The Emergence of the Motherhood Premium: Recent Trends in the Motherhood Wage Gap Across the Wage Distribution[*]

Eunhye Kwak[**]

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Abstract

The average wage gap between mothers and non-mothers has greatly declined over the past two decades, but it is unknown which group of earners has led this declining trend in the motherhood wage gap (MWG): high-wage, mean-wage, or low-wage earners. This paper estimates recent trends in the MWG across women's wage distribution using the unconditional quantile regression method and finds that the MWG evolves heterogeneously by women's wage level. The MWG below the median declines less than the average. Mothers' wages sharply increase at the upper wage quantiles in the mid-1990s, leading to the motherhood premium. This great convergence of the MWG, which is largely driven by high-wage earners, may have resulted in a rise in inequality among mothers. I also explore several underlying forces to explain the heterogeneous convergence of the MWG and the emergence of the motherhood premium, focusing on changes in first-birth timing, marriage, and work hours. I conclude that an increase in marriage of high-wage women and their delays in first-birth timing result in positive selection into motherhood for high-wage earners. Moreover, increasing trends in mothers' overwork and the overwork premium are one of the probable reasons for the large changes in the MWG at the upper wage quantiles in the mid-1990s.

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[**] PhD Candidate, Department of Economics, University of Illinois at Urbana-Champaign.
Email:ekwak6@illinois.edu.

1. Introduction

The difference in wages between mothers and non-mothers, known as the motherhood wage gap (MWG), fell dramatically from an average of 8 percent in 1990 to 1 percent in 2013 (Pal & Waldfogel, 2016). A large decrease in the wage gap between mothers and non-mothers implies that women gradually resume their careers after giving birth. The MWG, however, may show heterogeneous trends across women's wage distribution because unobserved individual characteristics (e.g., work ability) and both home and work environments differ by women's wage level. Even though the average wage gap between mothers and non-mothers has decreased over time, the heterogeneous evolution of the MWG over the wage distribution may have ultimately resulted in increased wage disparity among mothers. In this paper, I examine whether the MWG equally decreases for all mothers by estimating recent trends in the MWG across women's wage distribution and discuss possible explanations for the heterogeneous trends in the MWG.

I begin this paper by documenting three new facts about the distribution of the MWG from 1990 through 2017. First, mothers who earn below the median wage have experienced a smaller than average convergence of the MWG. Beginning in 2008, there is no significant average wage gap between mothers and non-mothers, but mothers earning at or below the median wage still receive lower hourly wages than non-mothers. Second, the MWG at the top of the wage distribution has reversed, leading to a *motherhood premium*. This premium has grown to over 5 percent by 2017, or around half of the fatherhood wage premium at the top of the male wage distribution[1]. Taken together, these two facts imply that the convergence of the MWG masks a rise in inequality among mothers. Third, I identify the mid-1990s as a crucial period in the emergence of the motherhood wage premium. In the mid-1990s, mothers' wages sharply increased at the top of the wage distribution, increasing the wage dispersion of mothers.

In light of these findings, I expand my research to investigate whether maternal wage disparity increases over time. First, using the Oaxaca-Blinder (OB) decomposition method, I estimate how mothers' wage distribution changes during the period. I find a clear increase in wage inequality among mothers that cannot be entirely explained by women's human capital and work-

[1] I estimate trends in the fatherhood wage premium to compare with the MWG trends. The results are presented in Appendix B. Unlike the MWG, the fatherhood wage premium does not change much over time.

related characteristics. In addition, I find evidence of assortative marriage which is nearly unchanged over time. These facts imply that the decline in the MWG, which is mostly driven by high-wage mothers, is associated with maternal and household income disparities.

The remainder of the paper explores several possible explanations for the changing MWG across the wage distribution and the emergence of the motherhood premium. Specifically, I focus on the role of changes in fertility timing, marriage, and work hours. Each of these forces has been identified as having large impacts on women's labor market outcomes over the last several decades. I first discuss the rationale for considering each underlying factor as a possible explanation for the overall MWG trend and show the trends in these factors. I then present the heterogeneous evolution of the MWG over the wage distribution according to each factor. I explore the potential contribution of each underlying force to the overall trend in the MWG by disaggregating the quantile results according to these underlying factors.

Such a broad analysis of wage trends is necessarily non-causal. Identifying causality is not simple in long-term trend studies due to data limitations. It is very challenging to find comparable panel data sets for a long period or long-period data with a proper instrumental variable for the presence of children. This paper does not estimate the effects of having children on women’s wages, but rather I analyze how the wages of women with children have changed by wage level in a comprehensive manner. I employ the unconditional quantile regression (UQR) method to flexibly explore the possible contributory factors to the heterogeneous trends in the MWG by considering various characteristics of women according to their wage levels.

This paper is significant in that it unmasks two hidden phenomena behind the declining trend in the average MWG. First, this paper reveals that the heterogeneous convergence of the MWG is related to a rise in wage disparity among mothers. The analysis of the heterogeneous trends in the MWG will be helpful for designing effective policies to reduce wage disparities not only between mothers and non-mothers, but also among mothers. Second, this paper finds that negative selection into motherhood has been reversed for high-wage earners. This changing trend would stimulate future research on fertility decisions of high-skilled women. Positive selection into motherhood among high-wage earners indicates that high wages before childbearing do not necessarily mean high opportunity costs of childbirth.

This paper makes the following contributions to the existing MWG literature by documenting new facts about the heterogeneous trends in the MWG. First, it adds to the literature that estimates the MWG using quantile analysis. Budig and Hodges (2010, 2014) and England et al. (2016) used the National Longitudinal Survey of Youth (NLSY79) to estimate the static wage gap by different wage quantiles with individual fixed effects. I use the Current Population Survey (CPS), a larger and more representative sample than the NLSY79. Consistent with the previous studies, I find that the MWG is heterogeneous across women's wage distribution. I expand upon this literature by estimating the changes in the distribution of the MWG over time.

Secondly, this paper contributes to the literature on MWG trends. Despite extensive research on the MWG, few studies have considered trends in the MWG. Avellar and Smock (2003) looked at a short-term change in the MWG by comparing two cohorts of women using the 1975–1985 waves of the National Longitudinal Survey of Young Women and the 1986–1998 waves of National Longitudinal Survey of Youth. They concluded that the negative effect of having an additional child on women's wages did not decrease much across the two cohorts. In this paper, I suggest a possible reason for the unchanged effect of children in Avellar and Smock's (2003) study: that is, that the mid-1990s is a critical period in the convergence of the MWG.

While Avellar and Smock (2003) looked at a short-term change in the MWG, Pal and Waldfogel (2016) estimated a long-term trend in the MWG from 1967 through 2013 with OLS method using the CPS. This paper expands Pal and Waldfogel's (2016) research by adding heterogeneity to the analysis of the trend. This paper investigates whether the MWG changes over time; it also describes how the MWG changes by women's wage level. This paper contributes several new findings regarding heterogeneity in the MWG trend.

Lastly, the findings of this paper provide policy implications and stimulate several follow-up research questions. The heterogeneous convergence of the MWG emphasizes that the policy for supporting mothers' economic activities should be refined by breaking down the policy beneficiaries to mitigate inequality among mothers. Moreover, this paper expands the scope of research regarding the MWG by showing that analysis periods and women's wage levels may affect scholars' estimation of the MWG. This paper opens up avenues of further research on various mechanisms that may help explain the heterogeneous trends in the MWG.

The paper proceeds as follows. Following the introduction, I describe the data and variables in the next section. Section 3 introduces the empirical methods for estimating heterogeneous trends in the MWG and changes in maternal wage disparity. Section 4 presents the results, including several new descriptive findings about the MWG trends and wage inequality among mothers. In Sections 5 and 6, I provide several explanations for the findings with empirical evidence. Specifically, in Section 5, I discuss motivation and compositional changes of underlying forces that may explain the heterogeneous trends; in Section 6, I consider the heterogeneous evolution of the MWG along each of these underlying forces. I conclude in Section 7 by offering policy implications and future research suggestions.

2. Data and Variables

I use the CPS Outgoing Rotation Groups for years 1990 through 2017. I restrict each year's CPS data to women aged 20–45. Each regression sample pools the data for two years in order to create more stable samples. The sample excludes women who are self-employed and are in military service or school.

The dependent variable is the log of hourly wages. I use reported hourly wages if the respondents are paid hourly (61.27 percent of the entire sample), and I impute hourly wages for salaried workers using weekly earnings and usual work hours per week. All wages are valued in 2017 USD. When calculating compositional changes by wage level, I divide the sample into 10 equal subsamples according to hourly wage level regardless of the presence of children. Therefore, the wage groups of mothers and non-mothers presented in this paper are comparable with each other.

The baseline explanatory variables are motherhood status, age, five indicators of education, and three indicators of race. Marital status, full-time work indicator, and 26 occupation indicators are additionally considered. Women who have their own children under the age of 18 in their household are defined as mothers. The own children include biological children, step-children and adopted children. Education indicators are less than high school, high school, some college, four-year college, or more than four-year college. Three race and ethnicity indicators are White, Black, or Hispanic.

"Married women", in this paper, are women who currently live with their husbands. Never-married women and women whose husbands are absent for any reason are considered single women. The full-time work indicator is defined based on the work status reported in the CPS, and the occupation indicators are defined according to the CPS occupation codes. Lastly, following the standards set out in previous research (e.g., Cha & Weeden, 2014; Weeden et al., 2016; Cortes & Pan, 2017), "overwork" indicates whether the paid work hours exceed 50 hours a week.

3. Empirical Methods

Main specification: Unconditional Quantile Regression

The goal of this study is to estimate the residual wage gap between mothers and non-mothers and to look at its trends across the wage distribution. By investigating the estimated distribution of the MWG, this paper attempts to provide a broad understanding of the changes in work-related characteristics of mothers by wage level. To that end, I use the unconditional quantile regression (UQR) method (Firpo, Fortin, & Lemieux, 2009) to estimate the distribution of the MWG. UQR measures the effect of motherhood status on the unconditional wage distribution holding the other covariates constant, while the conditional quantile regression (CQR) method estimates the effect on the conditional wage distribution of women who have the same values for the other covariates (Porter, 2015). The CQR method is unable to provide direct intuition about women's characteristics along with the unconditional wage distribution because conditional quantiles are not comparable to each other. For example, the 75th quantile wage of the highly educated women's wage distribution is not comparable to the corresponding quantile wage of the less educated women's wage distribution. The UQR method allows for flexible analysis of mothers' characteristics depending on wage levels that may induce heterogeneous changes in the MWG.

The UQR uses the estimated density of the dependent variable, and the results may vary depending on the choices of bandwidth and kernel (Porter, 2015). I report the main results using the Gaussian kernel and the optimal bandwidth calculated with Silverman's formula, and present the results with different kernels (Epanechnikov and Uniform) and bandwidths (0.03 and 0.07) in Appendix Table A1.

The baseline model includes motherhood status (m), age (a), age squared (a^2), five indicators of education (edu), three race and ethnicity indicators ($race$) and year fixed effect. Year fixed effect is included because each regression sample pools the data for two-year periods.

$$ln(wage)_q = \beta_{q0} + \beta_{q1}m + \beta_{q2}a + \beta_{q3}a^2 + \beta_{q4}edu + \beta_{q5}race + yearFE + \varepsilon \qquad (1)$$

In this equation, subscript q refers to the q^{th} quantile. I first control for variables from the basic Mincer equation, and then I subsequently add some endogenous variables which may affect the residual MWG: marital status, full-time work and 26 occupation indicators. By considering additional variables, I can show the role of marital status and work-related characteristics in the residual MWG.

The coefficient of motherhood status (β_{q1}) indicates the residual MWG conditional on the other covariates. The estimated MWG using the UQR is not the causal effect of motherhood on women's wages. Instead, the residual MWG is a summary statistic for a gap in work-related unobserved characteristics between mothers and non-mothers, like work hours, productivity, and discrimination.

Empirical method for estimating changes in wage disparity of mothers

In order to measure the wage inequality of mothers, I check how much the dispersion of mothers' wage distribution changes between 1990–1991 and 2000–2001 and between 2000–2001 and 2010–2011 using the recentered influence function (henceforth RIF) and OB decomposition method. I use changes in the inter-quantile ranges and the Gini coefficient as inequality measures: the log wage differential between the 90^{th} and 10^{th}, between the 90^{th} and 50^{th}, and between the 50^{th} and 10^{th} quantiles of the unconditional wage distribution. The OB method decomposes the estimated change in inequality measure into the changes in characteristics (explained change) and the changes in wage structures (unexplained change) between the periods.

$$\hat{v}_{t1} - \hat{v}_{t0} = (\bar{X}_{t1} - \bar{X}_{t0})\hat{\beta}_{t1} + \bar{X}_{t0}(\hat{\beta}_{t1} - \hat{\beta}_{t0}) \quad (2)$$

$\hat{v}_t$ refers to the estimated inequality measure at time t, $\bar{X}_t$ refers to the mean of the observed characteristics at time t, and $\hat{\beta}_t$ refers to the estimated coefficient from the OLS regression for times $t0$ and $t1$. Baseline specification includes age, age squared, education, indicators of race (White, Black, and Hispanic), and year fixed effect. Expanded specification adds marital status, full-time status, and the five occupation indicators[2]. The estimated inequality measure between the quantiles of the unconditional wage distribution ($\hat{v}_t$) is based on the RIF following Firpo, Fortin and Lemieux (2011). In this case, $\hat{\beta}_t$ is the estimated coefficient of the UQR.

4. Results

4.1. Descriptive Statistics

Table 1 presents descriptive statistics of the regression sample in which women have positive hourly wages in the displayed years. The labor force participation and employment rates are calculated including women who are not working. Childless women's labor force participation rate is 86 percent in 1990–1991 and it slightly decreases in 2000–2001 and 2010–2011. At that time, mothers' labor force participation rate is around 70 percent. Mothers' employment rate is 20 percentage points lower than non-mothers' employment rate in 1990–1991, but the gap decreases to 11 percentage points in 2010–2011.

The estimated MWG could be affected by the changes in women's employment rate because the Mincer equation includes only working women in the regression. For example, if mothers with low work ability entered or mothers with high work ability left the labor market, the

[2] I considered 26 occupation groups earlier when estimating the distribution of the MWG. There are some empty occupation groups if dividing the sample into 26 occupation groups, and it is problematic when using the OB decomposition method. For this reason, I defined occupation indicators more broadly than before.

estimated MWG would be larger and vice versa. However, as Table 1 shows, women's employment rate has not changed considerably since 1990, and the changes in women's employment status are not large enough to affect the estimated trend in the MWG. The changes in women's labor force participation and employment rates are more precisely presented in Figure 1.

Mothers' hourly wages increase from 1990–1991 through 2010–2011, and the gap in the average wages of mothers and non-mothers is reversed in 2010–2011. The percentage of full-time workers among non-mothers is 13 percentage points higher than that among mothers in 1990–1991, but the difference decreases to 6 percentage points in 2010–2011. The percentage of mothers who work over 50 hours a week is 4–5 percent, and the percentage of overworking non-mothers is 8–10 percent. The percentage of highly educated non-mothers (four-year college or more) is 13–16 percentage points higher than the percentage of highly educated mothers.

Mothers are 4–5 years older than non-mothers on average. The proportion of White among non-mothers is higher than that among mothers, and the proportion of White women tends to decrease over time for both mothers and non-mothers. The ratio of married women to all women decreases over time regardless of the presence of children. For mothers, the average age at first birth and the average number of children increase over time.

Figure 2 shows trends in the demographic characteristics of women with and without children by wage decile. These demographic characteristics are the variables included in the baseline specification. After 2000, mothers' average age slightly increases in the top wage decile, and non-mothers' average age decreases in the lowest decile. Education level increases for both mothers and non-mothers. In 1990–1991, the percentage of White women is higher among non-mothers than mothers regardless of wage level. The proportion of White women decreases for both mothers and non-mothers, and the proportion becomes similar in 2016–2017. In general, changes in demographic characteristics are unnoticeable.

4.2. Heterogeneous Trends in the Motherhood Wage Gap

Figure 3A shows the residual MWG estimated from the baseline specification using OLS estimation. The *y*-axis indicates the estimated coefficients of motherhood status. A negative value means that mothers earn lower hourly wages than non-mothers with the same observed characteristics, and the upward-sloping fitted line means a converging MWG over time. Figure 3A shows that mothers earn 6 percent lower wages than non-mothers in 1990–1991 but there is no significant wage gap between mothers and non-mothers from 2008–2009. This declining trend in the average motherhood penalty is consistent with the main finding of Pal and Waldfogel (2016).

In order to understand how much the presence of a husband and work-related characteristics can explain the MWG, I subsequently add marital status, the full-time work status, and occupation indicators. The results are presented in Figure 3B. The baseline MWG increases when adding marital status, and this indicates a positive marriage effect on women's wages. The full-time indicator reduces the MWG by 1.6–2.8 percentage points. The residual MWG rarely changes even conditional on occupations.

Figure 4 presents the MWG across the wage distribution by year. The MWG is estimated with the baseline specification. Note that the estimated coefficients are very similar, even with the different kernels and bandwidths (Appendix Table A1). In 1990–1991, mothers receive lower wages than non-mothers at all quantiles. The MWG increases with the wage quantile until the 55th quantile, and the MWG decreases above the 55th quantile. The graph becomes more U-shaped in 1996–1997 because of a large convergence of the MWG above the 70th quantile.[3] The MWG is reduced by more than 6 percentage points above the 90th wage quantile between 1990–1991 and 1996–1997, leading to a reversed wage gap. Mothers have received significantly[4] higher wages than non-mothers with the same observed characteristics above the 90th quantile since 1996–1997 and above the 80th quantile since 2008-2009. The area where the motherhood premium exists widens over time across the wage distribution. Convergence of the MWG and a rise in the motherhood premium continues even after 2000, but is slower compared to the 1990s.

Like the OLS estimates, the wage gap between mothers and non-mothers becomes larger at all wage quantiles when controlling for marital status, and it becomes smaller when full-time and occupation indicators are added (Appendix Figures 2 and 3). Adding marital status and work-related characteristics has larger effects on the residual MWG at or below the median compared to the upper wage quantiles. The presence of a husband increases the wage gap more, and work-

[3] The same figure adding 1989 and all other years in the 1990s is presented in Appendix Figure 1.

[4] Significant at the 95% confidence level.

related characteristics explain a greater portion of the MWG at or below the median than the upper quantiles. This implies that the MWG at the low quantiles is largely caused by work type and occupation, but a substantial portion of the MWG remains unexplained at the high quantiles of the wage distribution.

Table 2 shows the estimated coefficients of motherhood status in 1990–1991 and 2016–2017. The first and fourth columns show the baseline model results. The second and fifth columns add marital status to the baseline model, and the third and last columns subsequently add full-time and occupation indicators. Mothers' wages are 5.9 percent less than non-mothers' wages at the mean in 1990–1991 in the baseline model. The average MWG converges to 0.3 percent in 2016–2017. The MWG increases when adding marital status and decreases when adding full-time and occupation indicators. As shown in Appendix Figures 2 and 3, much of the low-wage mothers' MWG is attributed to full-time status, while the high-wage mothers' MWG is largely unexplained.

To compare the trends more clearly, Table 3 presents the estimated MWG in 1990–1991, 2000–2001, and 2016–2017 and differences in the wage gaps between the displayed years. The numbers in the first six columns are the motherhood wage gaps and the standard errors estimated from the baseline specification. The numbers in the last three columns represent the differences in the wage gaps. For example, the last column shows the difference in the wage gaps between 1990–1991 and 2016–2017. Above the median, the MWG converges faster than average between 1990–1991 and 2016–2017. Above the 70th quantile, the MWG decreases by 8–9 percentage points from 1990–1991 through 2016–2017, leading to the motherhood premium in the 2010s. The last three columns in Table 3 show that great changes take place in the 1990s, and the convergence slows down in the 2000s.

The OLS and UQR estimates indicate that the average wage gap between mothers and non-mothers falls greatly over time, and it falls especially strikingly for high-wage mothers. Mothers in the bottom and the middle quantiles still receive lower hourly wages than non-mothers, and mothers in the upper quantiles gradually earn similar or higher wages than non-mothers. The heterogeneous changes in the MWG may result in a rise in the wage gap among mothers. In the next section, I investigate how much the wage distribution of mothers changes over time in order to see the changes in wage dispersion among mothers.

4.3. Wage Inequality Among Mothers

Table 4 shows the changes in inequality measures in relation to the mothers' wage distribution. Panel A presents the baseline model results and Panel B presents the results including marital status and work-related characteristics. Adding marital status and occupation indicators does not make a big difference; rather, the difference in the results of two specifications is mainly derived from adding the full-time work indicator.

The baseline results show that mothers' wage disparity increases at the top, as measured by the 90–10 and 90–50 log wage differentials, and decreases at the bottom, as measured by the 50–10 log wage differential, between 1990–1991 and 2000–2001. The 90–50 wage differential increases by 11.8 percentage points and the 50–10 wage differential decreases by 4.8 percentage points between 1990–1991 and 2000–2001. Wage disparity at the top increases even more between 2000-2001 and 2010-2011. The Gini coefficient also increases in both periods. By incorporating work-related characteristics, the total differentials in the expected wage disparities between years decrease compared to the baseline model. This results from a large reduction in the unexplained gap. More precisely, gaps in constants largely decrease by adding the full-time work indicator.

I estimate the wage inequality of non-mothers with the same empirical method to see whether it shows a similar pattern. The results are presented in Appendix Table A2. Note that the results for non-mothers are not directly comparable to the results for mothers because mothers and non-mothers have different wage distributions. However, changes in the wage disparity of non-mothers over the same period can be used to understand the results for mothers. Changes in the wage inequality of non-mothers show a similar pattern to the results for mothers' wage distribution. The wage inequality of non-mothers increases at the top, as measured by the 90–50 wage differential, and decreases at the bottom, as measured by the 50–10 wage differential, in the 1990s. Wage disparity among non-mothers diverges more at the top in the 2000s. When incorporating work-related characteristics, the wage disparity becomes much smaller in both periods.

Additionally, I look at whether the characteristics of high-wage mothers' husbands have changed during the period. If the earnings and work hours of high-wage mothers' husbands are more reduced than those of the husbands of low-wage mothers, the motherhood wage premium of high-wage mothers may be attributed to relatively large changes in the spousal role in housework for high-wage mothers. Figure 5 present husbands' average labor market outcomes by wives' wage level. Since the subsample is divided by women's hourly wage level, the wage percentiles are comparable to those of other figures in this paper. The proportion of husbands at work is defined based on the total number of husbands of mothers in each wage group, and work hours and weekly earnings include 0 values. I restrict the sample to couples who have children, but the magnitudes and patterns are almost the same as those of the entire sample.

Husbands of high-wage mothers have higher employment rates, work hours, and weekly earnings than husbands of low-wage mothers, implying positive sorting in marriage. Husbands' average number of work hours decreases at all wives' wage levels, suggesting that husbands' participation in household work increases (Parker & Wang, 2013). According to Figure 5, there is no evidence that the labor market outcomes (employment rate, weekly work hours, and weekly earnings) of high-wage mothers' husbands are more reduced than those of the husbands of low-wage mothers.

Trends in the fatherhood wage premium presented in Appendix B and positive sorting in marriage have not changed much since 1990, while mothers' characteristics at work and their labor market outcomes have dramatically changed, especially for high-wage mothers. I also find that the aggregate earnings of a couple with children have increased by more than 500 USD in the top women's wage decile since 1990, while there has been almost no change in the middle and lowest wage deciles during the same period (Appendix Figure A4). These associated trends suggest that the great convergence of the MWG, which is largely driven by high-wage women, could be related to an increase in maternal wage disparity and inequality among families with children.

5. Possible Explanations for the Heterogeneous Trends in the MWG.

The above trend in the MWG does not indicate a causal effect of children on women's wages. Instead, the results imply that the unobserved characteristics of working mothers (selection into motherhood) and the gap in work-related characteristics (e.g., work hours and productivity) between mothers and non-mothers greatly change at the top of the wage distribution. The emergence of the motherhood premium for high-wage mothers is especially likely to be driven by selection because the presence of children is a constraint on mothers' work in the labor market.

In the remainder of this paper, I discuss several underlying factors associated with the heterogeneous changes in the MWG over women's wage distribution, taking into account both changes in selection into motherhood and the labor supply of mothers. The discussion mainly focuses on the reasons for a large change in the MWG for high-wage mothers. In this section, I describe three underlying forces that explain the heterogeneous evolution of the MWG, including the rationale for considering each factor and the trends in these factors.

5.1. Changes in First-Birth Timing

High-skilled women are likely to postpone having their first child. High-skilled women have a higher opportunity cost associated with childbirth, especially in the early stages of their careers, than do low-skilled women. This assertion is supported by Miller (2011), who showed that an exogenous delay in motherhood increases women's hourly wages and that the delay benefit is the largest for college-educated women and those in professional and managerial occupations. Since delays in first birth are one of the critical factors in increasing mothers' wages especially for high-wage women, changes in first-birth timing could be associated with the trend in the MWG.

The first-birth timing of high-wage women is more likely to be delayed over time. Figure 6A presents the average age at first birth by wage level. High-wage women have their first child later than low-wage women do. Women's average ages at first birth tend to increase in all wage groups, but the rate of increase differs by wage level. In the highest wage decile, women's average age at first birth increases the most. The average age at first birth increases by more than 2 years in the highest wage group, and it increases by 1.36 years in the median wage group. It increases less than 1 year in the bottom wage group.

In order to identify the trends more clearly, I calculate changes in the proportion of mothers whose first birth is at or after 30 years old (henceforth late-birth mothers). Figure 6B shows the proportion of late-birth mothers by wage level. One striking feature is that the percentage of late-birth mothers increases by almost 20 percentage points in the highest wage decile (from 29.90 to 49.76), while it increases by 3.89 percentage points in the lowest wage decile (from 5.90 to 9.79).

The proportion of late-birth mothers increases by around 10 percentage points at the middle part of the wage distribution (from 9.33 to 18.60).

The trend in the proportion of late-birth mothers is consistent with the MWG trend. Both present a striking change at the upper wage quantiles. Because the MWG and fertility timing affect each other, we do not know what the cause or consequence is. These results simply show that the reduced MWG in the upper wage quantiles and the emergence of the motherhood wage premium for high-wage earners could be associated with a huge increase in late-birth mothers in the high-wage groups.

5.2. Changes in Marriage

The previous section suggests that the estimated MWG increases when adding marital status into the regression equation, implying that marriage has a positive effect on women's wages. This positive effect could be due to an increase in a husband's participation in household work and positive selection among married women. Since marital status is associated with the MWG, marriage may show a heterogeneous trend depending on women's wage level, and the overall trend in the MWG could be attributed to changes in marriage trends.

Pal and Waldfogel (2016) pointed out that an increase in husbands' participation in housework decreases the amount of time mothers spend on housework, thereby increasing mothers' working hours and reducing the motherhood penalty. If husbands' role in housework affects the trend in the MWG, the MWG of single mothers would not change much compared to that of married mothers. This is because single mothers still bear heavy housework costs compared to mothers living with their husbands.

Selection into marriage for high-wage women may be an underlying factor leading to positive selection into motherhood for high-wage women. In this vein, Isen and Stevenson (2010) pointed out that a changing trend in marriage reveals positive selection into marriage for highly skilled women. "Production complementarity" (Becker, 1981) is the economic reason traditionally given for marriage. A married couple can achieve higher productivities in both housework and paid work in the labor market compared to single people by specializing in housework and paid work. This theory implies that high-wage women who are productive in the labor market and are uninterested in housework experience less of a marriage benefit compared to low-wage women. The fact that highly educated women were less likely to get married in the past supports the "production complementarity" theory.

However, the marriage benefit gained through women's specialization in housework has become smaller, because household work has become easier than ever before with the advancement of technology and service industries. Moreover, women's market wages have risen over time (Isen & Stevenson, 2010). Easier household work and the increased potential wages of women in the labor market reduce the value women place on specializing in housework.

Another economic gain from marriage is that a married couple can share public goods. For example, a couple can reduce housing costs and enjoy higher utility by consuming leisure time together and by having children. Isen and Stevenson (2010) pointed out that gains from "production complementarity" gradually decrease and gains from "consumption complementarity" increase as women come to receive greater wages in the labor market. The change in the source of the marriage benefit leads to a change in the marriage trend. Decreasing gains from "production complementarity" and increasing gains from "consumption complementarity" imply that marriage becomes more attractive to women with more disposable income (Isen & Stevenson, 2010).

A change in the marriage benefit makes women with higher wages or higher work abilities more likely to get married than women with lower wages among all highly skilled women (positive selection among highly skilled women who got married). High-wage women are highly likely to continue their career after marriage and after having children, and positive selection into marriage among high-wage women may be reflected in the motherhood premium.

Greenstone and Looney (2012) provided evidence showing that high-wage women's marriage rate has increased and low-wage women's marriage rate has decreased. The marriage rate stays nearly constant or increases above the 90th annual earnings percentile between 1970 and 2011, and the marriage rate greatly decreases at the bottom of the earnings distribution (Greenstone & Looney, 2012).

The declining trend of marriage for low-wage women is also seen in my sample. Figure 7A shows the proportion of single mothers in all mothers by wage level. This proportion increases by 20 percentage points and by 10 percentage points in the lowest wage decile and at the middle, respectively. However, there is almost no change in the top wage decile. The limited convergence of the MWG at the lower parts of the wage distribution could be driven by increasing number of single mothers in the low-wage group. Figure 7B shows the proportion of women who have ever been married among women aged 28 or older. The figure shows that the proportion of women who have ever been married substantially decreases in the lower-wage groups but the proportion in the top-wage decile is nearly unchanged.[5]

5.3. Changes in Labor Supply

An increase in mothers' work hours is a critical factor in the wage increases of mothers because work hours are closely related to work experience, positions, and productivity. The primary cause of the motherhood penalty, as explained by human capital theory, is the reduced human capital investment and work experience of mothers due to short work hours. In the same vein, mothers seek a flexible working schedule even with lower hourly wages.

An increase in mothers who work 50 or more hours a week—"overwork"—may be closely related to a big increase in the wages of high-skilled mothers. This is because mothers may have jobs whose requirements cannot be met with a shorter labor time, leading them to increase their work hours. For example, a lawyer in charge of a big case is required to work more and receive greater hourly wages than a lawyer who provides counsel in lower-stakes cases.

The explanation for why high-wage mothers are more likely to increase their level of overworking than low-wage mothers are can be considered from two perspectives, the supply and demand sides. From the supply-side perspective, high-wage mothers are more able to increase their work hours than are low-wage mothers. For example, high-wage mothers are likely to pay for more external housework services (Cortes & Tessada, 2011) and have more family-friendly jobs and favorable private policies for family care than low-wage mothers do (e.g., Laughlin, 2013).[6]

[5] Even if the cutoff is changed to somewhere around 30 years old, the trends are the same.

[6] Laughlin (2013) pointed out that less-educated women are less likely to receive paid maternity leave than highly educated women are.

From the demand-side perspective, the wage premium related to overworking might increase more for high-wage earners than it does for low-wage earners. According to Goldin (2014), as an employee becomes harder to substitute with another worker, an employer attaches a greater premium to the employee because difficult substitution means high transaction costs. Using the same logic, if a worker is easily substituted, there is no reason to pay the worker a premium to work long hours. Cortes and Pan (2017) showed that the wage premium for male workers to overwork increased consistently between 1980 and 2010 for all educational groups and that highly educated workers experienced the largest increase in the overwork premium during the period.

Mothers' working hours have slightly increased since 1990. For example, mothers in the top wage decile increased their work hours by more than 2 hours a week between 1990 and 2017, while non-mothers in the same wage decile had almost no change (Figure 8). One interesting feature is that the proportion of women who work 50 or more hours a week in the top wage decile evidently increased in the 1990s (among both mothers and non-mothers) and the proportion continued to increase even after 2000 among mothers. An increase in the proportion of overworking mothers is more prominent for late-birth mothers than it is for early-birth mothers.

Some recent research indicates a positive relationship between wage compensation for overwork and the gender wage gap (Cha & Weeden, 2014; Goldin, 2014; Weeden et al., 2016; Cortes & Pan, 2017). Scholars exploit the fact that the overwork wage premium varies by occupation. In Section 6.3, I present evidence that the overwork premium for female workers varies with women's wage level and that women's wage premium to overwork shows a very similar trend to that of the MWG. This time-series evidence suggests that an increase in mothers' overwork is a likely cause of the sharp rise in mothers' hourly wages at the upper wage quantiles in the mid-1990s.

6. Contribution of the Underlying Factors to the Overall MWG Trend

In the previous section, I presented the compositional changes of several factors potentially associated with the heterogeneous convergence of the MWG and the emergence of the motherhood premium. First-birth timing, marriage rate, and overwork have shown particularly great changes for high-wage mothers compared to low-wage mothers. In this section, I explore the potential contributions of these underlying forces to the results from the entire sample.

6.1. MWG by First-Birth Timing

The proportion of late-birth mothers increases by 20 percentage points in the highest wage decile. Since late-birth mothers and early-birth mothers have different characteristics, the MWG and its evolution could be heterogeneous by first-birth timing. I estimate the MWG for each group of mothers by first-birth timing, including interaction terms in the regression equation:

$$ln(wage)_q = \beta_{q0} + \beta_{q1}(m * late) + \beta_{q2}(m * early) + \beta_{q3}X + yearFE + \varepsilon \qquad (3)$$

X includes age, age squared, education, and race. Note that the comparison group is non-mothers and the quantiles of wages are comparable for β_{q1} and β_{q2}.

Figure 9A shows the wage gap between early-birth mothers and non-mothers and Figure 9B shows the wage gap between late-birth mothers and non-mothers across the wage distribution for the displayed years. According to Figure 9A, early-birth mothers receive less hourly wages than non-mothers at all wage quantiles, but the wage gap decreases over time. As in the overall sample results, there exists a large decrease in the MWG at the upper quartiles in the mid-1990s. The MWG at the middle of the wage distribution substantially converges towards zero until the mid-2000s, but the wage gap between early-birth mothers and non-mothers is larger than the wage gap in the entire sample.

Late-birth mothers who earn more than the median wage receive similar or higher hourly wages than non-mothers, while late-birth mothers who earn below the median wage receive slightly lower wages than non-mothers. The motherhood premium above the median increases the most in the mid-1990s (Figure 9B). The heterogeneous evolution of the MWG by first-birth timing implies that the motherhood wage premium observed in the overall sample is derived from the late-birth mothers. Given that the proportion of late-birth mothers greatly increases in the high-wage group, a large wage premium among late-birth mothers in the upper wage quantiles can explain the emergence of the motherhood premium and its increasing trend in the overall sample.

The motherhood premium among late-birth mothers means that late-birth mothers are a positively selected group in terms of wages. Late-birth mothers, like non-mothers, are very likely to be career-oriented and have high work abilities. This assertion is supported by Figure 10, which shows the proportion of women who have at least a four-year college education by wage level. Late-birth mothers include the largest proportion of highly educated women across all wage groups, and the proportion is particularly large in the high-wage group. Note that the sample is divided into 10 equal subsamples according to wage level regardless of the presence of children, and the wage groups presented in each figure are comparable with each other. Women who have strong career desires postpone motherhood. Among these women, those who are not likely to have wage loss after childbirth are more likely to be mothers, causing upward selection in the residual MWG at the upper wage quantiles.

6.2. MWG by Marital Status

In this section, I present the different MWG trends by mothers' marital status. I also explore how the heterogeneous trends in the MWG by marital status and the changing trend in marriage can be associated with the overall sample's results.

I estimate the MWG of married mothers and single mothers separately by including interaction terms as in the regression equation (3). Figure 11A shows the wage gap between married mothers and non-mothers. The MWG of married women converges to zero much faster than the MWG of the entire sample, and the motherhood premium at the upper quantiles also increases faster than that of the entire sample. Beginning in 2010, married mothers above the 65th quantile earn significantly higher wages than non-mothers. The motherhood wage premium increases as the wage quantile does.

Meanwhile, single mothers in most of the quantiles earn lower wages than non-mothers even until 2016–2017, and there is no motherhood premium for single mothers (Figure 11B). The MWG of single mothers shows a U-shape over the wage distribution. Even though single mothers do not experience the motherhood premium, the negative wage gap largely declines in the mid-

1990s at the upper wage quantiles. Notably, the MWG of single mothers does not change much compared to that of married mothers, especially at the low and middle wage quantiles. The large MWG of single mothers that does not diminish over time and the quickly converging MWG of married mothers support that the spousal role in housework contributes to reducing the MWG.

The estimated MWG by marital status indicates that the motherhood wage premium in the overall sample is derived from married mothers. On average, the proportion of single mothers among mothers increases from 27.14 percent in 1990–1991 to 34.75 percent in 2016–2017. Most of the increase in single mothers can be seen in the low-wage group, and more than 80 percent of high-wage mothers are married. The heterogeneous trends in the MWG by marital status, heterogeneous changes in single mothers by wage level, and the changing trend in marriage for high-wage women all explain the emergence of the reversed MWG for high-wage mothers, as well as the limited convergence of the MWG for low-wage mothers.

6.3. Wage Premium to Overwork

The empirical goal is to consider whether the correlation between long work hours and wage rates differs by women's wage level and to understand how the correlation varies over time. Estimating the effect of long work hours on wage rates is not simple, because thresholds of work hours leading to changed wage rates differ by occupation and work position, and women with long work hours may be positively selected at the high end of the wage distribution. Nevertheless, I run a naïve regression of log hourly wages on an indicator of long work hours (50 hours a week). Even though the estimates are very likely to be upward-biased at the top of the wage distribution,[7] I can consider whether changes in the wage premium to work long hours are more striking at the top of the wage distribution than they are at the bottom. Cortes and Pan (2017) showed that the wage premium to overwork, as estimated by OLS, is partially causal and this is not merely a proxy for unobserved characteristics of workers who work long hours.

[7] The estimates might be downward biased at the bottom because low-skilled women could increase their work hours to increase their total income.

The regression equation is based on the covariates that are used when estimating the MWG. I include an additional indicator focusing on whether weekly work hours are over 50 hours.[8]

$$ln(wage)_q = \delta_{q0} + \delta_{q1}overwork + \delta_{q2}X + yearFE + \varepsilon \quad (4)$$

where $overwork$ is 1 if a woman's usual work hours are at least 50 hours a week, and X includes motherhood status, age, age squared, education and race. Marital status, the full-time work indicator, and 26 occupation indicators are subsequently added to the baseline specification. These results are presented in Appendix Figure A5.

Figure 12A shows the OLS and UQR estimates of the wage premium for all female workers to work over 50 hours per week. The OLS estimates show that there is no significant wage premium in 1990–1991 and 1992–1993 but that the overwork premium substantially increases in 1996–1997. The wage premium to overwork keeps increasing until 2010–2011.

The UQR results show that women who work more than 50 hours a week earn similar or lower wages than women working fewer than 50 hours in 1990–1991 at most quantiles. Above the 80th quantile, the overwork premium dramatically increases by more than 10 percentage points between 1990–1991 and 1996–1997. The increase in the overwork premium is greater at the upper quantiles than at the lower ones. In 1996–1997, overwork significantly[9] increases the 80th quantile wage by 9 percent and the 90th quantile wage by 11 percent.

When additionally controlling for marital status, the full-time work indicator, and occupation indicators, the overwork premium below the 80th quantile is reduced and there is almost no wage premium below the 80th quantile. The overwork premium above the 80th quantile remains

[8] Since low-wage workers might have multiple jobs in order to increase their total income and this could affect the estimated overwork premium, I also controlled for an indicator of multiple jobs. The variable of multiple jobs is available from 1994 onward in my data, and I found almost the same results as those reported in this paper without controlling for multiple jobs.

[9] The estimates are significant at the 99% confidence level.

almost unchanged, even when taking into account work-related characteristics (Appendix Figure 5). Marital status has little impact on the baseline results.

Figure 12B presents trends in the overwork premium for male workers to compare those for female workers. The OLS results show that there is an increasing trend in the overwork premium for male workers as well and that like women's overwork premium, men's overwork premium increases sharply in the mid-1990s. This result implies that a large increase in the overwork premium in the mid-1990s was an overall phenomenon in the labor market. In terms of wage distribution, women's overwork premium increases mainly for high-wage women, but men's overwork premium increases at most quantiles of the wage distribution.

As these results show, women's wage premium to overwork is similar in trend to the MWG: that is, there is a sharp decline in the MWG and a large increase in the motherhood premium in the mid-1990s. Trends in women's wage premium to overwork reflect both the causal effect of long work hours and selection. Even if the estimated trends in the overwork premium to work long hours are not entirely due to a causal effect, the significant relationship between long work hours and high wage rates for women and the increasing trends at the upper quantiles suggest that the wage premium to overwork is a probable reason for the large changes in the MWG at the upper wage quantiles in the mid-1990s.

7. Conclusion

This paper looks at recent trends in the MWG across women's wage distribution and discusses several reasons for the heterogeneous changes in the MWG. I find that a declining trend in the average MWG is mainly driven by high-wage mothers, and the MWG below the median decreases less than the average. The converging MWG means that mothers' productivity levels at work gradually become similar to those of non-mothers and negative selection into motherhood decreases over time.

I also find that a motherhood premium emerges for high-wage mothers. This paper describes the positive selection among high-wage mothers associated with the positive selection into marriage and late-birth among high-wage earners. Positive selection among high-wage mothers suggests that the traditional economics mechanism about women's wages and fertility timing needs to be more sophisticated. Low-skilled women tend to have low opportunity costs of childbirth and larger family sizes (e.g., Heckman & Walker, 1990), and mothers have been thought to be negatively selected in terms of wage. However, the trend changes at the high end of the wage distribution.

Family sizes of women in the top wage decile increase over time (Figures 13A and 13B) and their hourly wages increase during the same period (Figure 13C). The positive relationship between the trends in women's wages and family sizes in the top wage decile suggests that using the current wage level as a proxy for the opportunity cost of childbirth may not be suitable for high-wage earners. Positive selection into motherhood for high-wage women implies that highly skilled women who have sufficient work abilities to avoid losing their wages even after giving birth are likely to be mothers, leading to the motherhood premium at the top of the wage distribution.

This paper also pointed out that the uneven convergence of the MWG and the positive selection among high-wage mothers could result in an increase in wage inequality among mothers and among families with children. Reducing the motherhood penalty and increasing mothers' economic activities have been longstanding policy goals, but it is time to further refine the policy objective. Low-wage and middle-wage mothers who are less likely to benefit from private policies need more national protection. The United States needs policy support for low-wage and middle-wage mothers, including the increasing number of single mothers, so that they can keep a balance between economic activities and family lives.

Since the heterogeneous trends in the MWG by women's wage level are new findings, there may be many follow-up studies. First, in addition to women's marriage, delays in first birth, and overwork, there may be mechanisms that can explain the heterogeneous MWG trends across the wage distribution. Secondly, there are some empirical research topics that can be examined using the proposed mechanism of this paper. For example, this paper does not provide any causal effects of first-birth timing, marriage, and overwork on the MWG. Providing causal links between these factors and the MWG trend will add to the literature on the MWG. Lastly, the heterogeneous trends in the MWG could be considered in research on women's fertility decisions. Since the MWG is heterogeneous across the wage distribution, childless women could have different expectations of future wages after giving birth depending on their wage quantiles. Women's first-birth timing can be affected by these heterogeneous expectations of the MWG.

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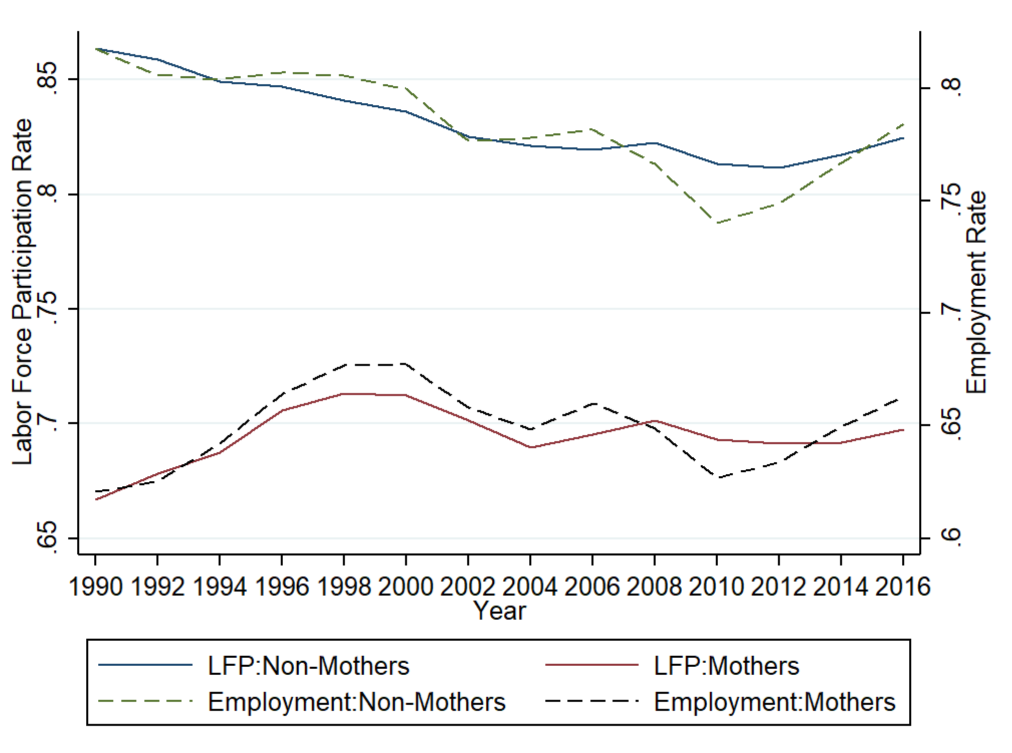
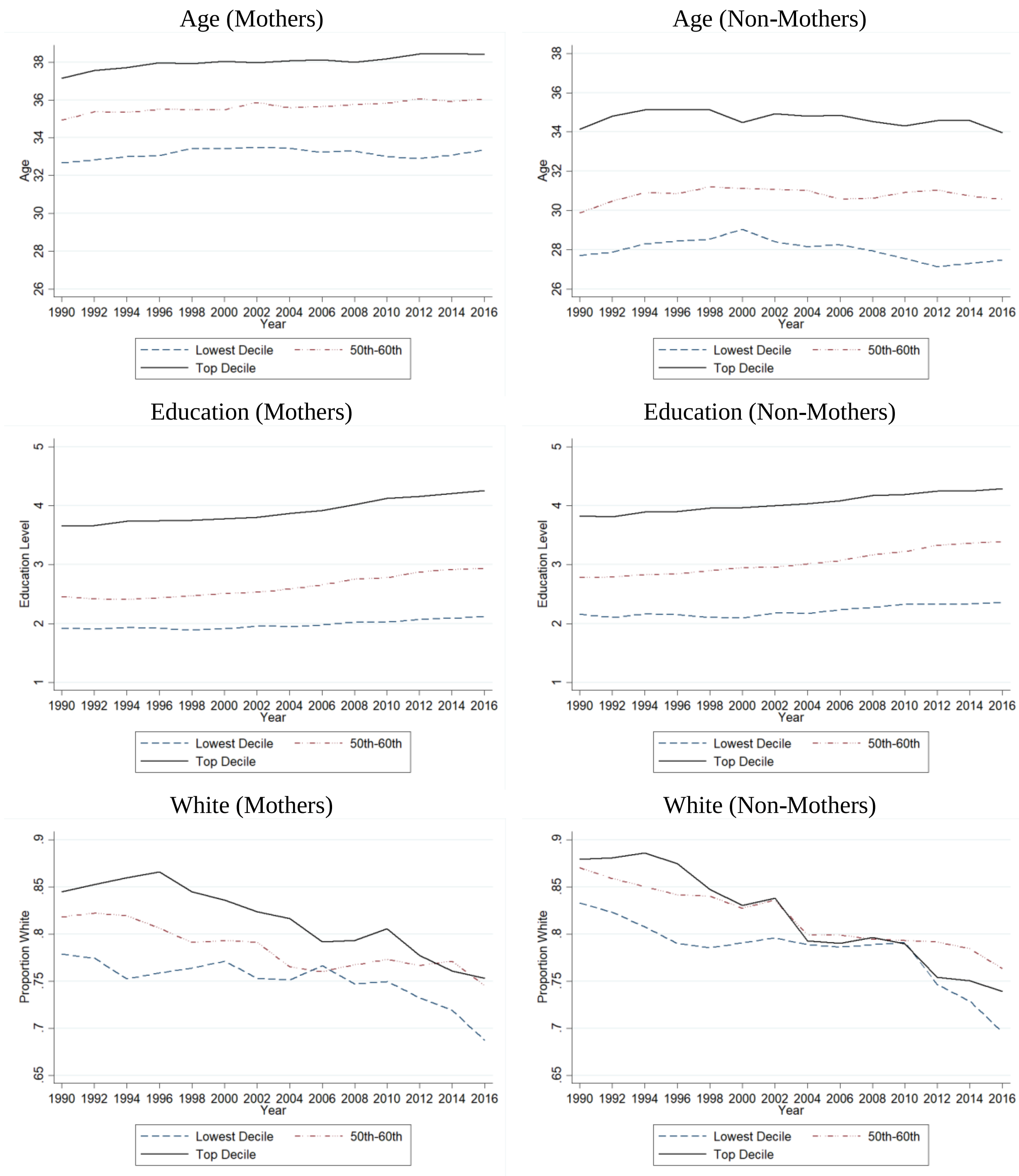
Figure 1: Labor Force Participation and Employment Rates by Motherhood Status



Notes: Labor force participation and employment rates are calculated among all mothers and non-mothers separately. Data are the CPS Outgoing Rotation Group. Samples are restricted to women aged 20 through 45, and do not include self-employed women and those in school or military.

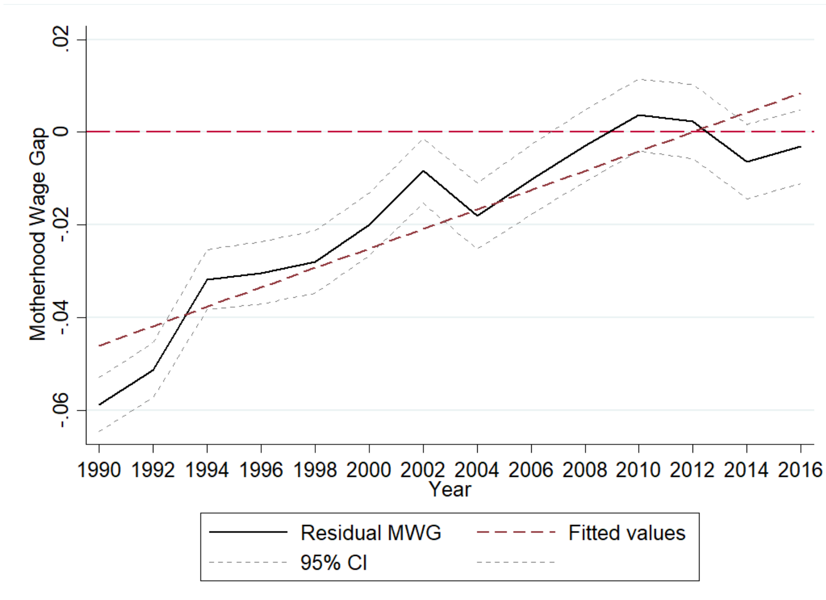
Figure 2: Changes in Demographic Characteristics of the Sample by Motherhood Status and Wage Decile



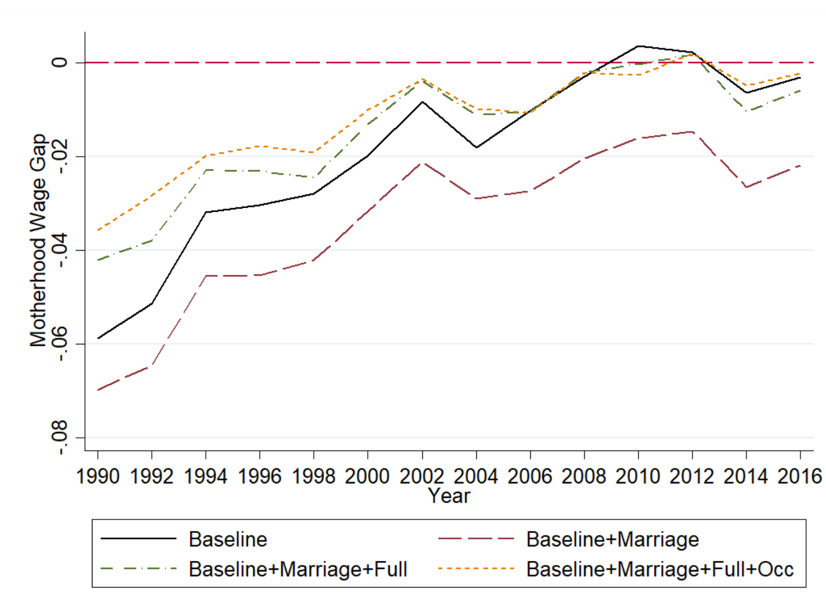
Notes: The sample is divided into 10 equal subsamples according to wage level regardless of the presence of children. Therefore, mothers and non-mothers in the same wage group are comparable. Each figure shows the changes in compositions of demographic characteristics for mothers and non-mothers by wage decile. For education level, each number indicates 1. less than high school, 2. high school, 3. some college, 4. four-year college, and 5. graduate school.

Figure 3: Trends in the Average Motherhood Wage Gap

A. Residual Motherhood Wage Gap with the 95% Confidence Interval

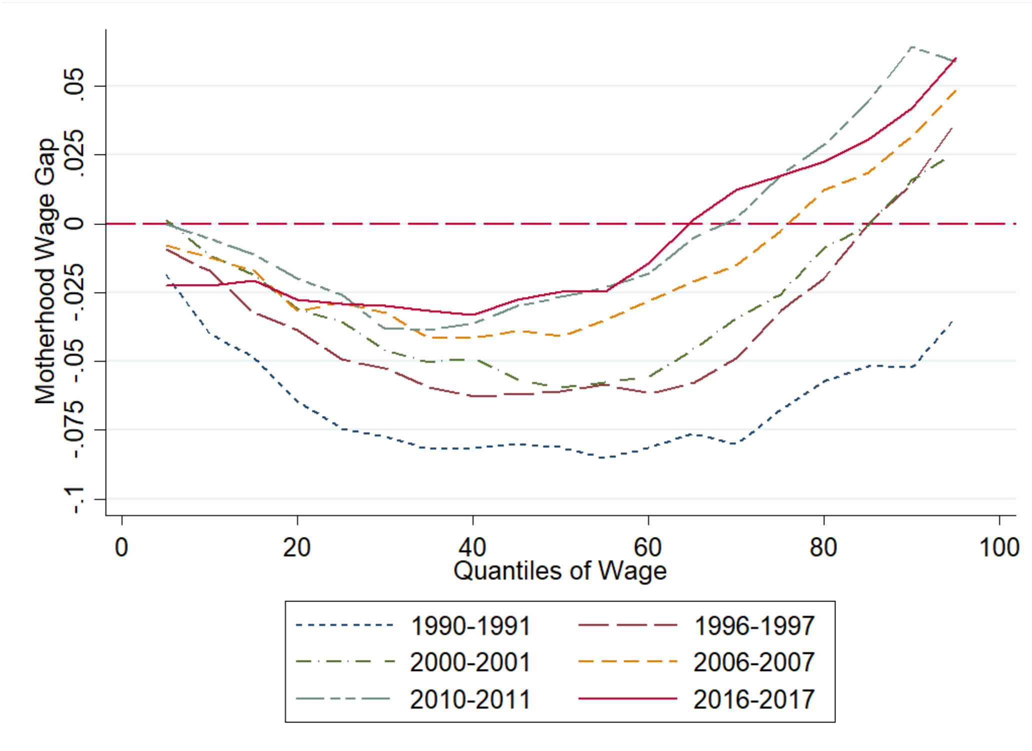


B. Residual Motherhood Wage Gap with Additional Controls



Notes: The Figures show the motherhood wage gaps estimated from the OLS estimation in each year. "Baseline" specification includes motherhood status, age, age squared, education, race indicators (White, Black, and Hispanic) and year fixed effect. Then, marital status, full-time work indicator, and 26 occupation indicators are subsequently added. Marital status indicates whether a woman currently lives with a husband. Full-time work indicator is defined based on the reports of the respondents. Occupation indicators are defined according to the CPS occupation codes.

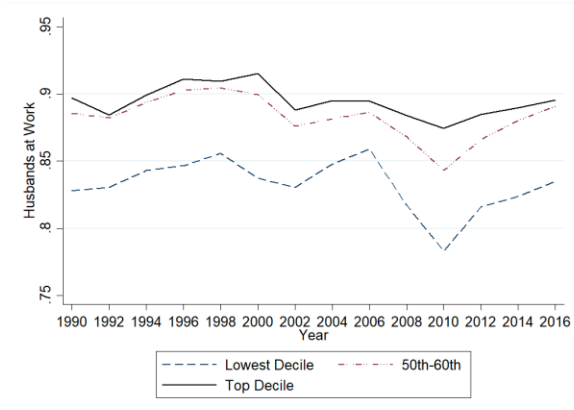
Figure 4: Motherhood Wage Gap Across the Wage Distribution by Year



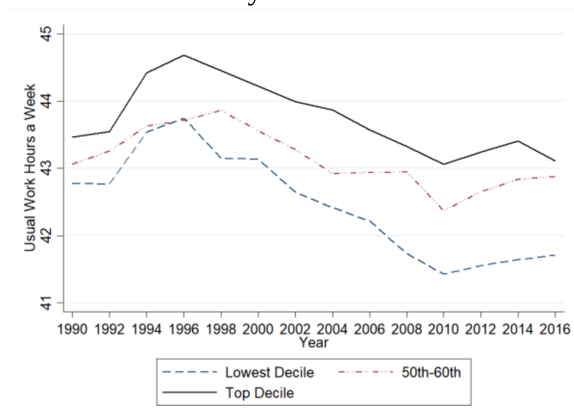
Notes: The figure shows the distribution of the motherhood wage gaps estimated from the UQR. The regression includes baseline covariates which are motherhood status, age, age squared, education, race indicators (White, Black, and Hispanic), and year fixed effect.

Figure 5: Husbands' Labor Market Outcomes by Wives' Wage Decile

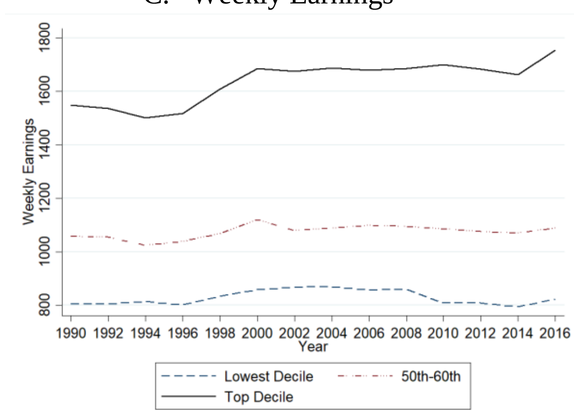
A. Proportion of Husbands at Work



B. Weekly Work Hours



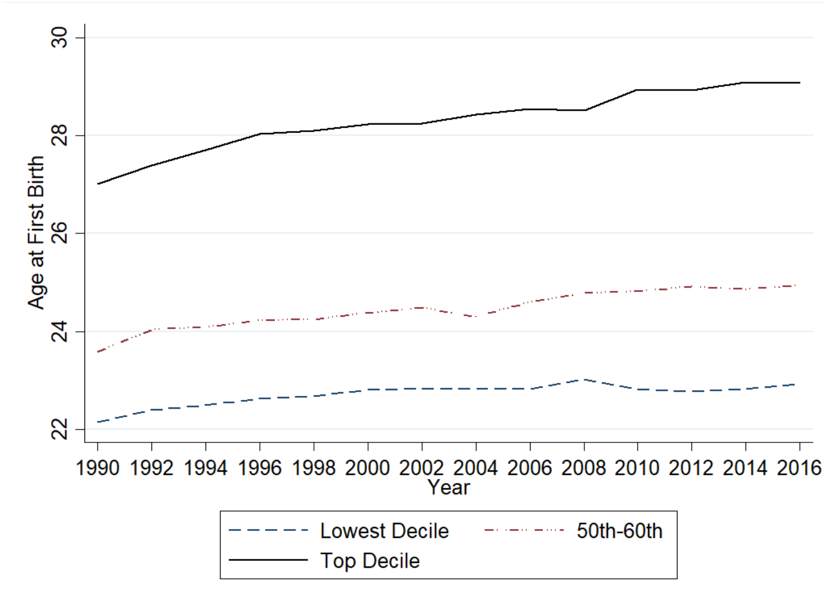
C. Weekly Earnings



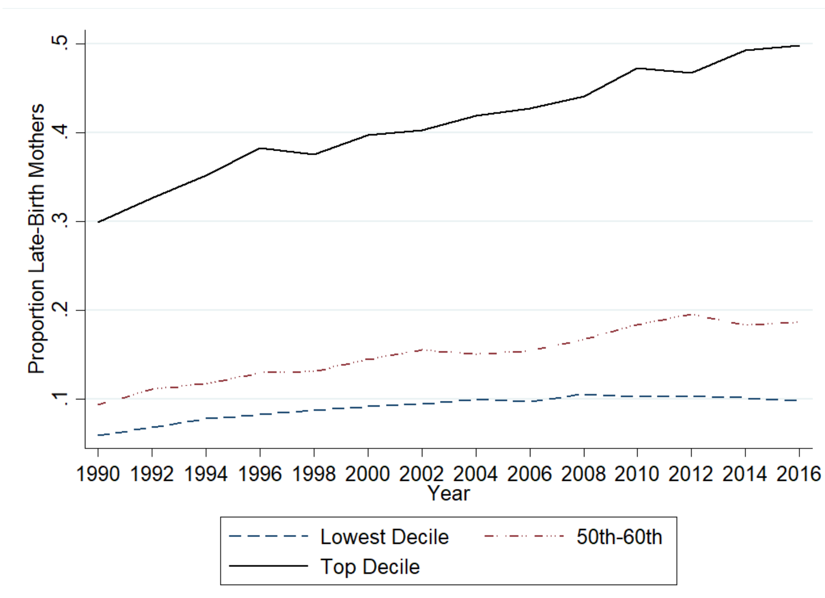
Notes: The Figures show husbands' labor market outcomes by wives' wage decile. Husbands who are at work are defined in all husbands in each wives' wage group. Weekly work hours and weekly earnings include 0 values.

Figure 6: Changes in First-Birth Timing by Wage Decile

A. Average Age at First Birth



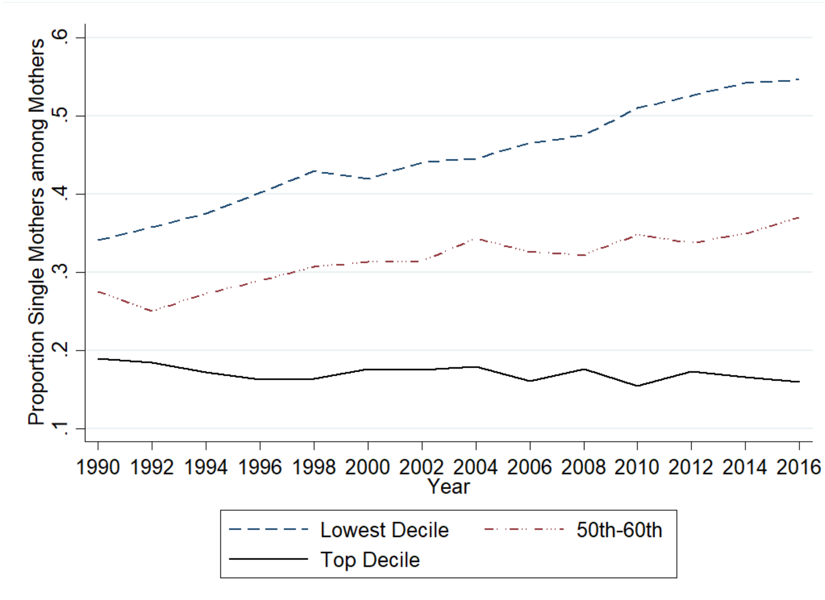
B. The Proportion of Late-Birth Mothers



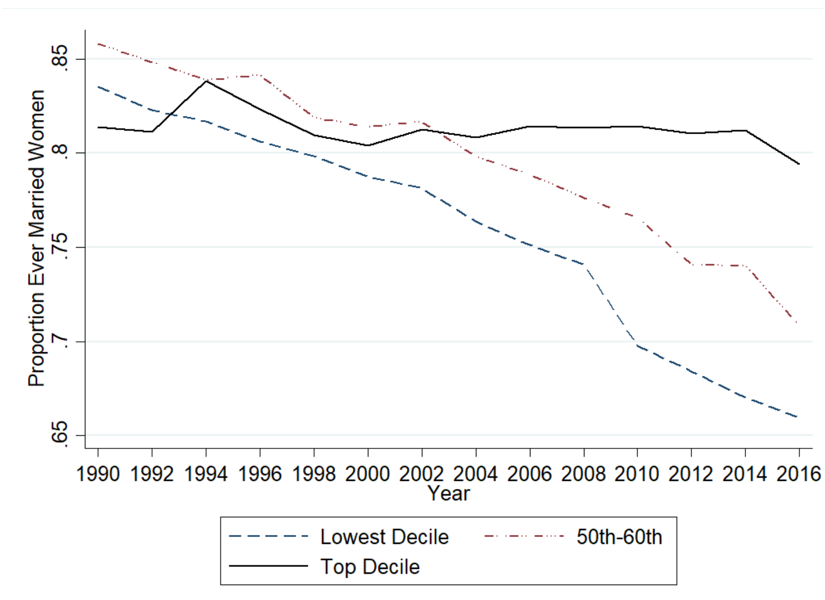
Notes: The sample is divided into 10 equal subsamples according to wage level without distinguishing mothers and non-mothers. The proportion of late-birth mothers is defined in all mothers in each wage group.

Figure 7: The Proportion of Single Mothers and Ever Married Women by Wage Level

A. The Proportion of Single Mothers by Wage Level

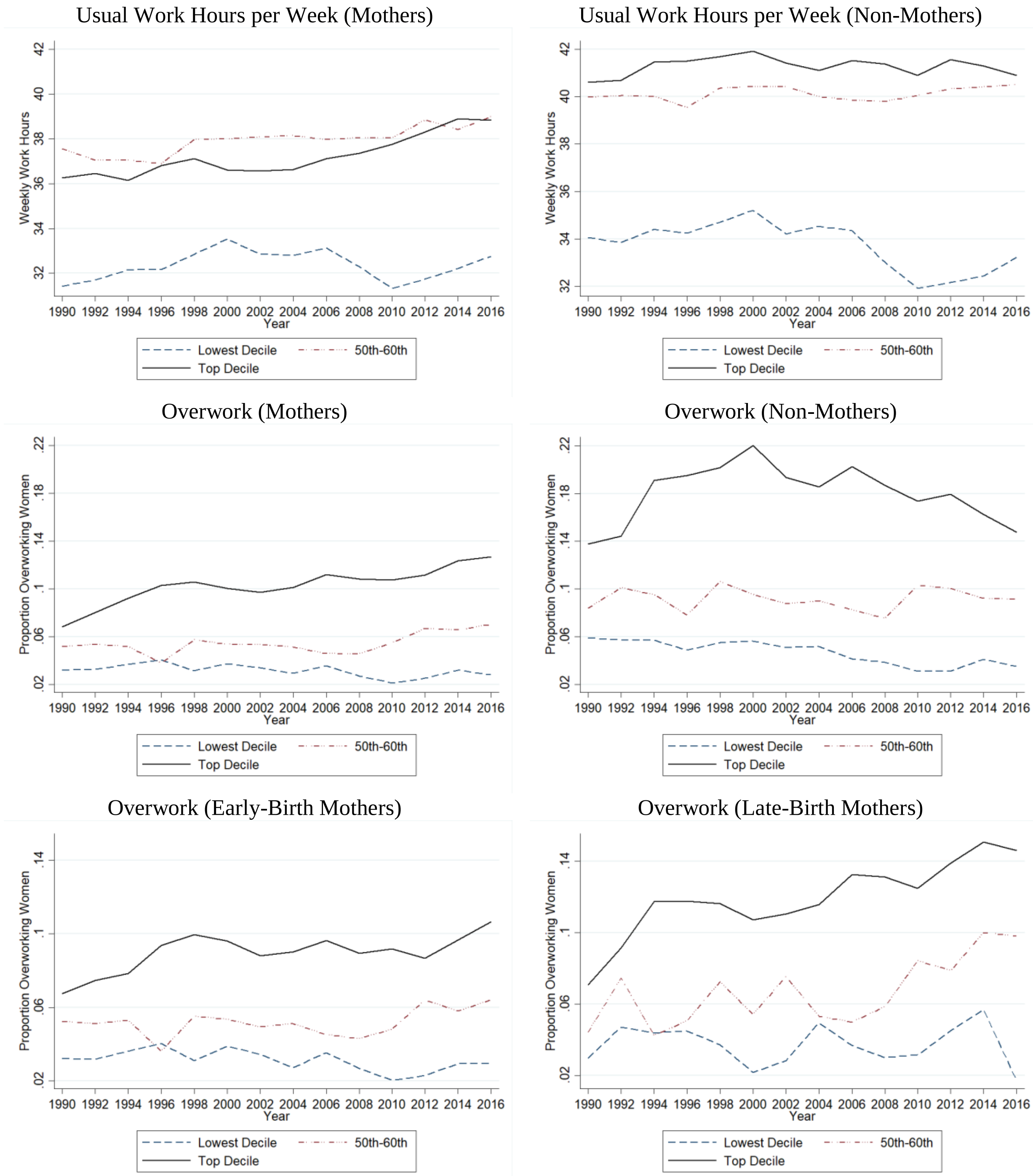


B. The Proportion of Women Who Have Ever Been Married Among Women Aged 28 or Older by Wage Decile



Notes: The sample is divided into 10 equal subsamples according to wage level regardless of the presence of children, and mothers and non-mothers in the same wage group are comparable. Panel A shows the proportion of single mothers in all mothers in each wage group, and Panel B shows the proportion of women who have ever been married among women aged 28 or older in each wage group regardless of the presence of children.

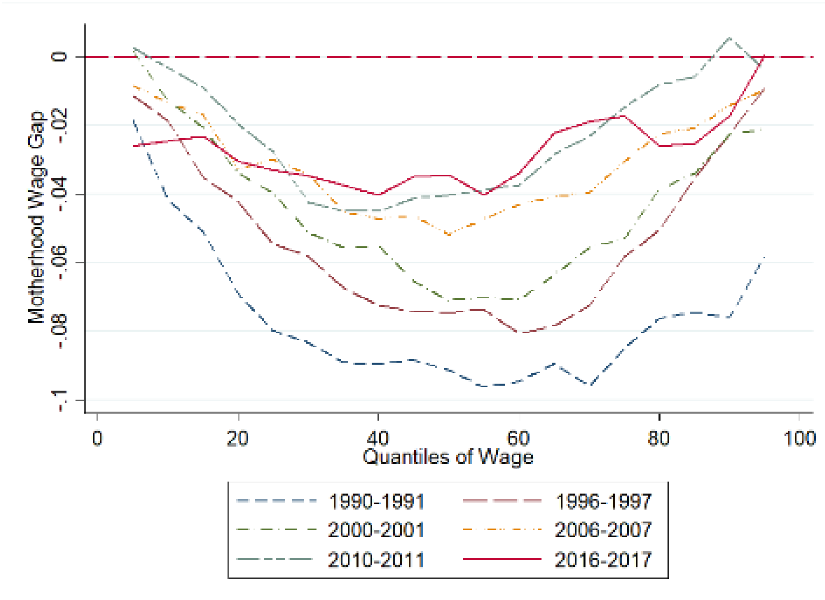
Figure 8: Changes in Weekly Work Hours by Wage Decile



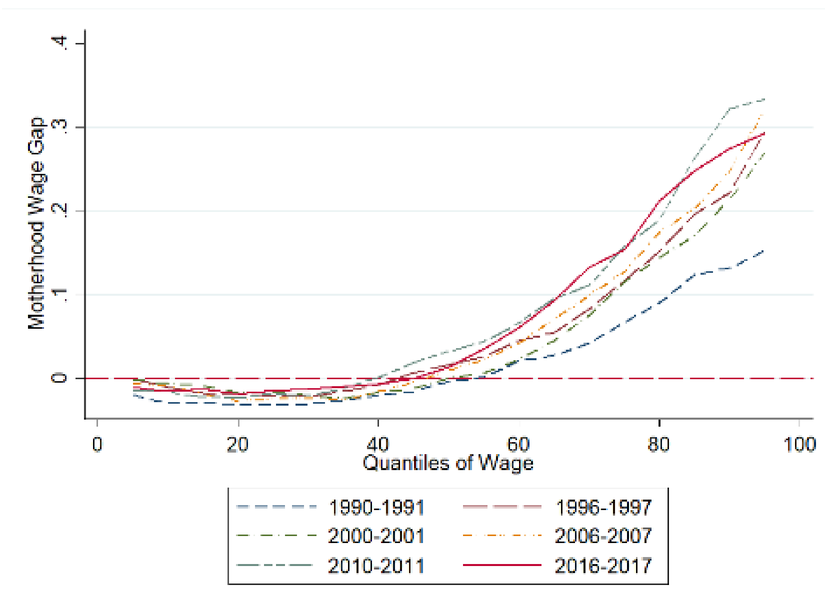
Notes: The sample is divided into 10 equal subsamples according to wage level regardless of the presence of children, and mothers and non-mothers in the same wage group are comparable. The proportion of overworking mothers (non-mothers) is defined in all mothers (non-mothers) in each wage group.

Figure 9: Motherhood Wage Gap by Maternal Ages at First Birth

A. First Birth Before 30 Years Old (Early-Birth Mothers)



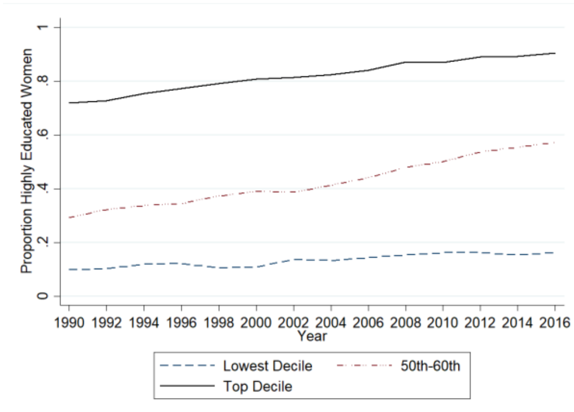
B. First Birth at 30 Years Old or After (Late-Birth Mothers)



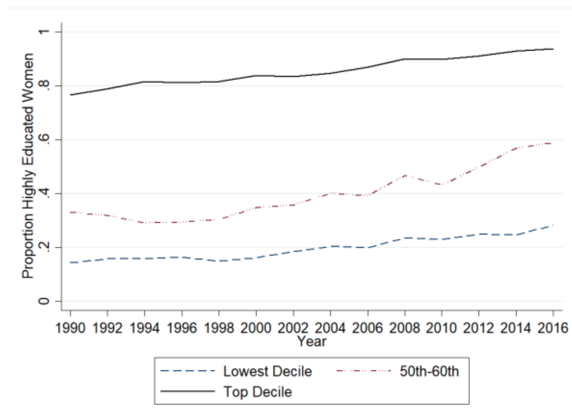
Notes: The motherhood wage gaps are estimated by including interaction terms in the baseline specification. The baseline covariates are motherhood status, age, age squared, education, race, and year fixed effect.

Figure 10: The Proportion of Women Who Have at Least a Four-Year College Education by Wage Decile

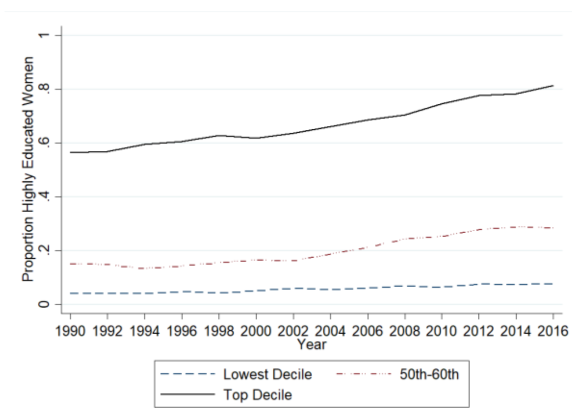
A. Non-Mothers



B. Late-Birth Mothers



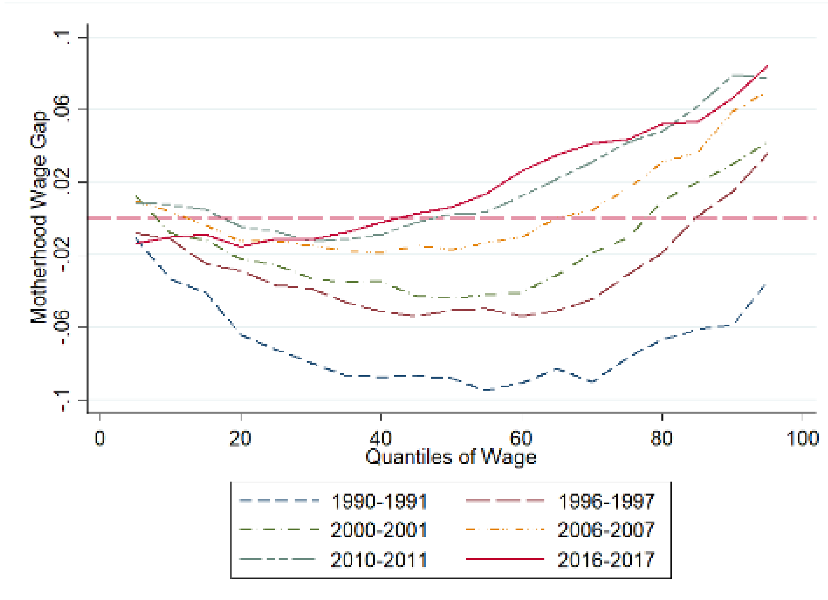
C. Early-Birth Mothers



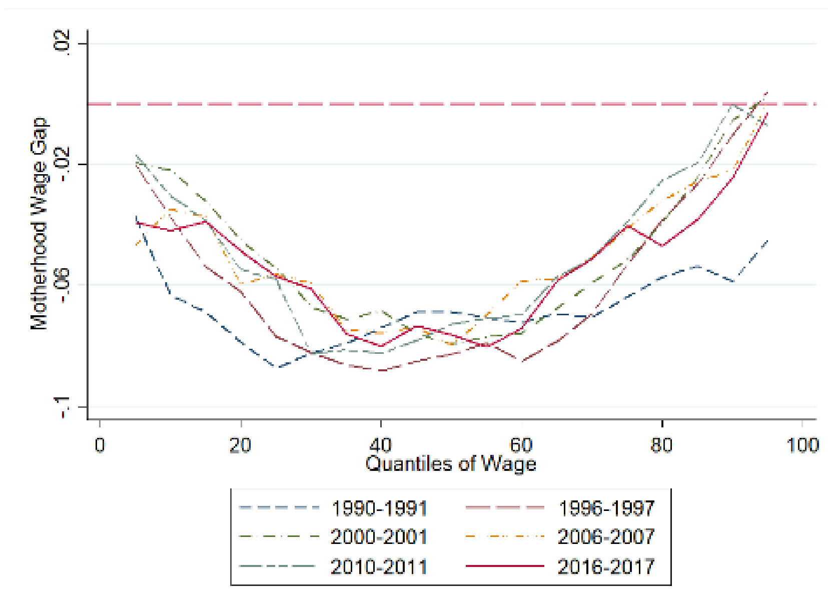
Notes: The sample is divided into 10 equal subsamples according to wage level regardless of the presence of children. The proportion of highly educated non-mothers (late-birth mothers, early-birth mothers) are defined in all non-mothers (late-birth mothers, early-birth mothers) in each wage group.

Figure 11: Motherhood Wage Gap by Marital Status

A. Wage Gap Between Married Mothers and Non-Mothers



B. Wage Gap Between Single Mothers and Non-Mothers

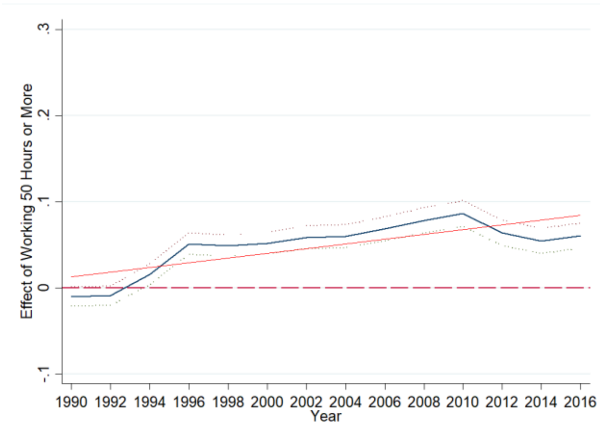


Notes: The motherhood wage gaps are estimated by including interaction terms in the baseline specification. The baseline covariates are motherhood status, age, age squared, education, race, and year fixed effect.

Figure 12: Relationship Between Overwork and Hourly Wage

A. Women

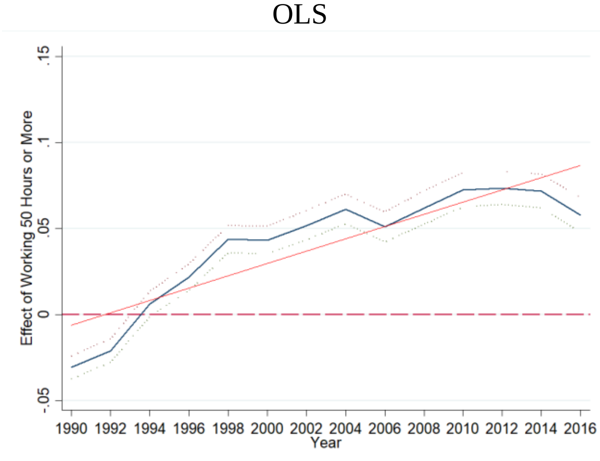
OLS



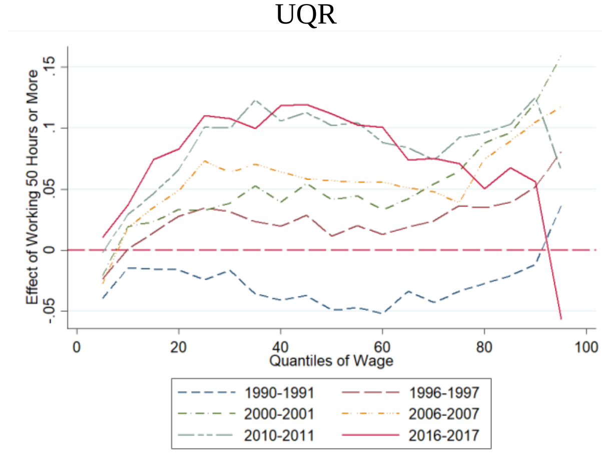
UQR

B. Men

OLS

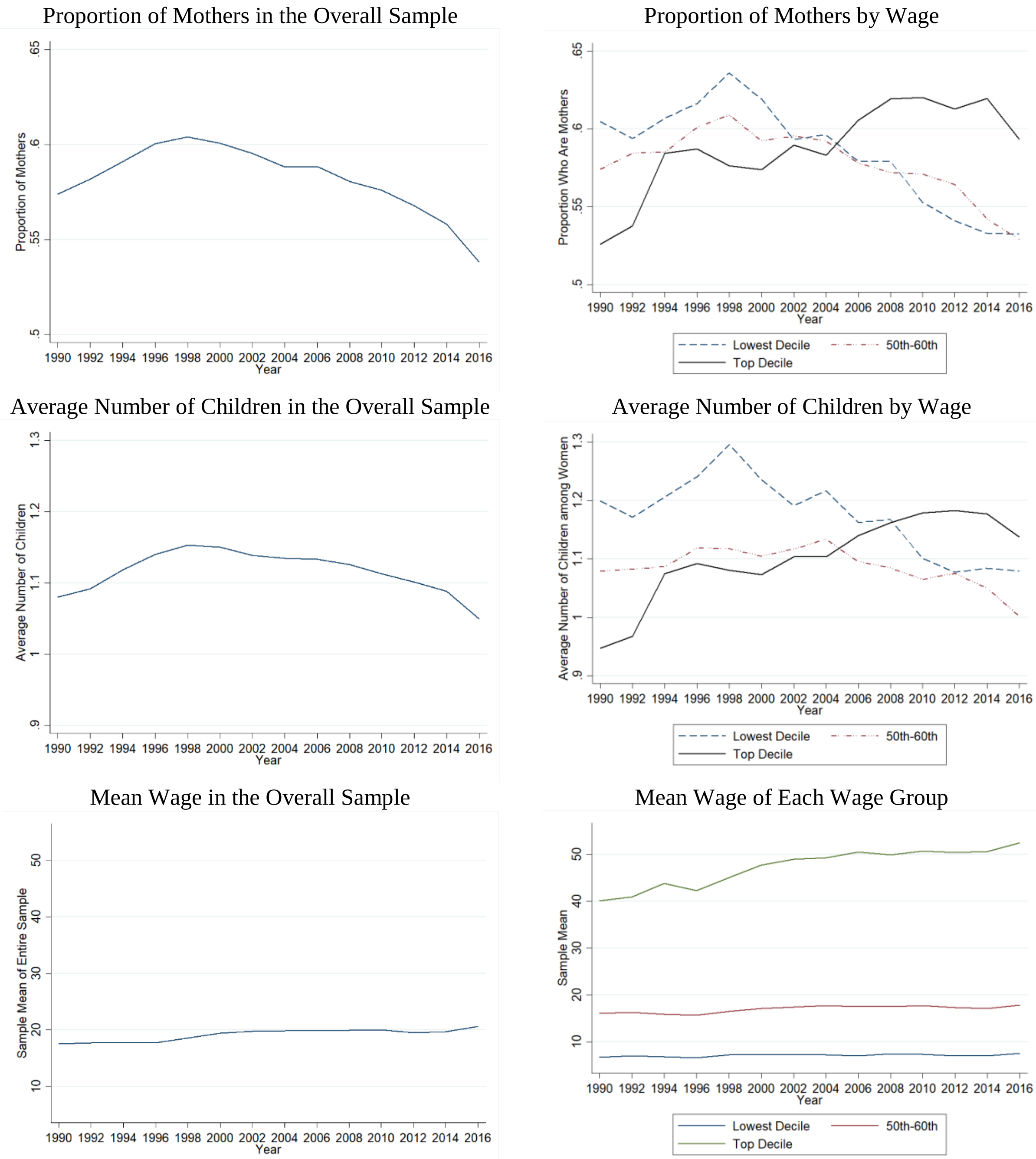


UQR



Notes: The figures show the relationship between work over 50 hours per week and hourly wage rates of female and male workers. Control variables are an indicator of work exceeding 50 hours a week, motherhood status, age, age squared, education, race, and year fixed effect. The dotted lines with the OLS estimates are the 95 percent confidence intervals.

Figure 13: Trends in the Proportion of Mothers and the Average Number of Children



Notes: The sample is divided into 10 equal subsamples according to wage level regardless of the presence of children. The average number of children in each wage group is defined for all women (not only for mothers) in each wage group.

Table 1: Descriptive Statistics in 1990-1991, 2000-2001, and 2010-2011

	1990-1991				2000-2001				2010-2011			
	Mothers		Non-Mothers		Mothers		Non-Mothers		Mothers		Non-Mothers	
	0.57		0.43		0.60		0.40		0.58		0.42	
Variable	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
LFP	0.67	(0.47)	0.86	(0.34)	0.71	(0.45)	0.84	(0.37)	0.69	(0.46)	0.81	(0.39)
Employed	0.62	(0.49)	0.82	(0.39)	0.68	(0.47)	0.80	(0.40)	0.63	(0.48)	0.74	(0.44)
Wage	17.17	(10.04)	18.10	(10.35)	19.08	(12.80)	19.98	(12.65)	20.29	(13.66)	19.60	(12.58)
Full-time	0.74	(0.44)	0.87	(0.34)	0.77	(0.42)	0.89	(0.32)	0.76	(0.43)	0.82	(0.38)
Overwork	0.04	(0.20)	0.08	(0.27)	0.05	(0.22)	0.10	(0.30)	0.05	(0.21)	0.08	(0.27)
Age	34.82	(6.22)	30.14	(7.15)	35.39	(6.45)	31.21	(7.47)	35.52	(6.34)	30.39	(7.12)
Less HS	0.10	(0.30)	0.06	(0.23)	0.10	(0.30)	0.05	(0.23)	0.08	(0.27)	0.04	(0.19)
HS	0.55	(0.50)	0.44	(0.50)	0.55	(0.50)	0.45	(0.50)	0.46	(0.50)	0.39	(0.49)
Some Col.	0.15	(0.35)	0.17	(0.37)	0.12	(0.32)	0.10	(0.30)	0.14	(0.34)	0.10	(0.31)
BA	0.15	(0.36)	0.26	(0.44)	0.17	(0.38)	0.29	(0.46)	0.22	(0.41)	0.33	(0.47)
More BA	0.05	(0.22)	0.07	(0.26)	0.06	(0.24)	0.10	(0.30)	0.11	(0.32)	0.14	(0.34)
White	0.81	(0.39)	0.86	(0.35)	0.78	(0.41)	0.81	(0.39)	0.77	(0.42)	0.79	(0.41)
Black	0.15	(0.36)	0.10	(0.30)	0.16	(0.37)	0.12	(0.33)	0.15	(0.36)	0.13	(0.33)
Hispanic	0.00	(0.07)	0.00	(0.06)	0.01	(0.09)	0.01	(0.07)	0.02	(0.12)	0.01	(0.10)
Married	0.73	(0.44)	0.35	(0.48)	0.68	(0.47)	0.33	(0.47)	0.65	(0.48)	0.28	(0.45)
Age at FB	23.80	(4.62)			24.48	(5.05)			24.93	(5.31)		
Num. Children	1.88	(0.90)			1.91	(0.92)			1.93	(0.93)		
Obs.	67,426		48,625		58,180		37,518		49,070		35,253	

Notes: The data are the Current Population Survey (CPS) Outgoing Rotation Groups. Samples are restricted to employed women aged 20 to 45. Each sample pools the data for two years. All sample means of mothers are statistically different from those for non-mothers. The number of observations for the labor force participation and employment rates are 106,951, 84,829, and 76,505 for mothers and 59,176, 46,712, and 46,872 for non-mothers in 1990–1991, 2000–2001, and 2010–2011 respectively.

Table 2: Motherhood Wage Gap at the Mean and by Quantiles of the Hourly Wage Distribution

	Log of Hourly Wage					
	1990-1991			2016-2017		
	Baseline	+Marriage	+Full-Time Work and Occupation	Baseline	+Marriage	+Full-Time Work and Occupation
OLS	-0.059***	-0.070***	-0.036***	-0.003	-0.022***	-0.002
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
UQR						
q=10	-0.040***	-0.057***	-0.019***	-0.022***	-0.030***	-0.015***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)
q=25	-0.074***	-0.088***	-0.044***	-0.029***	-0.042***	-0.016***
	(0.005)	(0.005)	(0.004)	(0.005)	(0.006)	(0.005)
q=50	-0.081***	-0.085***	-0.050***	-0.024***	-0.046***	-0.022***
	(0.004)	(0.005)	(0.004)	(0.006)	(0.006)	(0.006)
q=75	-0.068***	-0.072***	-0.047***	0.018**	-0.006	0.011
	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)
q=90	-0.052***	-0.061***	-0.041***	0.042***	0.020**	0.034***
	(0.007)	(0.007)	(0.007)	(0.010)	(0.010)	(0.010)
Obs.	116,051	116,051	116,051	77,528	77,528	77,528

Notes: Baseline model includes age, age squared, education, race indicators (White, Black, and Hispanic), and year fixed effect. The second and fifth columns add marital status to the baseline model, and the third and last column subsequently adds full-time work and occupation indicators. (* p < 0.10, ** p < 0.05, *** p < 0.01)

Table 3: The Estimated Motherhood Wage Gap and Differences in the Wage Gaps

	1990-1991		2000-2001		2016-2017		Difference between		
	MWG	Std. err.	MWG	Std. err.	MWG	Std. err.	1990-2000	2000-2016	1990-2016
OLS	-0.059	(0.003)	-0.020	(0.003)	-0.003	(0.004)	0.039	0.017	0.056
UQR									
10^{th}	-0.040	(0.005)	-0.012	(0.005)	-0.022	(0.005)	0.029	-0.011	0.018
20^{th}	-0.065	(0.005)	-0.031	(0.005)	-0.028	(0.005)	0.034	0.003	0.037
30^{th}	-0.077	(0.004)	-0.046	(0.005)	-0.030	(0.005)	0.031	0.016	0.047
40^{th}	-0.082	(0.004)	-0.049	(0.004)	-0.033	(0.005)	0.033	0.015	0.048
50^{th}	-0.081	(0.004)	-0.059	(0.005)	-0.024	(0.006)	0.022	0.035	0.057
60^{th}	-0.081	(0.005)	-0.056	(0.005)	-0.015	(0.006)	0.026	0.041	0.067
70^{th}	-0.080	(0.005)	-0.034	(0.005)	0.012	(0.007)	0.046	0.047	0.092
80^{th}	-0.057	(0.005)	-0.009	(0.006)	0.022	(0.008)	0.048	0.031	0.080
90^{th}	-0.052	(0.007)	0.016	(0.008)	0.042	(0.010)	0.068	0.026	0.094

Notes: This table shows the estimated motherhood wage gap in 1990–1991, 2000–2001, and 2016–2017. The last three columns show a difference in the motherhood wage gap between the displayed years. For example, the second row of the last column is found by subtracting -0.040 (the estimated motherhood wage gap in 1990–1991 at the 10^{th} quantile) from -0.022 (the estimated motherhood wage gap in 2016–2017 at the 10^{th} quantile).

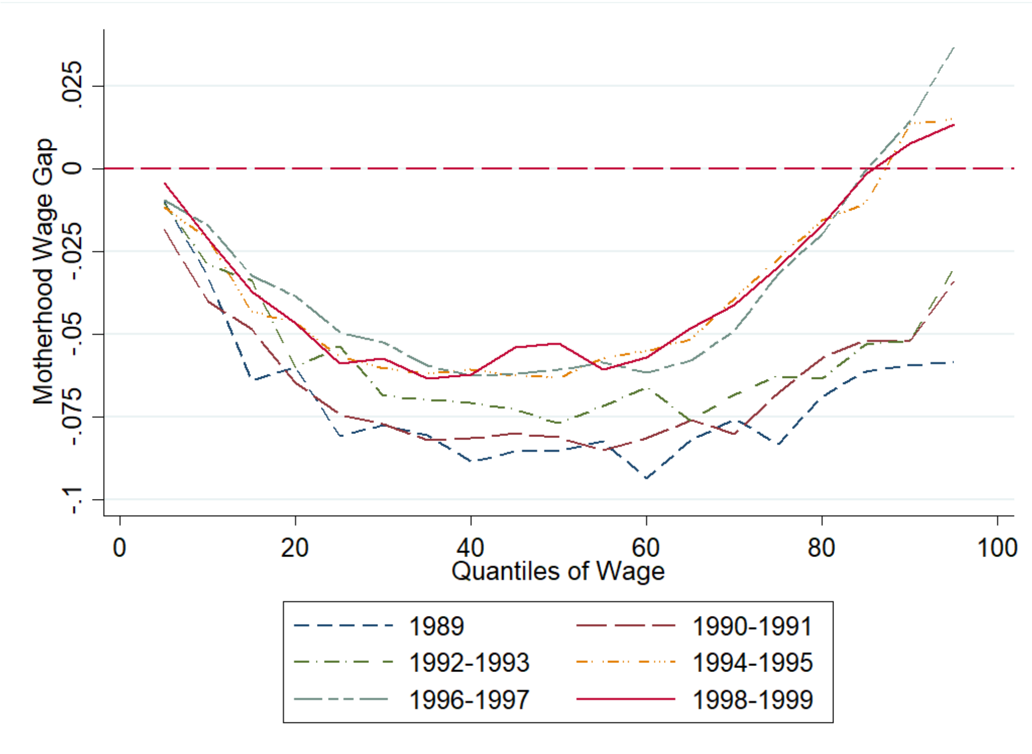
Table 4: Wage Inequality Among Mothers from Aggregate Oaxaca-Blinder Decomposition

	A. Baseline Model							
	1990-2000				2000-2010			
	90^{th}-10^{th}	90^{th}-50^{th}	50^{th}-10^{th}	Gini*100	90^{th}-10^{th}	90^{th}-50^{th}	50^{th}-10^{th}	Gini*100
Total	0.070	0.118	-0.048	15.063	0.352	0.273	0.079	37.203
Explained	-0.006	-0.014	0.008	0.194	-0.008	-0.024	0.016	-0.053
Unexplained	0.076	0.132	-0.056	14.869	0.361	0.298	0.063	37.256
	B. Full Model							
	1990-2000				2000-2010			
	90^{th}-10^{th}	90^{th}-50^{th}	50^{th}-10^{th}	Gini*100	90^{th}-10^{th}	90^{th}-50^{th}	50^{th}-10^{th}	Gini*100
Total	0.053	0.074	-0.021	0.068	0.093	0.077	0.017	0.740
Explained	0.025	0.006	0.019	0.093	0.083	0.037	0.046	0.445
Unexplained	0.028	0.068	-0.040	-0.025	0.011	0.040	-0.029	0.295

Notes: Inequality measures are the estimated difference between the 90^{th} and 10^{th} quantiles (90^{th}-10^{th}), between the 90^{th} and 50^{th} quantiles (90^{th}-50^{th}), and between the 50^{th} and 10^{th} quantiles (50^{th}-10^{th}) of the unconditional wage distribution, and the estimated Gini coefficient. The Oaxaca-Blinder decomposition method decomposes the estimated changes in inequality measures into changes in covariates (explained change) and changes in wage structures (unexplained change) between the displayed periods. Age, age squared, education, race and year fixed effect are included in the baseline model. Marital status, full-time work, and five occupation indicators are additionally included in Panel B.

Appendix A: Additional Figures and Tables

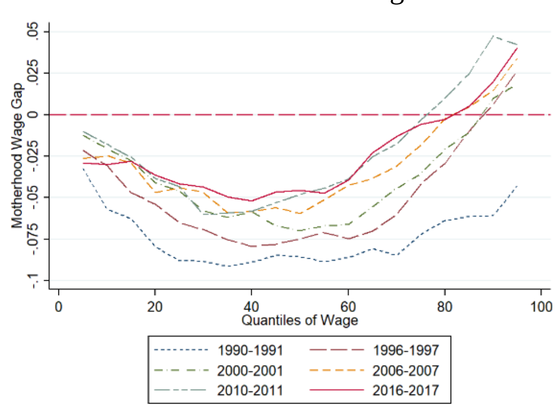
Appendix Figure A1: Motherhood Wage Gap Across the Wage Distribution in 1989 and in the 1990s



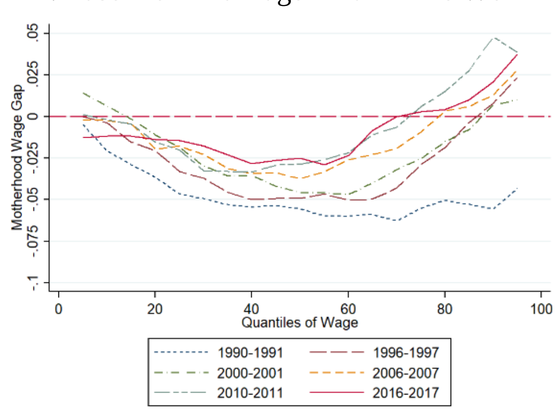
Notes: Graph shows the motherhood wage gaps estimated from the UQR from 1989 through 1999. The regression includes baseline covariates which are motherhood status, age, age squared, education, race indicators (White, Black, and Hispanic), and year fixed effect.

Appendix Figure A2: Motherhood Wage Gap Across the Wage Distribution with Additional Covariates

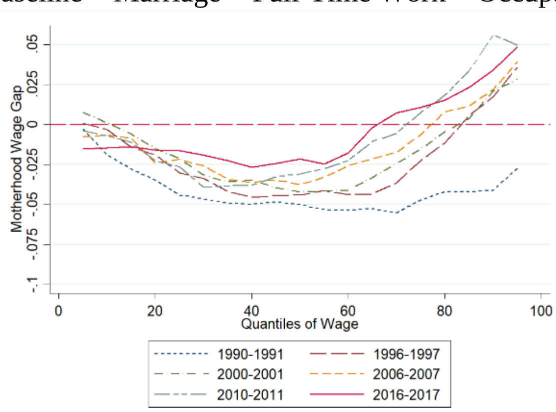
A. Baseline + Marriage



B. Baseline + Marriage + Full-Time Work

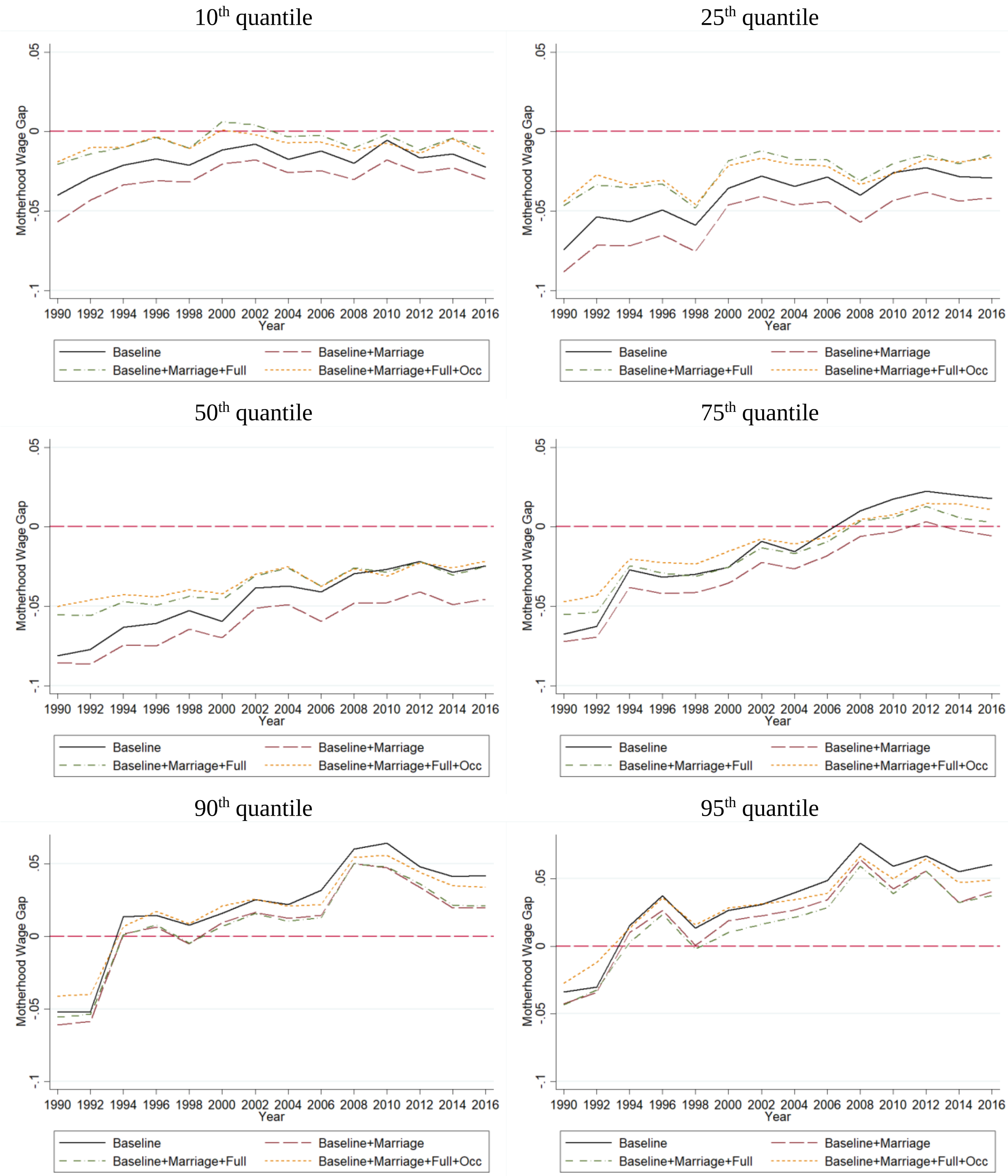


C. Baseline + Marriage + Full-Time Work + Occupation



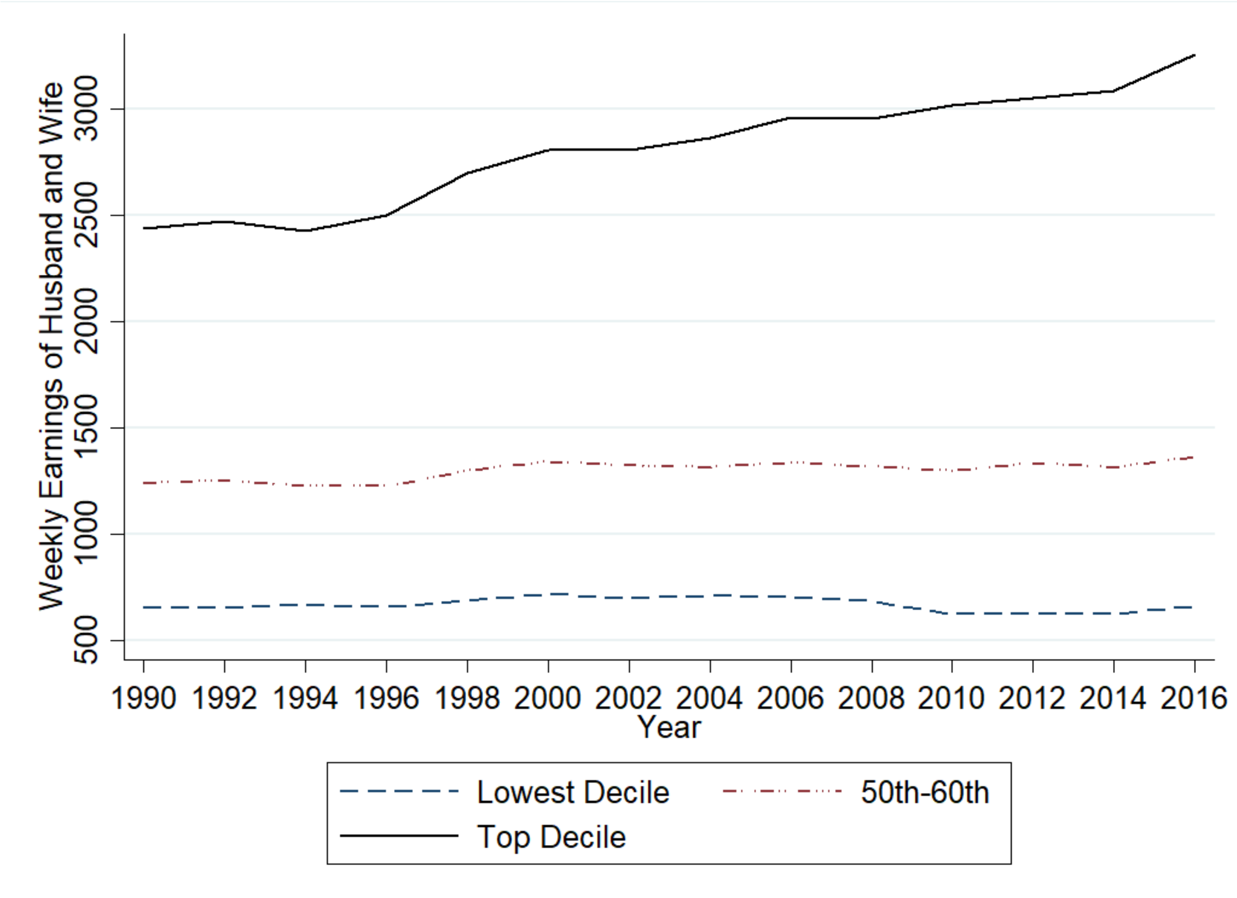
Notes: Graphs show the motherhood wage gap estimated from the UQR in the displayed years. Baseline model include motherhood status, age, age squared, education, race indicators (White, Black, and Hispanic), and year fixed effect. Full-time work indicator is defined based on the responded work type in the CPS. Occupation indicators are defined according to the CPS occupation codes.

Appendix Figure A3: Motherhood Wage Gap by Wage Quantile



Notes: The figures present the UQR estimates by wage quantiles. "Baseline" regression includes motherhood status, age, age squared, education, race and year fixed effect.

Appendix Figure A4: Weekly Earnings of Husband and Wife by Wives' Wage Level

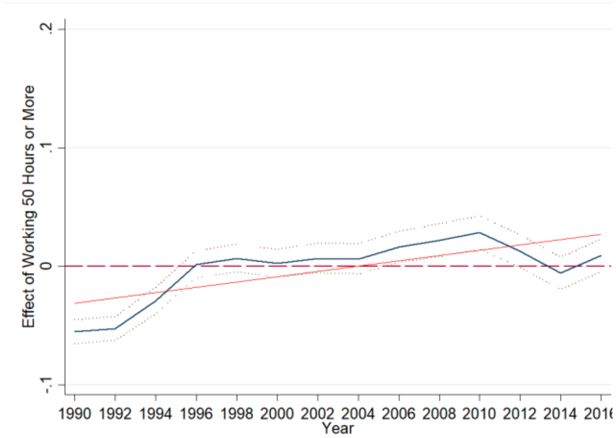


Notes: This figure shows the sum of husband and wife's weekly earnings by wives' wage level. Wives' wage level is defined among all women regardless of the presence of children. The sample for this figure is restricted to household with children.

Appendix Figure A5: Relationship between Working above 50 Hours and Hourly Wage Estimated with Full Sets of Covariates

A. Women

OLS



UQR

B. Men

OLS

UQR

Notes: Figures show the relationship between working above 50 hours and wage rates of women and men, estimated from the OLS and UQR. Control variables are an indicator of working above 50 hours a week, motherhood status, age, age squared, education and race indicators, the full-time work indicator and 26 occupation indicators. Regression samples pool the data for two years and all regressions include year fixed effects. The dotted lines with the OLS estimates are the 95 percent confidence intervals.

Appendix Table A1: Sensitivity of UQR Results to Kernel and Bandwidth Selection

			A. 1990-1991			
Kernel	Bandwidth	q=10	q=25	q=50	q=75	q=90
Gaussian	0.045	-0.040***	-0.074***	-0.081***	-0.068***	-0.052***
		(0.005)	(0.005)	(0.004)	(0.005)	(0.007)
	0.03	-0.041***	-0.074***	-0.081***	-0.068***	-0.054***
		(0.005)	(0.004)	(0.004)	(0.005)	(0.007)
	0.07	-0.039***	-0.075***	-0.082***	-0.068***	-0.051***
		(0.005)	(0.005)	(0.004)	(0.005)	(0.006)
Epanechnikov	0.045	-0.040***	-0.074***	-0.081***	-0.067***	-0.052***
		(0.005)	(0.004)	(0.004)	(0.005)	(0.007)
	0.03	-0.041***	-0.072***	-0.082***	-0.067***	-0.055***
		(0.005)	(0.004)	(0.004)	(0.005)	(0.007)
	0.07	-0.038***	-0.076***	-0.082***	-0.069***	-0.050***
		(0.004)	(0.005)	(0.004)	(0.005)	(0.006)
Uniform	0.045	-0.043***	-0.059***	-0.080***	-0.065***	-0.056***
		(0.005)	(0.004)	(0.004)	(0.005)	(0.007)
	0.03	-0.044***	-0.087***	-0.084***	-0.080***	-0.055***
		(0.005)	(0.005)	(0.005)	(0.006)	(0.007)
	0.07	-0.040***	-0.077***	-0.078***	-0.073***	-0.048***
		(0.005)	(0.005)	(0.004)	(0.005)	(0.006)
Obs.		116,051	116,051	116,051	116,051	116,051
			B. 2000-2001			
Kernel	Bandwidth	q=10	q=25	q=50	q=75	q=90
Gaussian	0.048	-0.012**	-0.036***	-0.059***	-0.026***	0.016**
		(0.005)	(0.004)	(0.005)	(0.006)	(0.008)
	0.03	-0.012**	-0.034***	-0.060***	-0.026***	0.016**
		(0.005)	(0.004)	(0.005)	(0.006)	(0.007)
	0.07	-0.012**	-0.036***	-0.058***	-0.025***	0.016**
		(0.005)	(0.005)	(0.005)	(0.006)	(0.008)
Epanechnikov	0.048	-0.011**	-0.036***	-0.059***	-0.025***	0.016**
		(0.005)	(0.005)	(0.005)	(0.006)	(0.008)
	0.03	-0.012**	-0.035***	-0.059***	-0.026***	0.016**
		(0.005)	(0.004)	(0.005)	(0.006)	(0.008)
	0.07	-0.011**	-0.036***	-0.057***	-0.025***	0.016**
		(0.005)	(0.005)	(0.005)	(0.006)	(0.008)
Uniform	0.048	-0.013**	-0.034***	-0.062***	-0.027***	0.016**
		(0.005)	(0.004)	(0.005)	(0.006)	(0.008)
	0.03	-0.014**	-0.037***	-0.068***	-0.026***	0.015**
		(0.006)	(0.005)	(0.006)	(0.006)	(0.007)
	0.07	-0.011**	-0.035***	-0.062***	-0.025***	0.015**
		(0.005)	(0.004)	(0.005)	(0.006)	(0.007)
Obs.		95,698	95,698	95,698	95,698	95,698
			C. 2010-2011			
Kernel	Bandwidth	q=10	q=25	q=50	q=75	q=90
Gaussian	0.055	-0.005	-0.026***	-0.027***	0.017**	0.065***
		(0.004)	(0.005)	(0.005)	(0.007)	(0.009)

	0.03	-0.005	-0.021***	-0.025***	0.018**	0.067***
		(0.004)	(0.004)	(0.005)	(0.007)	(0.010)
	0.07	-0.006	-0.027***	-0.027***	0.017**	0.064***
		(0.004)	(0.005)	(0.005)	(0.007)	(0.009)
Epanechnikov	0.055	-0.005	-0.027***	-0.027***	0.017**	0.064***
		(0.004)	(0.005)	(0.005)	(0.007)	(0.009)
	0.03	-0.005	-0.023***	-0.025***	0.018**	0.066***
		(0.004)	(0.004)	(0.005)	(0.007)	(0.009)
	0.07	-0.006	-0.028***	-0.028***	0.017**	0.063***
		(0.004)	(0.005)	(0.006)	(0.007)	(0.009)
Uniform	0.055	-0.005	-0.025***	-0.024***	0.018**	0.069***
		(0.004)	(0.005)	(0.005)	(0.007)	(0.010)
	0.03	-0.004	-0.019***	-0.023***	0.019**	0.076***
		(0.003)	(0.003)	(0.005)	(0.008)	(0.011)
	0.07	-0.005	-0.026***	-0.026***	0.019**	0.067***
		(0.004)	(0.005)	(0.005)	(0.008)	(0.010)
Obs.		84,323	84,323	84,323	84,323	84,323

Notes: Cell entries are the estimated MWG with standard errors in parentheses. The MWG is estimated from the baseline specification, which includes age, age squared, education, race indicators (White, Black, and Hispanic), and year fixed effect. The first bandwidth of each kernel is the optimal bandwidth calculated with Silverman's (1992) formula. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

Appendix Table A2: Wage Inequality Among Childless Women from Aggregate Oaxaca-Blinder Decomposition

	A. Baseline Model							
	1990-2000				2000-2010			
	90^{th}-10^{th}	90^{th}-50^{th}	50^{th}-10^{th}	Gini*100	90^{th}-10^{th}	90^{th}-50^{th}	50^{th}-10^{th}	Gini*100
Total	0.089	0.106	-0.017	19.785	0.242	0.214	0.028	22.541
Explained	0.022	0.007	0.014	3.636	-0.030	-0.035	0.005	-2.686
Unexplained	0.067	0.099	-0.032	16.149	0.272	0.249	0.023	25.227
	B. Full Model							
	1990-2000				2000-2010			
	90^{th}-10^{th}	90^{th}-50^{th}	50^{th}-10^{th}	Gini*100	90^{th}-10^{th}	90^{th}-50^{th}	50^{th}-10^{th}	Gini*100
Total	0.003	0.026	-0.023	0.130	0.020	0.054	-0.033	0.650
Explained	0.034	0.000	0.034	0.023	0.040	0.024	0.016	0.509
Unexplained	-0.031	0.025	-0.056	0.107	-0.020	0.030	-0.050	0.141

Notes: Inequality measures are the estimated difference between the 90^{th} and 10^{th} quantiles (90^{th}-10^{th}), between the 90^{th} and 50^{th} quantiles (90^{th}-50^{th}), and between the 50^{th} and 10^{th} quantiles (50^{th}-10^{th}) of the unconditional wage distribution, and the estimated Gini coefficient. The Oaxaca-Blinder decomposition method decomposes the estimated changes in inequality measures into changes in covariates (explained change) and changes in wage structures (unexplained change) between the displayed periods. Age, age squared, education, race and year fixed effect are included in the baseline model. Marital status, full-time work, and five occupation indicators are additionally included in Panel B.

Appendix B: Trends in the Fatherhood Wage Premium

Like the MWG, it is widely known that fathers earn more wages than childless men under the same observed conditions (Budig & Hodges, 2010; Glauber, 2008; Lundberg & Rose, 2000). In order to compare trends in the fatherhood wage premium (FWP) to the MWG trends, I estimate the residual FWP with the same sample restriction and regression equations. Descriptive statistics of the sample are presented in Appendix Table B1. The estimated results are presented in Appendix Figure B1.

Panel A of Appendix Figure B1 shows the trends in the FWP estimated from the OLS, and Panel B of Appendix Figure B1 shows the trends across men's wage distribution. One interesting feature is that marital status reduces the average FWP by more than half, which implies a huge marriage premium for men. Work type and occupation do not result in much change in the FWP. The residual FWP that is conditional on marital status does not change much over time on average.

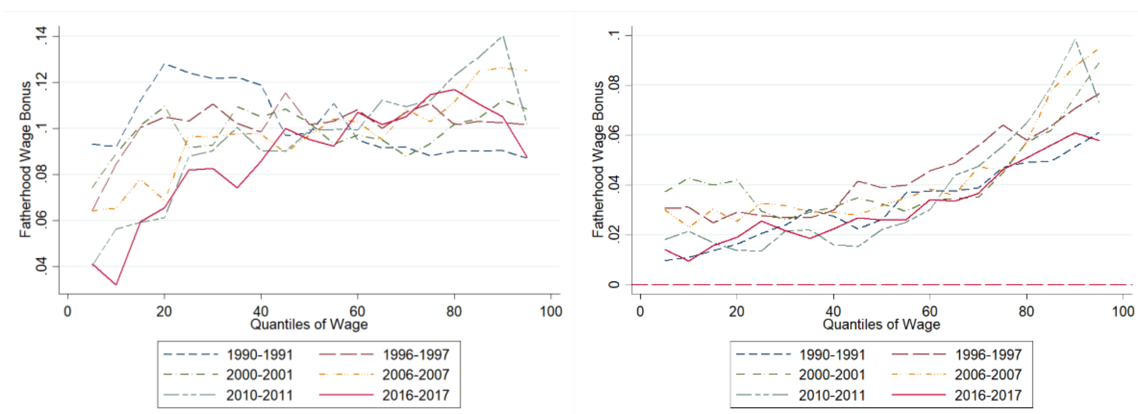
Panel B of Appendix Figure B1 shows the FWP over time across men's wage quantiles. The left graph is the baseline model and the right graph is the results once marital status is added to the baseline model. As seen in the OLS results, work-related characteristics do not lead to much change in the UQR result. In the baseline model results, the FWP below the median decreases over time and the FWP above the median slightly increases. Fathers' wage premium is around 8-14 percent above the 90^{th} quantile of men's wage distribution, and mothers' wage premium is at most 7.6 percent at the same quantiles of women's wage distribution in the baseline specification. When adding marital status, the FWP increases as the wage quantile increases in all years, and the trends in the FWP do not change much. This is consistent with the OLS results surrounding marital status.

Appendix Figure B1: Fatherhood Wage Premium

A. Trends in the Average Fatherhood Wage Premium

Notes: The fatherhood wage premium is estimated from the OLS estimation in each year. "Baseline" regression includes fatherhood status, age, age squared, education, race indicators (White, Black, and Hispanic) and year fixed effect. Marital status is a dummy variable indicating whether a man currently lives with a wife. The full-time work indicator is defined based on the responded work type in the CPS. Occupation indicators are defined according to the CPS occupation codes.

B. Trends in the Fatherhood Wage Premium Across the Male Wage Distribution



Notes: The left graph shows the baseline model, which includes the covariates of fatherhood status, age, age squared, education, race indicators (White, Black, and Hispanic), and year fixed effect. The right graph shows the results with adding marital status.

Appendix Table B1: Descriptive Statistics for Men by Decade

Panel A: Entire Sample												
	1990s				2000s				2010s			
	Non-Fathers		Fathers		Non-Fathers		Fathers		Non-Fathers		Fathers	
	0.53		0.47		0.54		0.46		0.58		0.42	
Variable	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
LFP	0.90	(0.30)	0.95	(0.21)	0.88	(0.33)	0.95	(0.22)	0.86	(0.35)	0.94	(0.24)
Employed	0.92	(0.26)	0.96	(0.20)	0.92	(0.26)	0.96	(0.20)	0.91	(0.29)	0.95	(0.22)
Full-time	0.91	(0.28)	0.96	(0.19)	0.91	(0.29)	0.96	(0.20)	0.88	(0.32)	0.95	(0.22)
Age	30.59	(7.10)	35.56	(6.03)	30.85	(7.37)	35.91	(6.13)	30.35	(7.11)	36.16	(5.97)
Less HS	0.21	(0.41)	0.22	(0.41)	0.14	(0.35)	0.15	(0.36)	0.10	(0.31)	0.13	(0.34)
HS	0.48	(0.50)	0.47	(0.50)	0.52	(0.50)	0.50	(0.50)	0.52	(0.50)	0.47	(0.50)
Some Col.	0.10	(0.29)	0.10	(0.30)	0.08	(0.26)	0.09	(0.28)	0.08	(0.28)	0.09	(0.29)
BA	0.16	(0.37)	0.15	(0.36)	0.20	(0.40)	0.18	(0.38)	0.22	(0.41)	0.20	(0.40)
More BA	0.05	(0.21)	0.06	(0.24)	0.06	(0.25)	0.09	(0.28)	0.07	(0.26)	0.11	(0.31)
White	0.81	(0.39)	0.85	(0.36)	0.79	(0.41)	0.83	(0.38)	0.75	(0.43)	0.80	(0.40)
Black	0.14	(0.35)	0.11	(0.31)	0.14	(0.34)	0.11	(0.31)	0.15	(0.35)	0.11	(0.31)
Hispanic	0.01	(0.09)	0.01	(0.09)	0.01	(0.11)	0.01	(0.11)	0.02	(0.14)	0.02	(0.14)
Married	0.23	(0.42)	0.91	(0.29)	0.21	(0.41)	0.86	(0.35)	0.18	(0.39)	0.82	(0.38)
Num. Children			2.01	(0.98)			2.02	(0.99)			2.04	(1.01)
Age at FB			25.99	(5.12)			26.38	(5.43)			26.64	(5.60)
Obs.	328,097		305,642		312,735		275,276		235,246		182,503	

Panel B: If Hourly Wage is Positive												
	1990s				2000s				2010s			
	Non-Fathers		Fathers		Non-Fathers		Fathers		Non-Fathers		Fathers	
	0.50		0.50		0.51		0.49		0.54		0.46	
Variable	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Hourly Wage	19.54	(12.20)	24.11	(13.79)	21.13	(13.78)	25.92	(15.89)	20.42	(13.37)	25.5	(15.66)
Full-time	0.91	(0.28)	0.96	(0.19)	0.91	(0.29)	0.96	(0.20)	0.88	(0.32)	0.95	(0.22)
Age	30.56	(7.01)	35.6	(5.99)	30.85	(7.25)	35.97	(6.07)	30.44	(6.97)	36.25	(5.90)
Less HS	0.19	(0.39)	0.20	(0.40)	0.12	(0.32)	0.14	(0.34)	0.08	(0.28)	0.12	(0.32)
HS	0.48	(0.50)	0.47	(0.50)	0.51	(0.50)	0.49	(0.50)	0.50	(0.50)	0.45	(0.50)
Some Col.	0.10	(0.30)	0.1	(0.30)	0.08	(0.27)	0.09	(0.29)	0.09	(0.29)	0.10	(0.30)
BA	0.18	(0.38)	0.16	(0.37)	0.22	(0.41)	0.19	(0.39)	0.24	(0.43)	0.21	(0.41)
More BA	0.05	(0.22)	0.07	(0.25)	0.07	(0.26)	0.09	(0.29)	0.08	(0.28)	0.12	(0.33)
White	0.83	(0.37)	0.86	(0.35)	0.81	(0.39)	0.84	(0.37)	0.78	(0.42)	0.81	(0.39)
Black	0.12	(0.33)	0.10	(0.30)	0.12	(0.32)	0.10	(0.30)	0.12	(0.33)	0.10	(0.29)
Hispanic	0.01	(0.09)	0.01	(0.09)	0.01	(0.11)	0.01	(0.11)	0.02	(0.14)	0.02	(0.14)
Married	0.25	(0.43)	0.92	(0.27)	0.23	(0.42)	0.87	(0.33)	0.20	(0.40)	0.84	(0.37)
Obs.	272,237		278,447		255,457		249,702		185,048		162,520	

Notes: The data are the Current Population Survey (CPS) Outgoing Rotation Groups from 1990 through 2017. Samples are restricted to employed men aged 20 to 45. The employment rate is defined among the labor force participants.