Gender Composition in the Workplace and Marriage Rates*

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Abstract.

Theoretical models have ambiguous predictions on how workplace gender composition affects the incidence of marriage. Marital search theory suggests that having more opportunities for interactions between members of the opposite gender increases the likelihood of marriage. Yet, according to overload choice theory, people with more options could actually delay or forgo marriage if the increase in the number of choices makes it more difficult for them to make marriage decisions. I explore how changes in the gender composition within occupation and industry over the past 40 years affect marriage decisions. I find that a higher share of opposite gender coworkers within a person's occupation-industry is associated with a decreased likelihood of ever having been married.

Keywords: Workplace gender composition · Marriage · Overload choice theory

JEL Classification: J12

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1 Introduction

The workplace is one of the most common places for people to meet a potential marital partner. In the United States, nearly 22% of married people met their spouses at work (Rosenfeld and Thomas 2012). As female labor force participation rates have increased (Goldin et al. 2006), and women have increasingly pursued careers in traditionally male occupations (Fry and Stepler 2017), the opportunities for workplace interactions between women and men have been increasing. This paper examines how marriage decisions are influenced by the gender makeup of the workplace.

From a theoretical perspective, it is unclear how an increase in the share of workers of the opposite gender in the workplace will impact the likelihood of heterosexual marriage.[1] Marital search theory predicts that more opportunities to interact with members of the opposite sex yield an increased likelihood of marriage (Becker 1981; Oppenheimer 1997; Burdett and Cole 1999; Shimer and Smith 2000; Smith 2006). However, overload choice theory (e.g., Iyengar and Lepper 2000; Schwartz 2004) suggests that more options could actually produce the opposite outcome as people may choose to defer or delay marriage, believing they can find a better match in the future.

Empirically, a substantial number of studies has considered how marriage rates are affected by an unequal gender composition using variation either across geography or across different demographic groups, where geographical changes can be at the nation level (Cox 1940; South and Lloyd 1992) or local level (Fossett and Kiecolt 1990, 1993), and where differences across demographic groups are across immigrant groups (Angrist 2002; Lafortune 2013) or college majors (Pestel 2017).[2]

[1] While same-sex marriages are legal in the U.S. in all fifty states, only 0.4% of all marriages in 2016 are same-sex marriages (Brown 2017).

[2] Despite different settings, all of these studies conclude that gender composition impacts marriage decisions, albeit in different ways. Cox (1940) and South and Lloyd (1992) find that a higher share of men increases marriage

To my knowledge, only one other paper examines the effect of imbalanced sex ratios in the workplace on the likelihood of partnership. Using data from Denmark, Svarer (2007) concludes that workplace gender composition does not affect the overall rates of partnership formation.[3] However, he also finds that among those married, the larger the share of coworkers of the opposite gender, the higher the likelihood that they are partnered with a coworker suggesting that people do search for partners in the workplace. Both of these results may be difficult to interpret causally because people may choose where to work based on their marriage intentions, or alternatively, based on third factors that happen to be correlated with marriage intentions. For example, women who work in male-dominated firms might have more career ambition or economic independence, while those who want to build families may choose jobs with more flexibility and family-friendly policies.

In a related paper, McKinnish (2007) examines how opportunities to encounter potential new spouses at work affects the likelihood of divorce among already married workers. She addresses the endogeneity concerns discussed above by focusing, not on sex ratios within a particular workplace, but instead on sex ratios within occupation-industry cells. While her measure does not accurately quantify the number of potential spouses in particular establishments, it suffers less from reverse causality and omitted variable bias to the extent that it is easier to change workplaces, in response to marriage-related preferences than it is to change occupation and industry. In order to estimate causal impact, she estimates models with industry fixed effects and occupation fixed effects thereby exploiting variation in sex ratios (in occupation-industry cells) among people working in the same occupation but across different

rates for women, while little to no effect for men. Fossett and Kiecolt (1990) find that a higher percentage of black men increases marriage rates for black women in the community in non-metropolitan Louisiana, while a larger share of black women decreases marriage rates for black men in the community. On the other hand, Angrist (2002) notes that higher proportion of men in a country of origin group increases marriage rates for both men and women. In a recent study, Pestel (2017) documents that a higher ratio of own-gender in a person's field of study is associated with a higher probability of being married for men but a lower probability for women after graduation.

[3] Svarer (2007) uses partnership to refer to both marriage and cohabitating couples.

industries. While concerns about endogeneity bias are mitigated in McKinnish's identification strategy relative to simply focusing on sex-ratios within the same establishment, there are still reasons to be concerned if, for example, among workers in the same occupation, preferences regarding industry of employment are systematically correlated with preferences related to divorce. For instance, if females working as engineers in the finance industry (an industry with relatively few females) have stronger divorce preferences than female engineers working in the fashion industry (an industry with more females), for reasons unrelated to workplace composition, then the estimates using McKinnish's identification strategy will be biased.

This study makes several contributions to McKinnish's analysis. First, like Svarer (2007), I consider union formation, specifically, marriage – instead of divorce. Second, and perhaps more importantly, instead of exploiting variation across industries within the same occupation in gender composition in a given year, I exploit variation in gender composition within occupation-industry cells over time. This setting enables me to identify whether an increase in the share of female employees in an occupation-industry cell affects the likelihood of marriage. In other words, it compares marriage probabilities for a male engineer working in the finance industry in 1980 to another male engineer who working in the same industry in the 2000, given the change in the number of female engineers employed in finance over that period. This identification strategy allows marriage-related preferences to influence one's occupation and industry choices, but exploits variation over time in gender composition of occupation-industry cells.

This paper uses data from the 5 percent public use samples of the 1980, 1990, and 2000 U.S Censuses, along with the 2006-2010 5-year American Community Survey (ACS) to determine the percentage female in each occupation-industry cell studied. The variation in this percentage over time within each occupation-industry is then used to examine the impact of

changing gender composition on the probability of ever having been married for males and females separately.

The main finding of this paper is that the gender composition in the workplace influences individuals' marital choices. The evidence suggests that an increase of one percentage point in the share of own-gender coworkers in a person's occupation-industry increases the probability of being married by 0.09 percentage points for women. For men, an increase of one percentage point in the share of female colleagues in the occupation-industry decreases the likelihood of marriage by 0.05 percentage points. These findings align with overload choice theory, suggesting that people who are exposed to more people of the opposite gender on the job may defer or forgo marriage perhaps believing that better options may present themselves in the future.

The remainder of this paper is structured as follows. Section 2 reviews previous literature. Section 3 describes the data. Section 4 presents the identification strategy, and section 5 describes the baseline results and robustness checks. Sections 6 discusses additional checks. A conclusion and some further discussions are presented in section 7.

2 Theoretical Relationship between Workplace Gender Composition and Marriage

In Becker's marriage model (1981), people choose to marry if others can provide something they want or need (e.g. income, housework, reproduction, etc.). He argues that a change in the gender composition of a marriage market (as defined by age, geography, social status, etc.) affects marriage rates. For instance, when men start outnumbering women in a marriage market, the demand for wives increases and this increases the odds that marriage-minded women will find a partner. Oppenheimer (1988) utilizes the ideas of job-search theory to analyze the "marriage matching process," contending that a rational individual who searches

for a spouse accepts a given proposal if the expected value of entering the marriage is greater than that of remaining single. In her framework, if women/men are scarce in a marriage market, it is more likely they will find a potential spouse with a quality at or above their reservation level relatively quickly as more options are available during the mate-selection process. The fundamental idea of Oppenheimer's marital searching theory is that there are large amounts of available proposals for a given marriage seeker, but only on of the given proposals presents a "perfect" match.

Marriage market participants may search for spouses on the job for several reasons. First, on-the-job search implies that an individual will not need to pay out of pocket costs of dating (either for the dates themselves or preparing for the dates by purchasing a new outfit). Second, the time costs of going on dates in order to get to know potential spouses is lower when dating a coworker. Third, because people are exposed to coworkers on the job, they may find an attractive potential partner even without actively searching for a spouse.

If it is true that many marriage market participants either actively or implicitly search for potential spouses at work, then Oppenheimer's (1988) theory suggests that the more exposure participants have to opposite-sex coworkers, the easier it will be to find a potential spouse. In a related paper, Mansour and McKinnish (2014) study whether preferences or lower search costs explain why there are so many same occupation couples. They find that lower search costs within occupation is the primary reason individuals marry within their occupations so often. Furthermore, Angrist (2002) argues that when men outnumber women in a marriage market, women are able to attract higher quality men given their enhanced female bargaining power in the marriage market.

While marital search theory suggests that more opportunities to interact with members of the opposite gender increase the odds of marrying, recent literature on overload choice theory argues that as choices increase, people may have difficulty managing them (e.g. Iyengar

and Lepper 2000; Schwartz 2004). This theory considers the relationship between the number of alternatives and the actual choices people make, arguing that a surfeit of choices leads to a decrease in people's desires to make a decision. There are several reasons why an abundance of choice may lead to demotivation. Iyengar et al. (2006) claim that variety of options make an exhaustive comparison of all options which could induce a fear of making a choice. Similarly, Todd et al. (2007) suggest that more options are likely to make the process of making a choice more difficult. Further, Liu et al. (2008) argue it is difficult to justify the choice of any particular option because the most attractive options become more similar as the number of choices increase.

Based on this theory, increasing the pool of potential mates in the workplace could complicate the selection process, and accordingly will, lead people to avert or delay marriage. Consistent with this idea, Turkle (2016) uses online dating data to study overload choice theory, finding that an abundance of potential partners available online reduces an individual's commitment to marriage.

3 Data

This analysis uses data drawn from a 5 percent sample of 1980, 1990, and 2000 U.S. Census data and from a 5-year sample of the 2006-2010 American Community Survey (ACS), which were downloaded from the Integrated Public Used Microdata Series (IPUMS) (Ruggles et al. 2020). These are nationally representative surveys providing comprehensive information about U.S. population characteristics, including industry of employment and occupation, demographics, and other socioeconomic characteristics. This section describes the overall gender variation in the labor market and follows with a brief description of changes in marriage rates over the past three decades.

3.1 Gender Composition in Occupation-Industry

Following McKinnish (2007), this paper measures gender composition in occupation-industry groups. In order to make occupation-industry combinations consistent and comparable across the selected analysis period, I use the IPUMS-provided consistent classification of occupations and industries based on the 1990 coding scheme. In cases where an occupation or industry is not available in all four data sets, I drop the combination from the analysis.[4] The analysis further restricts the sample to occupation-industry cells that have at least 50 employees and at least 5 male workers and 5 female workers with wages in the range of $2-$200/hour. These restrictions are made because occupation-industry cells containing only a few individuals and higher wage variation are subject to more measurement error. Females included in the sample are ages 18-38 and males are ages 20-40, the age groups when marriages are most likely to occur.[5] Additionally, because I measure local marriage markets using information at the metropolitan statistical area (MSA) level, I drop individuals who either do not reside in an MSA or do not report it. Finally, the sample also excludes institutionalized, agricultural, and non-wage workers. In total, the sample consists of 178 industry categories and 249 occupation categories, generating a total of 1878 occupation-industry cells.

Table 1 shows the share of female workers within occupation-industries by year for the years between 1980 and 2010. As can be seen in the table, the percentage of female employees in occupation-industry cells in which the median male workers worked increased from 18% in 1980 to approximately 26% in 2010. In contrast, the percentage of female workers in occupation-industry cells in which the median female employees worked decreased from 77% in 1980 to 73% in 2010. However, this substantial variation is not uniformly distributed across

[4] Some industries and occupations may be listed on the 1980 Census data but either disappear completely in later years or are split into several categories in the other samples. The inconsistent occupation-industry groups comprise only about 7.6% of the total sample.

[5] Angrist (2002) uses men aged 20-35 and women aged 18-33 in his analysis using data from 1910, 1920, and 1940 Census. This study extends the "marriage age" category by 5 years for each gender to the older ages of first marriage in order to be consistent with marriage patterns in more recent decades.

all occupation-industries. As shown in the Table 1, 5% of men worked in occupation-industries that were 1% female in 1980, and this figure was the same in 2010. This indicates that male-dominant workplaces have remained predominantly male and female-dominant workplaces have remained predominantly female, even after 30 years.

Figure 1 indicates the share of female employees in 1980 and average changes from 1980 to 2010 among the 10 occupation-industry groups that had the greatest increase in the share of female workers. As shown in the Figure 1, the "personnel, HR, training, and labor relations specialist" occupation in the motor vehicles and motor vehicle equipment industry experienced the largest increase in female workers among those 10 occupation-industry groups. It increased an average of 17 percent points in the past three decades. In addition, salespersons in the social services sector has shifted from being predominantly male to almost evenly balanced.

Figure 2 presents the same information but for the 10 occupation-industry groups with the greatest declines in the share of workers who are female. As shown in Figure 2, the "material recording, scheduling, production, planning, and expediting clerks" in the electrical goods sector moved from being predominantly female workers to having more male workers, though female workers are still the majority. Others, such as newspaper-publishing-industry's typesetters, apparel-industry's dressmakers, and textile-sewing-machine operators from the fabric mill industry remain predominantly female, though the share of female employees decreased dramatically.

3.2 Marriage Rates, Gender Composition and Occupation-industry

Ever-married individuals are defined as those who report being either married - spouse present, married - spouse absent, separated, divorced, or widowed. Table 2 presents ever-married rates conditional on the percentage of females in occupation-industry cells between 1980 and 2010. The table separates the share of female in the given occupation-industries as follows: less than

5 percent, 5-25 percent, 25-50 percent, 50-75 percent, 75-95 percent, and 95 percent and above. For both women and men, the overall numbers of individuals who had ever been married declined from 1980 to 2010. In general, for men, marriage rates decrease as the percentage of female coworkers increase in occupation-industries across all 4 sample years. For women, marriage rates have a U-shape as the number of female coworkers in an occupation-industry increased. Specifically, the marriage rates for women increase first until the share of female coworkers reached 25 percent, and then decrease between 25 percent and 95 percent female coworkers, and then increase again when occupation-industry groups are comprised of more than 95 percent females.

4 Empirical Strategy

The analysis uses variation in the percentage of female employees within occupation-industry combinations over time to estimate the impact of workplace interactions on the probability of ever having been married.

The baseline equation is the following:

$$Y_{ionmt} = \beta_0 + \beta_1 * ShareFem_{ont} + \beta_2 W'_{ont} + \beta_3 M'_{mt} + \beta_4 X'_{ionmt} + \tau_t + \delta_{on} + \varphi_m + \varepsilon_{ionmt} \quad (1)$$

where Y_{ionmt} is equal to one if person *i* who works in occupation *o* and industry *n* in year *t* has ever been married and zero otherwise. Specifically, it equals 1 if the person is married, divorced, separated, or widowed and zero if is single. The main variable of interest is $ShareFem_{ont}$, which represents the share of all marital age workers in the person's occupation-industry who are female. The vector W'_{ont} is a set of average wage controls at the occupation-industry level in year *t*.[6] The vector includes average hourly wages for both female and male workers, separately, and the logarithms of female and male hourly wage variance in

[6] Following McKinnish (2007), individual wage is a potential endogenous factor that may be related to one's marriage decision.

each occupation-industry in the corresponding year. The vector M'_{mt} contains time-varying metropolitan area specific controls including the number of female residents, the share of females who are employed, the mean male and female hourly wage and the logarithms of male and female wage variance in each metropolitan statistical area (MSA) at year *t*. The vector X'_i includes individual level characteristics such as age, age-squared, race dummies (Black, Asian, white, and other races), and education dummies (high school degree, some college degree, college degree, higher than a college degree, and others).

In addition, τ_t denotes year fixed effects and φ_m denotes metropolitan statistical area (MSA) fixed effects, and they control for unobserved factors that induce differences in marriage outcomes across years and MSAs. Most importantly for the analysis, δ_{on} denotes occupation-industry fixed effects. Adding occupation-industry fixed effects allows for the removal of any time-invariant unobserved characteristics of individuals who select into jobs with different gender distributions in ways that are correlated with their marriage preferences. By controlling for occupation-industry choice, I exploit only variation in gender composition within occupation-industry cells over time. Changing in the gender composition in different occupations and industries are difficult to predict at the start of people's careers. Moreover, switching occupations or industry is costly after a few years of investing in occupation and industry-specific human capital. For both these reasons, exploiting plausibly exogenous variation over time in the gender composition of a person's occupation-industry can yield arguably causal impacts of gender composition in the workplace on marriage decisions especially considering the extensive list of controls included in the model. The regression is estimated separately for women and men using linear probability models with standard errors clustered at the occupation-industry level. Table 3 shows summary statistics of the sample used in this analysis.

5 Empirical Findings

5.1 Baseline Results

The main regression results are in Table 4. Columns 1 and 2 show the results for females while columns 3 and 4 show the results for males. I start by estimating McKinnish's (2007) model with just the occupation fixed effects and industry fixed effects but using more years of data. The results, shown in column 1 for females, reveal that a higher share of female employees is positively associated with a woman's probability of being married. In particular, an increase in the share of female employees by one percentage point increases the likelihood of marriage by 0.08 percentage points for women. This implies that females are more likely to enter marriage when the own-gender share is larger in their occupation-industry. Column 2 replaces the occupation and industry fixed effects (included separately) with occupation-industry fixed effects. The results again suggest that a higher percentage of female coworkers increases the probability of being married for females, and the magnitude of the coefficient estimate is slightly larger. Specifically, a one percentage point increase in the share of own-gender coworkers in an occupation-industry cell raises a woman's probability of being married by 0.09 percentage points. Both of these results are in line with overload theory. An excess of own-gender in a woman's occupation-industry seems to lead women to worry more about availability of marriageable men, and as a result, women enter marriage more easily. The similarity of the estimates constructed from two very different sources of variation also provided some deal of comfort that they might be interpreted as causal.

Columns 3 and 4 display the results for males. Again, I show results from a model with occupation fixed effects and industry fixed effects in column 3 followed by one with occupation-industry fixed effects is shown in column 4. Both models predict that a higher share of female employees within an occupation-industry is associated with a significantly lower probability of being married for males, but this time, the magnitude is slightly smaller in model with occupation-industry fixed effects. In the model with occupation-industry fixed effects, the

results imply that a one percentage point higher share of women in occupation-industry decreases the probability of being married by 0.05 percentage point.

For both women and men, the results presented above are consistent with overload choice theory. As people are faced with more alternatives, they may have difficulty choosing one. Indeed, Schwartz (2004) argues that people become picky if the potential partners are surfeit, and therefore, less inclined to make any choice.

Apart from the main variable of interest, variables measuring the average wages in each occupation-industry cell suggest that in occupation-industries where women earn higher wages, both males and females are more likely to have ever been married at the time of the survey. Also, higher wage dispersion is negatively associated with the incidence of being married for both genders. Furthermore, there is a statistically significant U-shaped relationship between the number of females residing in the MSA and the incidence of marriage of both males and females. Additionally, the probability of ever having been married increases with age, while educational attainment decreases the incidence of marriage. Finally, black workers are less likely to have ever been married than white and Asian workers.

5.2 Heterogeneity by Race

Table 5 presents results separated by race. In these models, both the left hand and right hand side variables are constructed separately by race. For example, to construct the estimates shown in Panel A, I calculate occupation-industry variables (including the share of the occupation-industry that is female) by only using white workers. As seen in Panel A, the larger the share of females among white workers in the occupation-industry, the more likely it is that white females are married (column 1) and the less likely it is that white males are married (column 2) – again, consistent with choice overload theory. The same pattern can be observed in Panel B for black workers. Specifically, a one percentage point increase in the own-gender share

among workers of the same race in an occupation-industry cell increases the probability of being married by 0.11 for white females and 0.10 for black females. Similar effects are also shown between white men and black men. For Asian men, also in line with the baseline result, increasing the fraction of Asian female coworkers decreases the marriage probability when including occupation-industry fixed effects, and it is shown to be statistically significant at the 1% level. For Asian women, the estimate of interest has the opposite sign as the baseline result, but it is statistically insignificant. This finding may be driven by the smaller sample of Asian women in the workplace. The smaller sample sizes may induce measurement error in the variable of interest.

5.3 Heterogeneity by Educational Attainment

Next, I show the results separated by education. Here, I partition the sample by whether people have a college degree. The results, which can be seen in table 6, are consistent with the findings using the full sample. In particular, as shown in panel A for people who hold a college degree or higher, a one percentage point higher share of female in occupation-industries rises the likelihood of ever been married by 0.04 percentage points for women, and decreases the probability of being married by 0.08 percentage points for men. For people with less than a college degree, the corresponding results are similar to people who have at least a college degree while the magnitude is larger for female and lower for male. This result is however not surprising, given that higher educated people is often associated with greater economic independence and higher socio-economics status (Chiappori, Fortin and Lacroix 2002). Therefore, people with higher educational attainment have more bargaining power in marriage and they could become choosy in finding a "perfect" match.

5.4 Heterogeneity by Age

Table 7 presents the results separately by age. This is important for two reasons. First, it may

help to address concerns that people switch jobs, after getting married, to their spouse's occupation-industry perhaps as a result of getting married. Second, heterogeneity by age also provides insight on whether gender ratios within occupation-industry affect the timing of marriage or the likelihood of ever having been married. If it is the former, then we should see stronger results among the youngest individuals, but if it is the latter, we should see similar results across the age distribution. In table 7, I split the sample based on age and then run the main regression. For women, there is not much of a variation across age groups. However, for men, a one percentage point increase in the share of female employees reduces the odds of men between 20 and 26 getting married by 0.11 percentage points; however, for the two older age groups (27-31, 32-40) the coefficient for men is 0.07, a 36 percent drop. The age variation for the youngest group (20-26) can be explained by that men usually have their first marriage at age 27 (U.S. Census 2019). Thus, there are not a lot of marriages happening between age 20 and 26 for men.

5.5 Using MSA-Specific Workplace Gender Compositions

Table 8 presents the results with occupation-industry combinations calculated at the MSA level instead of the national level. This is important if the gender composition of an occupation-industry differs across geographic area in a way that happens to be correlated with marriage tendencies. For example, the gender composition of the entertainment industry in Las Vegas might be different from that in Salt Lake City and marriage tendencies are surely higher in Salt Lake City than they are in Las Vegas. Overall, after adjusting gender variation within occupation-industry groups at the MSA level, the results for both females and males are consistent with the main results, with relatively smaller effects of gender composition on marriage for women than for men, a result potentially explained by attenuation bias when calculating gender composition over smaller numbers of observations.

6 Workplace Gender Composition and Age at Marriage

In this section, I further investigate the impact of gender composition in the workplace on people's age at first marriage. The estimates of the main regression suggest that an increase in the share of own gender in the workplace decreases the incidence of ever having been married for both men and women. This could be driven either by changes in the likelihood of ever marrying or simply delays in marriage. Here, I look directly at the relationship between occupation-industry gender composition and age at first marriage.

The dataset I use in this section is derived from the 2008-2017 American Community Survey (ACS). The advantage of using this survey is that it collects information on year of the most recent marriage, which enables me to calculate the ages at first marriage for those who have only been married once. It is worth noting that, due to data limitations of only having information about individuals' most recent marriage, I restrict the sample to people who have married only once.[7] The problem is that instead of being able to exploit changes over four decades, I can only exploit variation over ten years making it more difficult to identify impacts.

The estimating equation used in this analysis is the same as equation (1), but with age at first marriage as the dependent variable.

The results are shown in Table 9. As with the previous analysis, the point estimate suggests that the larger the share of people of the opposite gender in a person's occupation-industry, the older they are at first marriage. However, the estimated coefficients of interest are not statistically significant – a result that may be explained by the much smaller sample sizes and the fact that there is much less variation in workplace gender composition over the most recent ten years than in the previous four decades.

[7] Qian (1997) argues that marriage patterns may differ between first marriage and remarriages.

7 Conclusion

This paper studies whether the growing share of females in the workplace is related to changes in the incidence of ever having been married for both men and women. Marital search theory suggests that a higher share of one's opposite gender in an environment is associated with less competition and lower search costs which could increases the likelihood of marriage. Another possibility, however, is that the more marriage prospects there are, the more marriage market participants delay marriage in hopes of finding a better match later. It is even possible that the inability to make decisions and delays of marriage ultimately result in increased likelihoods of never having been married even at older ages. The main finding is that an individual's marriage decision is related to gender composition in the workplace, but that the more opposite-gender workers there are in a person's occupation-industry, the less likely that person is to be married by any given age.

Overall, the result in this paper is consistent with overload choice theory (e.g. Iyengar and Lepper 2000; Schwartz 2004) if marriage market participants delay, and ultimately potentially forgo, marriage when confronted with many suitable marriages as a result of a belief that a more attractive mate would appear in the future. This implies that workplace gender composition is important and may alter one's marriage decision. However, we should be cautious with making any inference beyond the data patterns as the nature of marriage is often unpredictable and complex. Further research might randomly allocate different shares of potential spouses to a person's workplace, but this type of study might be difficult or impossible to implement.

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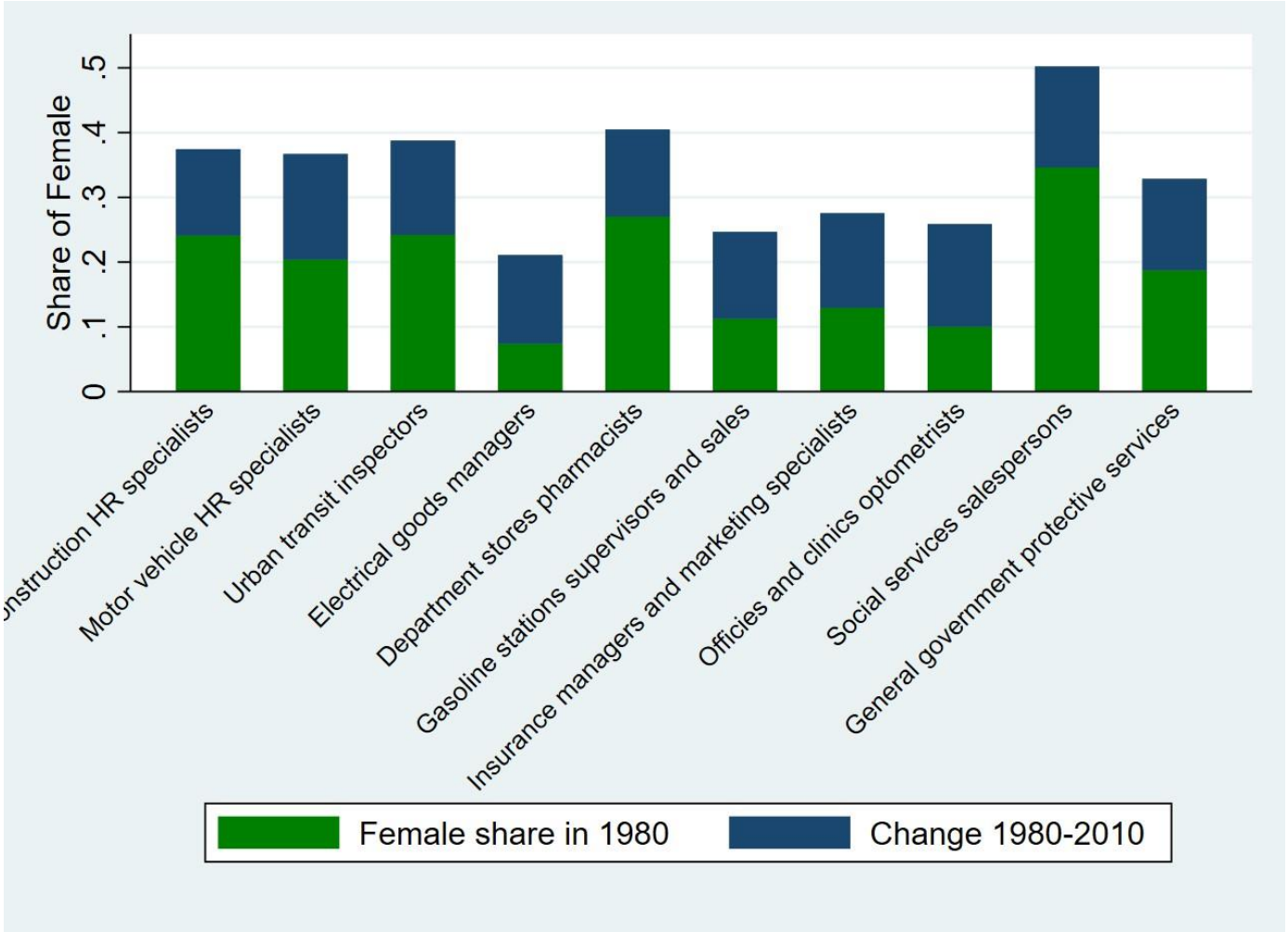
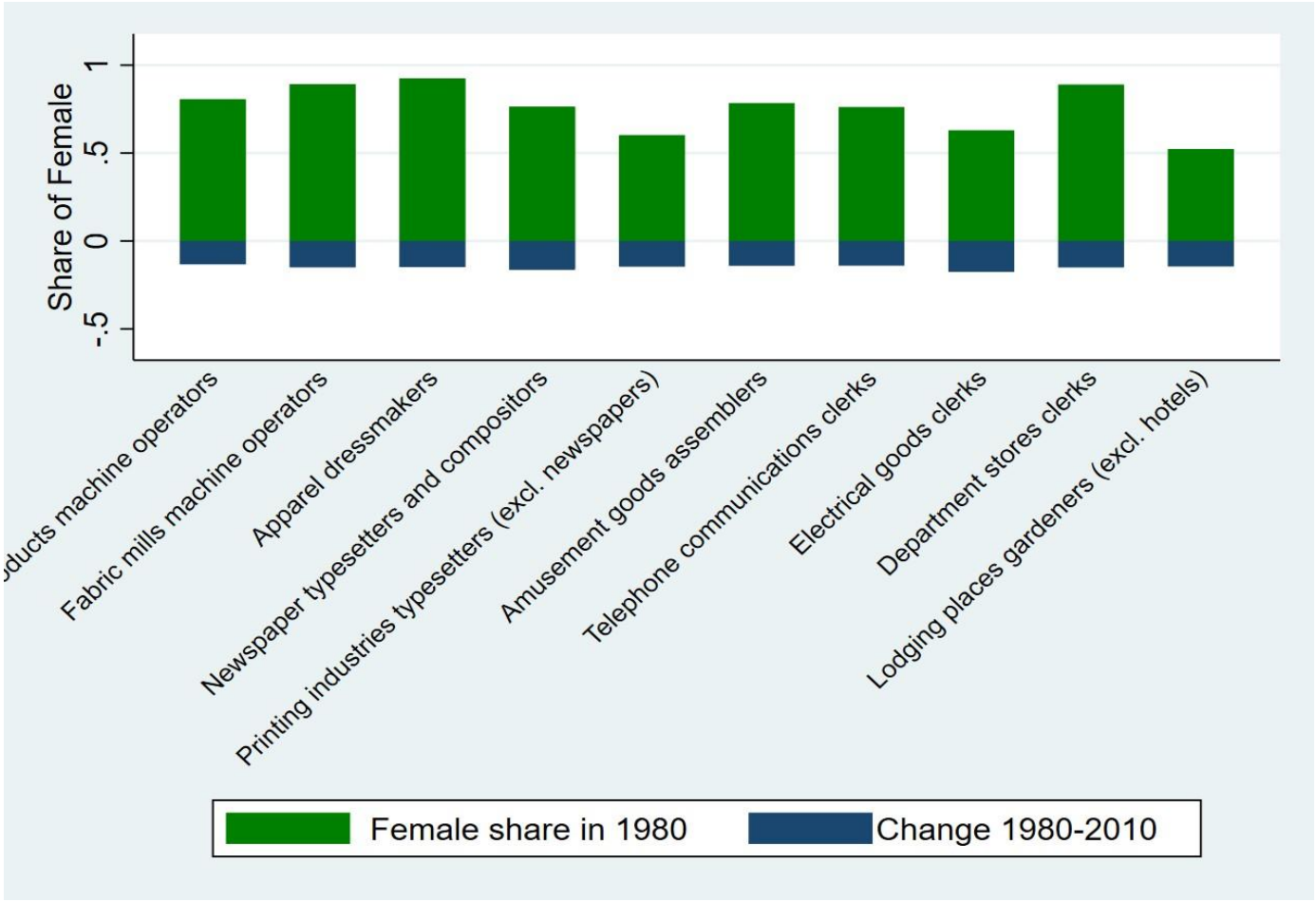
Figure 1: Gender Distribution in Occupation-industry among the 10 Occupation-Industry Groups that Indicated the Greatest Increase in Female Workers



Source: 1980, 1990, and 2000 U.S. Census, and 2010-2014 ACS, own calculations.
Notes: Figure 1 shows the share of females in 1980 and its average change from 1980 to 2010 among the 10 occupation-industry groups that indicated the greatest increase in female workers.

Figure 2: Gender Distribution in Occupation-industry among the 10 Occupation-Industry Groups that Indicated the Greatest Decline in Female Workers



Source: 1980, 1990, and 2000 U.S. Census and 2010-2014 ACS.
Notes: Figure 2 shows the share of females in 1980 and its average change from 1980 to 2010 among the 10 occupation-industry groups that indicated the greatest decline in female workers.

Table 1: Share Female in Occupation-Industry

Share Ever Married	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile
Panel A (1980)					
Male	0.01	0.05	0.18	0.41	0.77
Female	0.20	0.54	0.77	0.93	0.99
Panel B (1990)					
Male	0.01	0.07	0.23	0.44	0.77
Female	0.20	0.48	0.76	0.88	0.98
Panel C (2000)					
Male	0.02	0.07	0.25	0.47	0.77
Female	0.22	0.50	0.73	0.86	0.96
Panel D (2010)					
Male	0.01	0.09	0.26	0.49	0.77
Female	0.23	0.50	0.73	0.84	0.95

Source: 1980, 1990, and 2000 U.S. Census, and 2010-2014 ACS.

Note: Table 1 presents the share of female employees in people's occupation-industry separately by gender and year. The sample consists of workers who are between the ages of 18 and 40, are non-institutionalized, are non-agricultural workers and who report occupation-industry and do not work as non-wage workers.

Table 2: Marriage Rates by Fraction of Female in Occupation-Industry Between 1980-2010

Share Female in Occupation-Industry	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Panel A (1980)						
Male	0.73	0.74	0.67	0.64	0.44	0.49
Female	0.63	0.65	0.64	0.66	0.60	0.66
Panel B (1990)						
Male	0.66	0.68	0.62	0.58	0.44	0.39
Female	0.61	0.64	0.61	0.62	0.60	0.65
Panel C (2000)						
Male	0.64	0.64	0.58	0.52	0.45	0.39
Female	0.55	0.60	0.57	0.54	0.57	0.60
Panel D (2010)						
Male	0.58	0.61	0.56	0.45	0.45	0.42
Female	0.50	0.56	0.53	0.46	0.52	0.56

Source: 1980, 1990, and 2000 U.S. Census, and 2010-2014 ACS.
Note: Table 2 presents ever-married rates conditional on the percentage of females in occupation-industry cells between 1980 and 2010. It divides the percentage female in given occupation-industry cell as follows: less than 5 percent, 5-25 percent, 25-50 percent, 50-75 percent, 75-95 percent, and 95 percent and above. The sample consists of workers who are between the ages of 18 and 40, are non-institutionalized, are non-agricultural workers and who report occupation-industry and do not work as non-wage workers.

Table 3. Summary Statistics for the Sample

	Mean	Standard deviation	Minimum	Maximum
Ever married	0.59	0.49	0	1
Percent female in occupation-industry	0.47	0.31	0.01	0.99
Average male wage in occupation-industry	15.57	8.56	3.35	84.19
Average female wage in occupation-industry	13.16	7.02	2.96	65.80
Log wage variance in occupation-industry (male)	4.50	1.04	-0.57	7.84
Log wage variance in occupation-industry (female)	4.30	1.02	-0.82	80.40
Fraction female at MSA	0.47	0.02	0.34	0.61
Average female employed at MSA	0.95	0.01	0.84	0.98
Average male wage at MSA	16.16	5.72	5.86	38.32
Average female wage at MSA	14.53	5.32	5.23	33.22
Log wage variance at MSA (male)	5.10	0.85	2.52	7.20
Log wage variance at MSA (female)	4.60	0.79	1.62	6.21
White	0.77	0.42	0	1
Black	0.11	0.32	0	1
Asian	0.05	0.21	0	1
Age	29.46	5.94	18	40
High school degree	0.39	0.49	0	1
Some college degree	0.28	0.45	0	1
College degree	0.21	0.40	0	1
Higher than college degree	0.10	0.30	0	1
Observations		5,499,633		

Source: 1980, 1990, and 2000 U.S. Census, and 2010-2014 ACS.

Note: The sample consists of workers who are between the ages of 18 and 40, are non-institutionalized, are non-agricultural workers and who report occupation-industry and do not work as non-wage workers. Moreover, occupation-industry cells are restricted for fewer than 50 observations overall and fewer than five observations each for women and men with hourly wage in the range of $2 –200.

Table 4. Impact of Fraction Female in Occupation-Industry on Marriage Rates

	(1)	(2)	(3)	(4)
Dependent variable: Ever Married	**Female**		**Male**	
Percent female in occupation-industry	0.08***	0.09***	-0.10***	-0.05***
	(0.01)	(0.02)	(0.01)	(0.02)
Occupation-industry controls				
Mean male wage	-0.00	-0.001	-0.003***	-0.002***
	(0.00)	(0.00)	(0.00)	(0.00)
Mean female wage	0.007***	0.009***	0.002***	0.003***
	(0.00)	(0.00)	(0.00)	(0.00)
Log wage variance (male)	-0.0003	-0.001	-0.003*	-0.003
	(0.00)	(0.00)	(0.00)	(0.00)
Log wage variance (female)	-0.009***	-0.01***	0.004***	-0.004***
	(0.00)	(0.00)	(0.00)	(0.00)
MSA specific controls				
Fraction female	1.42***	1.37***	2.454***	2.45***
	(0.44)	(0.44)	(0.41)	(0.41)
Fraction female^2	-1.55***	-1.50***	-2.58***	-2.57***
	(0.46)	(0.46)	(0.44)	(0.44)
Mean female employed	-0.01	-0.01	-0.24***	-0.24***
	(0.04)	(0.04)	(0.04)	(0.04)
Mean male wage	0.02***	0.02***	0.02***	0.01***
	(0.002)	(0.002)	(0.002)	(0.002)
Mean female wage	-0.03***	-0.003***	-0.01***	-0.01***
	(0.003)	(0.003)	(0.003)	(0.002)
Log wage variance (male)	-0.01***	-0.01***	-0.006***	-0.006**
	(0.002)	(0.002)	(0.002)	(0.002)
Log wage variance (female)	0.02***	0.02***	0.01***	0.01***
	(0.002)	(0.002)	(0.002)	(0.002)

---> continued.

Table 4. Impact of Fraction Female in Occupation-Industry on Marriage Rates (Continued)

	(1)	(2)	(3)	(4)
Dependent variable: ever married	**Female**		**Male**	
Individual characteristics				
White	0.001	0.001	-0.02***	-0.03***
	(0.002)	(0.002)	(0.003)	(0.003)
Black	-0.15***	-0.15***	-0.10***	-0.10***
	(0.003)	(0.003)	(0.004)	(0.004)
Asian	0.02***	0.02***	-0.02***	-0.02***
	(0.003)	(0.003)	(0.004)	(0.004)
Age	0.16***	0.16***	0.15***	0.15***
	(0.002)	(0.002)	(0.003)	(0.003)
Age^2	-0.002***	-0.002***	-0.002***	-0.002***
	(0.00)	(0.00)	(0.00)	(0.00)
High school degree	-0.014***	-0.015***	-0.03***	-0.03***
	(0.004)	(0.004)	(0.006)	(0.006)
Some college degree	-0.08***	-0.07***	-0.05***	-0.05***
	(0.006)	(0.006)	(0.007)	(0.007)
College degree	-0.14***	-0.14***	-0.09***	-0.09***
	(0.007)	(0.007)	(0.007)	(0.007)
Higher than college	-0.14***	-0.014***	-0.06***	-0.06***
	(0.007)	(0.007)	(0.007)	(0.007)
Industry fixed effects	Yes	No	Yes	No
Occupation fixed effects	Yes	No	Yes	No
Occupation-industry fixed effects	No	Yes	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes
MSA specific fixed effects	Yes	Yes	Yes	Yes
Observations	2,589,722	2,589,722	2,909,911	2,909,911
Adjusted R-squared	0.309	0.31	0.298	0.299

Source: 1980, 1990, and 2000 U.S. Census, and 2010-2014 ACS.

Note: The sample consists of workers who are between the ages of 18 and 40, are non-institutionalized, are non-agricultural workers and who report occupation-industry and do not work as non-wage workers. Moreover, occupation-industry cells are restricted for fewer than 50 observations overall and fewer than five observations each for women and men with hourly wage in the range of $\$2 - 200$. The fraction of females within occupation-industry cell is a weighted average, which is weighted by a person's weight in each sample. Standard errors are clustered at the occupation-industry level. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 5. The Effect of The Fraction of Female in Occupation-Industry on Marriage Rates: Race Specific Results

Dependent variable: Ever Married	(1) **Female**	(2) **Male**
Panel A (White)		
Percent female in occupation-industry cell	0.11***	-0.04*
	(0.02)	(0.02)
Observations	1,961,155	2,268,025
Adjusted R-squared	0.325	0.307
Panel B (Black)		
Percent female in occupation-industry cell	0.10***	-0.05*
	(0.02)	(0.03)
Observations	344,241	280,090
Adjusted R-squared	0.244	0.274
Panel C (Asian)		
Percent female in occupation-industry cell	-0.00	-0.10***
	(0.05)	(0.04)
Observations	120,356	137,483
Adjusted R-squared	0.35	0.35
Occupation-industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
MSA specific fixed effects	Yes	Yes

Source: 1980, 1990, and 2000 U.S. Census, and 2010-2014 ACS.

Note: The table 2 reports coefficient of the fraction female in occupation-industry in different racial groups. The sample consists of workers who are between the ages of 18 and 40, are non-institutionalized, are non-agricultural workers and who report occupation-industry and do not work as non-wage workers. Moreover, occupation-industry cells are restricted for fewer than 50 observations overall and fewer than five observations each for women and men with hourly wage in the range of $\$2 - 200$. The fraction of females within occupation-industry cell is a weighted average, which is weighted by a person's weight in each sample. Standard errors are clustered at the occupation-industry level. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 6 The Effect of The Fraction of Female in Occupation-Industry on Marriage Rates, Education Specific Results

Dependent variable: Ever Married	(1) **Female**	(2) **Male**
People who have a college or higher degree		
Percent female in occupation-industry cell	0.04***	-0.08*
	(0.02)	(0.02)
Observations	786,591	887,507
Adjusted R-squared	0.231	0.262
People who have less than a college degree		
Percent female in occupation-industry cell	0.10***	-0.06***
	(0.02)	(0.02)
Observations	2,589,722	2,909,911
Adjusted R-squared	0.303	0.297
Occupation-industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
MSA specific fixed effects	Yes	Yes

Source: 1980, 1990, and 2000 U.S. Census, and 2010-2014 ACS.
Note: The estimation model for this table is the same as those used in table 1, with limiting sample analysis to those who have at least a college degree. The fraction of females within occupation-industry cell is a weighted average, which is weighted by a person's weight in each sample. Standard errors are clustered at the occupation-industry level. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 7: The Effect of The Fraction of Female in Occupation-Industry on Marriage Rates, Age Specific Effects

Dependent variable: Ever Married	(1) **18-24**	(2) **25-29**	(3) **30-34**
Female			
Percent female in occupation-industry cell	0.09***	0.08***	0.10***
	(0.02)	(0.03)	(0.02)
Observations	765,660	665,258	643,308
Adjusted R-squared	0.098	0.096	0.07
	20-26	**27-31**	**32-40**
Male			
Percent female in occupation-industry cell	-0.11***	-0.07***	-0.07***
	(0.03)	(0.03)	(0.02)
Observations	593,218	716,220	740,686
Adjusted R-squared	0.101	0.103	0.08
Occupation-industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
MSA specific fixed effects	Yes	Yes	Yes

Source: 1980, 1990, and 2000 U.S. Census, and 2010-2014 ACS.
Note: The estimation model for this table is the same as those used in table 1, with limiting sample analysis to specific age groups. The fraction of females within occupation-industry cell is a weighted average, which is weighted by a person's weight in each sample. Standard errors are clustered at the occupation-industry level. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 8. The Effect of The Fraction of Female in Occupation-Industry on Marriage Rates, at The MSA Level

Dependent variable: Ever Married	(1) **Female**	(2) **Male**
Percent female in occupation-industry-MSA cell	0.02***	-0.06*
	(0.01)	(0.01)
Occupation-industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
MSA specific fixed effects	Yes	Yes
Observations	1,714,980	1,790,610
Adjusted R-squared	0.303	0.299

Source: 1980, 1990, and 2000 U.S. Census, and 2010-2014 ACS.
Note: The estimation model for this table is the same as those used in table 1, with re-estimating the percentage of female within each occupation-industry cell at the MSA level. The fraction of females within occupation-industry cell is a weighted average, which is weighted by a person's weight in each sample. Standard errors are clustered at the occupation-industry level. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 9: The Effect of Fraction of Female in Occupation-Industry on People's Age at First Marriage

Dependent variable: Age at First Marriage	(1) **Female**	(2) **Male**
Percent female in occupation-industry cell	-0.12 (0.19)	0.02 (0.18)
Occupation-industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
MSA specific fixed effects	Yes	Yes
Observations	2,147,799	2,115,913
Adjusted R-squared	0.07	0.06

Source: 2008-2017 ACS.

Note: The estimation model for this table is the same as those used in table 1, with the dependent variable is people's age at first marriage. Additionally, the sample limit individuals who have only been married once. The fraction of females within occupation-industry cell is a weighted average, which is weighted by a person's weight in each sample. Standard errors are clustered at the occupation-industry level. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.