different "first stage", where the dependent variable is the observed wage indicated in the panel title. Sources: Proxy: 1970 decennial census, 1980 - 2011 March CPS, Wages: 1980-2000 decennial censuses, 2010 ACS. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01

Table A.10: Impact of Relative Wage Options on Single Earners in the Household

	Fem. Sing. Earner			Male Sing. Earner		
	(1) All	(2) Unmarr.	(3) Marr.	(4) All	(5) Unmarr	(6) Marr.
ln Rel. Wage Option	0.246**	0.228***	0.018	-0.204***	-0.033**	-0.171***
	(0.109)	(0.074)	(0.048)	(0.055)	(0.015)	(0.050)
Mean Y	0.221	0.156	0.065	0.107	0.007	0.100
R-Squared	0.700	0.693	0.429	0.712	0.324	0.736
Obs	23608	23608	23608	23608	23608	23608
Average Wage	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010.

Table A.11: Impact of Relative Wage Options on Single Parenthood - By Migration

	Single Mom		
	(1)	(2)	(3)
	All	And Did Not Move	And Moved States
ln Rel. Wage Option	0.221***	0.268***	0.011
	(0.075)	(0.060)	(0.019)
Mean Y	0.116	0.095	0.009
R-Squared	0.732	0.811	0.284
Obs	23608	17720	17720
Average Wage	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010.

Table A.12: First-Differenced Estimates: Impacts of Relative Wage Options on Marriage

	(1)	(2)	(3)
	Married	Divorced	Never Married
D.ln Rel. Wage Option	-0.425***	0.102	0.311***
	(0.123)	(0.074)	(0.108)
D.Avg. ln Wage Option	1.343***	-0.628***	-0.685***
	(0.148)	(0.073)	(0.117)
Mean Y	0.095	0.061	-0.162
R-Squared	0.750	0.158	0.790
Obs	9891	9891	9891

Notes: Women age 22-44. The dependent variable is shown in the column heading. State x year, education x year, race x year, cohort x year, and year fixed effects included. Controls for female and male educational attainment and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.

Table A.13: Robustness of Impacts to Dropping Salient Subgroups

	(1) Marr.	(2) Nev. Marr.	(3) Sp. More Ed.	(4) Hrs. Work	(5) Fert.	(6) Sngl. Mom	(7) Poverty
A: Drop: Black HS							
ln Rel. Wage Option	-0.467***	0.282***	0.461***	7.154***	0.009	0.253***	0.264**
	(0.082)	(0.051)	(0.113)	(2.053)	(0.033)	(0.069)	(0.112)
Obs	19894	19894	19379	19691	19894	19894	19883
B: Drop: Black College							
ln Rel. Wage Option	-0.602***	0.472***	0.385***	10.125***	0.019	0.342***	0.295***
	(0.091)	(0.085)	(0.116)	(2.618)	(0.035)	(0.073)	(0.109)
Obs	19885	19885	19269	19600	19885	19885	19865
C: Drop: White HS							
ln Rel. Wage Option	-0.209**	0.399***	0.263**	6.637**	0.090*	0.029	0.105
	(0.093)	(0.109)	(0.112)	(2.718)	(0.047)	(0.085)	(0.109)
Obs	19011	19011	18141	18698	19011	19011	18987
D. Drop: White College							
ln Rel. Wage Option	-0.252**	0.310***	0.260**	7.304***	0.064	0.062	0.024
	(0.104)	(0.107)	(0.119)	(2.251)	(0.048)	(0.091)	(0.087)
Obs	19008	19008	18116	18689	19008	19008	18983
Average Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.

Table A.14: Effects of Relative Wage Options on Marriage of Older Women

	(1) Married	(2) Divorced	(3) Never Married
ln Rel. Wage Option	-0.205	0.251**	-0.040
	(0.153)	(0.096)	(0.079)
Mean Y	0.688	0.152	0.062
R-Squared	0.724	0.667	0.639
Obs	15542	15542	15542
Average Wage	Yes	Yes	Yes

Notes: Women age 50-70. The dependent variable is shown in the column heading. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.

Table A.15: Impact of Relative Wage Options on Family Income Relative to Poverty Threshold, Interaction with Education

	Income Relative to Poverty				
	(1)	(2)	(3)	(4)	(5)
	0-100	101-200	201-300	301-400	401-500
Rel. Wage Option x Low Skill	0.255**	-0.107*	-0.192**	-0.111	0.151*
	(0.116)	(0.059)	(0.093)	(0.072)	(0.080)
Rel. Wage Option x High Skill	0.122	0.168	-0.112	-0.164*	-0.010
	(0.153)	(0.127)	(0.135)	(0.094)	(0.137)
Mean Y	0.135	0.171	0.188	0.164	0.341
R-Squared	0.845	0.744	0.531	0.555	0.923
Obs	23583	23583	23583	23583	23583
Average Wage	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading; AFDC/TANF/SSI is an indicator for receiving any assistance from AFDC/TANF/SSI in 1980-1990 and for any assistance from AFDC/TANF from 2000-2010. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy interacted with education, female and male educational attainment, and the sex ratio at the cell level also included. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010.

Table A.16: Impact of Relative Wage Options on Family Income (Census)

	Family Income				
	(1)	(2)	(3)	(4)	(5)
	l(F inc)	Q1	Q2	Q3	Q4
ln Rel. Wage Option	-0.534*	0.437***	-0.269***	-0.222***	0.054
	(0.306)	(0.124)	(0.067)	(0.078)	(0.061)
Mean Y	10.361	0.270	0.244	0.243	0.243
Mean Y - Low Skill	10.029	0.367	0.265	0.223	0.145
Mean Y - High Skill	10.600	0.201	0.229	0.257	0.313
R-Squared	0.942	0.866	0.468	0.597	0.874
Obs	23562	23581	23581	23581	23581
Average Wage	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading; AFDC/TANF/SSI is an indicator for receiving any assistance from AFDC/TANF/SSI in 1980-1990 and for any assistance from AFDC/TANF from 2000-2010. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy, female and male educational attainment, and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010.

Table A.17: Impact of Relative Wage Options on Family Income, Interaction with Education

	Family Income				
	(1)	(2)	(3)	(4)	(5)
	l(F inc)	Q1	Q2	Q3	Q4
Rel. Wage Option x Low Skill	-0.544*	0.542***	-0.344***	-0.261**	0.062
	(0.323)	(0.148)	(0.082)	(0.100)	(0.073)
Rel. Wage Option x High Skill	-0.618	0.220	-0.087	-0.131	-0.002
	(0.439)	(0.170)	(0.132)	(0.113)	(0.146)
Mean Y	10.361	0.270	0.244	0.243	0.243
Mean Y - Low Skill	10.029	0.367	0.265	0.223	0.145
Mean Y - High Skill	10.600	0.201	0.229	0.257	0.313
R-Squared	0.942	0.866	0.469	0.597	0.875
Obs	23562	23581	23581	23581	23581
Average Wage	Yes	Yes	Yes	Yes	Yes

Notes: Women age 22-44. The dependent variable is shown in the column heading; AFDC/TANF/SSI is an indicator for receiving any assistance from AFDC/TANF/SSI in 1980-1990 and for any assistance from AFDC/TANF from 2000-2010. Education x race x state, state x year, education x year, race x year, cohort x year, and year fixed effects included in all specifications. Controls for average log wage proxy interacted with education, female and male educational attainment, and the sex ratio at the cell level also included. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: Census 1980, 1990, 2000, and ACS 2010.

Table A.18: First Differenced Estimates: Impacts of Relative Wage Options on Income Relative to Poverty

	Income Relative to Poverty				
	(1)	(2)	(3)	(4)	(5)
	0-100	101-200	201-300	301-400	401-500
D.ln Rel. Wage Option	0.422***	-0.269*	-0.428***	-0.138	0.412***
	(0.141)	(0.146)	(0.117)	(0.083)	(0.132)
D.Avg. ln Wage Option	-0.264	0.399***	0.260**	-0.209**	-0.169
	(0.161)	(0.139)	(0.101)	(0.080)	(0.145)
Mean Y	-0.016	-0.025	-0.029	-0.006	0.076
R-Squared	0.284	0.181	0.191	0.155	0.536
Obs	9877	9877	9877	9877	9877

Notes: Women age 22-44. State x year, education x year, race x year, cohort x year, and year fixed effects included. Controls for female and male educational attainment and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.

Table A.19: First Differenced Estimates: Impacts of Relative Wage Options on Income Relative to Poverty

Interaction with Change in Male Income

	Income Relative to Poverty				
	(1)	(2)	(3)	(4)	(5)
	0-100	101-200	201-300	301-400	401-500
D. Rel. Wage x Q1 of D. Male Wage	0.468***	-0.336**	-0.445***	-0.088	0.398**
	(0.139)	(0.163)	(0.136)	(0.090)	(0.156)
D. Rel. Wage x Q2 of D. Male Wage	0.385**	-0.133	-0.384***	-0.239**	0.366**
	(0.184)	(0.150)	(0.135)	(0.096)	(0.145)
D. Rel. Wage x Q3 of D. Male Wage	0.164	-0.059	-0.295*	-0.276**	0.486**
	(0.195)	(0.163)	(0.157)	(0.122)	(0.220)
D. Rel. Wage x Q4 of D. Male Wage	0.298*	-0.176	-0.331**	-0.151	0.378**
	(0.176)	(0.183)	(0.124)	(0.094)	(0.162)
Mean Y	-0.016	-0.025	-0.029	-0.006	0.076
R-Squared	0.283	0.180	0.191	0.156	0.536
Obs	9877	9877	9877	9877	9877

Notes: Women age 22-44. The dependent variable is shown in the column heading. Quartile of growth is defined separately for each year. State x year, education x year, race x year, cohort x year, and year fixed effects included. Controls for female and male educational attainment and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.

Table A.20: Sensitivity to Dropping States with Large Share (over 30%) of Men Employed in Manufacturing

	Income Relative to Poverty				
	(1)	(2)	(3)	(4)	(5)
	0-100	101-200	201-300	301-400	401-500
ln Rel. Wage Option	0.185*	-0.024	-0.151*	-0.089	0.080
	(0.104)	(0.063)	(0.080)	(0.059)	(0.073)

Notes: Women age 22-44. The dependent variable is shown in the column heading. States where the share of men employed in basic manufacturing in 1970 exceeded 30% not included (Michigan, Ohio, Indiana, Wisconsin, Pennsylvania, Illinois). State x year, education x year, race x year, cohort x year, and year fixed effects included. Controls for female and male educational attainment and the sex ratio at the cell level also included. Weighted by female population in cell. Standard errors clustered at the state level. * p<0.10, ** p<0.05, *** p<0.01. Source: March CPS 1980, 1990, 2000, 2010.