The Family Gap in Pay: New Evidence for 1967 to 2013

IPSHITA PAL AND JANE WALDFOGEL

This paper provides new evidence on the family gap in pay—the differential in hourly wages between women with children and women without children—between 1967 and 2013, five decades that include important changes in women's employment, especially mothers' employment, policy reforms as well as contrasting economic cycles. We use data from the Current Population Survey and adjust for selection into motherhood, by estimating ordinary least square models and (as a robustness check) applying augmented inverse probability of treatment weighting, using the standard doubly robust estimator. For women overall, we find a decline in the family gap over this period from 6 percent in 1967 and 1968 to about 1 percent in 2011 through 2013. However, results vary by marital status, education, race-ethnicity, immigration status, temporal flexibility, and occupation. The most striking difference we find is between mothers who are married and those who are not. The family gap declined for married mothers and was replaced by a positive wage differential in the most recent period, whereas for unmarried mothers, a wage gap persisted throughout the two decades, rising to a notable high of 10 percent in 1996 through 1998.

Keywords: family gap, gender gap

The family gap in pay—the differential in hourly wages between women with children and women without children—has drawn considerable attention from economists and sociologists. Increasingly rigorous studies have examined the magnitude of the gap at particular points in time, across groups, and across countries. Yet we know surprisingly little about long-term or recent trends in the family gap in pay. Our previous work analyzing data from 1977, 1987, 1997, and 2007 suggests that the motherhood wage gap has fallen in recent decades for some groups, non-Hispanic whites and married women, but increased for others, Hispanics and never-married women (Pal and Waldfogel 2014). In this paper, we focus on a longer period, from 1967 to 2013, five decades that included dramatic changes in family structures, increases in women's and especially mothers' labor-force participation, gradual changes in men's role in the household, a declining gender wage gap, important welfare reforms that primarily affected low-income and single-mother families and finally, relative stagnation of work-family reconciliation policies as well as contrasting economic cycles.

We extend our previous work in three main ways. First, we include several earlier as well as

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several more recent years of data, our prior analyses having ended in 2007, before the Great Recession. We also include all the years of data between 1967 and 2013 rather than selected time points so that we can describe trends in the family gap more precisely. Second, we examine the trends by age of children and again by number of children. Finally, we analyze more specific subgroups (such as immigrant versus nonimmigrant women, splitting the nonmarried subgroup into cohabiting with partner and no partner), taking advantage of the more detailed data for the later periods. Two other subgroup analyses—by occupation and by temporal flexibility—merit attention, but these issues are analyzed elsewhere (see, in this volume, both Buchmann and McDaniel, and Weeden, Cha, and Bucca; for the importance of work hours and temporal flexibility, see Goldin 2014). To our knowledge, no existing research examines trends in the motherhood wage gap in the United States over these five decades, and only limited research examines the gap for the twenty-first century. Our primary goal is to learn the extent to which the family gap in pay has changed over this period and for which groups. Second, although our analysis is primarily descriptive, we hope our results will also shed light on the role that factors such as policy and labor market changes may have played.

Using data on nationally representative samples of women from the Current Population Survey (CPS), Annual Social and Economic Supplements for March 1968 through March 2014, we estimate ordinary least square models, controlling for various human capital, demographic and family characteristics. We also check the robustness of our results by employing augmented inverse probability of treatment weighting (AIPW), the standard doubly robust estimator (Robins, Rotnitzky, and Zhao 1994; Scharfstein, Rotnitzky, and Robins 1999; Wooldridge 2007; Rotnitzky et al. 2012; Słoczyński and Wooldridge 2014).

To briefly preview our results, we find a decline in the family gap in pay for women overall, from 6 percent in 1967 and 1968 to about 1 percent in 2011 through 2013. However, results vary by marital status, education, race-ethnicity, immigration status, temporal flexibility, and occupation. The most striking difference we find is between mothers who are married and those who are not. Over this period, the wage gap declined for married mothers and was even replaced by a positive differential in the most recent period, whereas it persisted for unmarried mothers, even rising to 10 percent from 1996 through 1998.

PRIOR RESEARCH

Researchers have long argued that at least a portion of the gender wage gap is attributable to the presence of children, pointing to a significant difference in the hourly pay between women with and without children (Hill 1979; Fuchs 1988).[1] The earliest studies directly estimating the associations between children and women's wages find a family wage gap of 10 to 15 percent and evidence of an increasing gap from 1980 to 1990 even as the gender wage gap was declining (Korenman and Neumark 1992; Waldfogel 1997). A robust body of research has developed in the two decades since then with the use of increasingly sophisticated methods to deal with endogeneity and selection bias. Researchers have used pooled ordinary least squares (OLS) and fixed-effects models as well as instrumental variables models to gauge the link between motherhood and wages (Korenman and Neumark 1992; Taniguchi 1999; Budig and England 2001; Anderson, Binder, and Krause 2002; Baum 2002; Avellar and Smock 2003; Amuedo-Dorantes and Kimmel 2008; Winder 2008).

Credible estimates of the wage gap at different periods exist, from both cross-sectional and longitudinal datasets, and for various economic and demographic subgroups of interest.[2] At the same time, however, comparing estimates across studies and gauging changes in the gap over time from these studies has

1. Victor Fuchs uses census data from 1960 and CPS data from 1986 and shows that women with children earn 7 to 9 percent less than childless women.

2. Most recently, a cross-national study uses 2004 LIS data for the United States and recentered influence function regressions to find a striking 18 percent wage gap at the 10th percentile, none at the 90th, and 2 to 6

become increasingly challenging. The research on variation by education and skill level, for instance, is inconclusive so far—some researchers have found the wage gap to be smaller or even absent at the highest end of the educational achievement distribution and larger in the middle (Taniguchi 1999; Todd 2001; Anderson, Binder, and Krause 2003; Amuedo-Dorantes and Kimmel 2005). Contrary to these findings, other researchers find no gaps for the least educated mothers and the largest gaps for women with the highest skill levels (Anderson, Binder, and Krause 2002; Wilde, Batchelder, and Ellwood 2010). Estimates of the variation in the wage gap by race and ethnicity is somewhat more consistent. Studies find that Hispanic mothers face no wage gap or smaller differentials than other groups (Budig and England 2001; Glauber 2007; England et al., forthcoming). Black mothers also tend to face smaller differentials (Waldfogel 1997; Glauber 2007; but see Anderson, Binder, and Krause 2003). With regard to variation by marital status, some evidence has linked marriage to a larger motherhood wage gap; other studies, however, have found the opposite.[3] Finally, one study has also looked at the variation by immigration status and found a lower wage gap for immigrant women than for native-born women (Srivastava and Rodgers 2013).

Most of these studies examine the family gap for a specific time or for a short period. Only a few published studies have examined trends over time (Waldfogel 1998a; Avellar and Smock 2003).[4]

DATA AND METHODS

Our data is drawn from the 1968 through 2014 March Current Population Survey, a nationally representative survey of the noninstitutionalized population in the United States, which provides retrospective data on earnings in the prior year as well as comprehensive information on individual characteristics and family demographics.[5]

Our primary analysis sample consists of women ages twenty-five to forty-four who worked in the prior year and reported any income from employment. We include both full-time and part-time workers but in our main analyses exclude the self-employed. As mentioned, employment rates of mothers have increased between the late 1960s and recent times; we see the same in our samples, with mothers of one child, and to some extent mothers of two children, now showing rates

percent at different points in between (Cooke 2014). See Gough and Noonan 2013 for a review of the U.S. evidence. Many other studies examine the family gap in other countries and across countries (see Todd 2001; Harkness and Waldfogel 2003; Sigle-Rushton and Waldfogel 2007; Gangl and Ziefle 2009; Cooke 2014). For a detailed review of the current U.S. and international evidence prepared for the International Labour Organization, see Grimshaw and Rubery 2015.

3. For larger family wage gaps for married mothers, see Budig and England 2001; Glauber 2007; Loughran and Zissimopoulos 2009. Michelle Budig and Melissa Hodges (2010) include interactions of marital status with the number of children at different income quantiles and find that never-married women earned lower penalties than both the married and the divorced or separated in the bottom quantiles only, whereas ever-married women at the top earnings quantiles earned a motherhood bonus. For a reanalysis using unconditional quantile regressions and the original researchers' response, see Killewald and Bearak 2014 and Budig and Hodges 2014 respectively. In earlier work, we find that the magnitude of the family gap has decreased over time for married mothers, but increased for never-married mothers (Pal and Waldfogel 2014). Rebecca Glauber (2013) finds similar trend differences by marital status for the period from 1980 to 2010.

4. In our prior work, we estimate the change in the family gap over 1977 to 2007 using data from the 1978, 1988, 1998, and 2008 March CPS and adjust for selection using ordinary least squares and simple inverse probability of treatment weighted regressions. We find that the wage gap in 2007 is not significantly different to that in 1977, at about 5 to 6 percent. Glauber (2013) examines long-term trends by marital status for the period between 1980 and 2010.

5. Data used in this research is from Miriam King and her colleagues (2010) and available at the Minnesota Population Center's Integrated Public Use Microdata Series website (https://cps.ipums.org).

very close to that of childless women. The percentage of mothers who are employed, however, is relatively stable when we look more closely at our later samples, from 74 percent between 1993 and 1995 to 72 percent in between 2011 and 2013, with a high of 79 percent between 1999 and 2001. The proportion of nonmothers who are employed is stable, at around 86 percent over the 1990s and at 81 percent to 83 percent over the 2000s, with a low of 79 percent between 2011 and 2013 (see figures A1 and A2).

To create larger and more stable samples, we have pooled the data for three-year periods: wages for 2011 through 2013 (data from March 2012 to 2014 CPS), 2008 through 2010, and so on back to 1967 (though the earliest period has only two years of data, 1967 and 1968). We did not pool the entire forty-five years because we are interested in addressing selection into motherhood and we cannot reasonably assume that to be stable over time. A further argument against pooling the forty-five years is that the coefficients on characteristics in the model may have changed over time. To eliminate extreme values, we dropped observations for which the hourly wage was less than 45 percent of the federal minimum wage for the year, and for which the hourly wage was more than $200.[6]

Our focal outcome variable is the natural log of hourly wages. From 1976 forward, we calculate the wage in each year by first creating a variable to denote the *total hours worked last year* (product of *weeks worked last year* and *usual hours worked per week last year*) and then dividing the *annual wage and salary income from last year* by this variable to arrive at the *hourly wage*. We define hourly wages pre-1976 as similarly as possible given the more limited data available in those years.[7] We adjust wages for inflation using the annual average CPI-U (Consumer Price Index, all Urban Consumers, provided by the Bureau of Labor Statistics) and express all income in 2014 dollars. Our key independent variable is a dummy variable for *mother*, which we define based on the presence of own children under the age of eighteen in the household. We also estimated some models allowing the associations between motherhood and wages to vary by number of children and by age of children (see figures A1 and A2).

Estimating the links between children and women's wages is complicated by selection into motherhood. Women who have children (or have more children) may differ from other women in ways that also affect their wages; if so, the failure to control for those differences will lead to biased estimates of the effect of children on women's pay. The standard approach to addressing such selection in the family gap literature is to estimate multivariate OLS regression models that include controls for the types of characteristics thought to affect both motherhood and wages—characteristics such as age, education, race-ethnicity, and so on. We adopt this approach in our first set of models.

$$Ln(Wage)_i = \beta_0 + \beta_1 Mother_i + \Sigma\beta_j X_{ji} + \varepsilon_i \quad (1)$$

where *Ln(Wage)* is the natural log of hourly wage (in 2014 dollars) for the i-th respondent; *Mother* is a dummy variable denoting whether a woman is a mother or not (as defined); *X* is the covariate vector and includes j demographic, family, and human capital variables (*age* and *age squared*, and dummies denoting

6. Prior estimates find the maximum hourly wages in the United States for 2011 to be $175 (Mishel and Shierholz 2011). In our sample, we find 62 percent of the greater than two hundred hourly wage observations in the 2013 survey year, and 83 percent in the 2014 survey year, to include improbable hours or weeks of work reported, so they likely involve errors (see also Schmitt 2003; Larrimore et al. 2008).

7. Specifically, we take three decisions regarding variables to ensure as much consistency as possible. First, usual hours of work last year variable is only available from 1976 survey year. So, for the 1968 to 1975 samples, we use the hours of work last week. Second, because hours worked last week can be zero, we ran an unadjusted regression of "usual hours worked last year" on "hours worked last week" and replaced the zero hours with the predicted values for last year's hours from this regression. This affects only 2.4 percent of the sample. Three, weeks worked last year is available in intervals for the period before 1976, so we use the midpoints of each interval.

educational attainment, *family status*, and *race and ethnicity*) as well as dummy variables for *year*. We use four categories for *educational attainment*: less than high school, high school only, some college, or college degree or more. We use two categories for *family status*: married or unmarried.[8] We use three categories for *race-ethnicity*: white, black, and others.[9] Our coefficient of interest in equation (1), β_1, provides an estimate of the percentage difference in wages between mothers and nonmothers in the given period. All models also include a control for year because each sample pools data for a three-year period.

A more refined approach to addressing selection, now quite common though until recently not on this topic, is the estimation of propensity score matching or weighting models (Rosenbaum and Rubin 1983, 1984, 1985; Austin 2011). These models take the same kinds of observed characteristics into account and adjust estimates for the likelihood of being in the treatment group (in this case, mothers). A major assumption underlying these approaches is the ignorability of treatment assignment or conditional independence; that is, conditional on a set of observed covariates, the outcome is independent of treatment assignment. The propensity score of each woman is the probability of being a mother, conditional on observed pretreatment covariates.

$$Mother_i = \beta_0 + \Sigma\beta_j X_{ji} + + u_i \qquad (2)$$

where *Mother* is the binary treatment (mother or nonmother) and *Xj* represents a vector of covariates that determine selection into motherhood and includes but is not limited to all covariates in the corresponding regression equation. The predicted probability from this probit model is the propensity score. The adjusted regression, equation (1), using the reweighted sample allows us to place more weight on those nonmothers who had a higher propensity score.

Specifically, drawing from a growing body of literature on doubly robust causal estimation techniques, we use augmented inverse probability of treatment weighting (Robins and Rotnitzky 1995; Robins, Rotnitzky, and Zhao 1994; Bang and Robins 2005; Tsiatis 2006; Wooldridge 2007, 2010; Glynn and Quinn 2010; Tan 2010; Funk et al. 2011; most recently summarized in Słoczyński and Woolridge 2014).[10] We assume that our treatment model could be misspecified but that our outcome model is correctly specified and therefore apply the augmented inverse probability of treatment weighting.[11] The AIPW estimator thus offers us a theoretical advantage over simple inverse probability weighting (IPW) because it remains unbiased even if the treatment model is misspecified. It is an IPW estimator but includes an augmentation term that corrects the estimator when the treatment model is misspecified. If the treatment specification is correct, the augmentation term disappears as the sam-

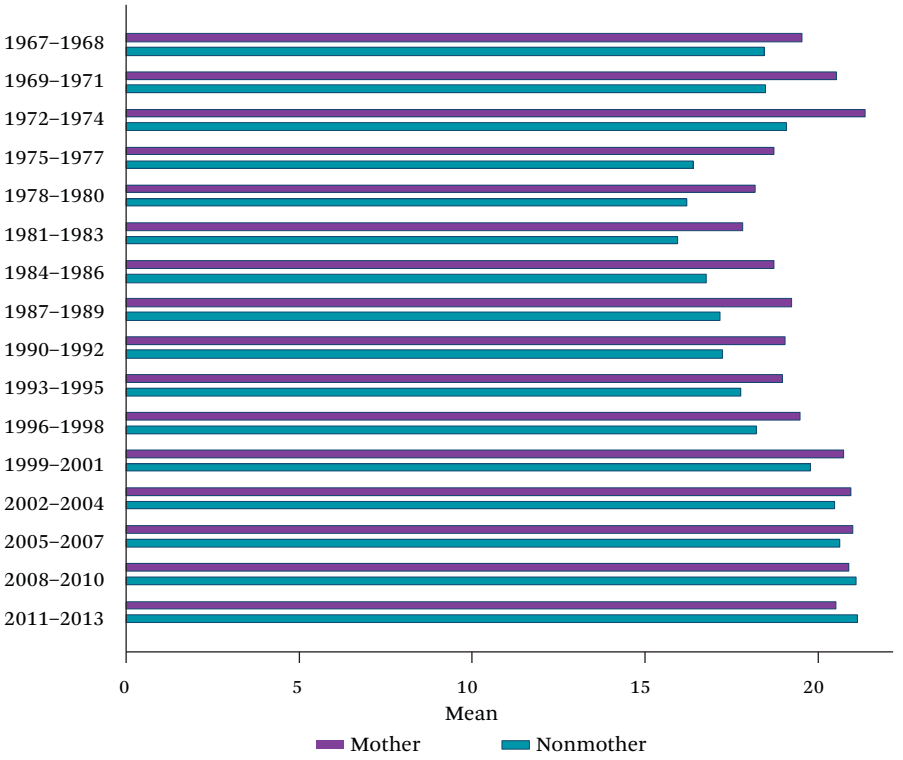
8. The way that cohabitors are identified is not completely consistent over the period. So in our main models we distinguish only between married and unmarried women. The married category includes women who report being married, spouse present. The unmarried category includes all others (married spouse absent, divorced, separated, widowed, and single). In supplemental models, we further divide unmarried women into those who are likely cohabiting and those who are not cohabiting.

9. Race and ethnic origin are not consistently defined in the CPS over the period of our study. In our main models, we therefore only use the three race categories of white, black, and others, but in subgroup analyses, we also include Hispanic and separate the race categories into non-Hispanic white and non-Hispanic black. We do not show the others category in subgroup analysis because the residual group changes too much between these two categorizations to be meaningful.

10. The advantage of this method is summarized in a 2011 article published in the *American Journal of Epidemiology*: "Doubly robust estimation combines a form of outcome regression with a model for the exposure (i.e., the propensity score) to estimate the causal effect of an exposure on an outcome. When used individually to estimate a causal effect, both outcome regression and propensity score methods are unbiased only if the statistical model is correctly specified. The doubly robust estimator combines these 2 approaches such that only 1 of the 2 models need be correctly specified to obtain an unbiased effect estimator" (Funk et al 2011).

11. AIPW and other doubly robust causal estimation techniques have been used in statistics, biostatistics and epidemiology but to our knowledge, have not previously been applied in the family gap literature.

Figure 1. Mean Hourly Wages for Mothers and Nonmothers



Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Wages in 2014 dollars. Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household. Sample means, unweighted.

ple size becomes large (Słoczyński and Wooldridge 2014). The estimator requires the overlap assumption to be satisfied—that is, each individual should have a positive probability of receiving each treatment level.

A common limitation of both the OLS and the AIPW models is that they adjust only for observable differences between groups. Unobservable differences may still remain between women who become mothers and those who do not. For example, the former group may be less career oriented. If so, even estimates from fully controlled or weighted regression models could still be biased.

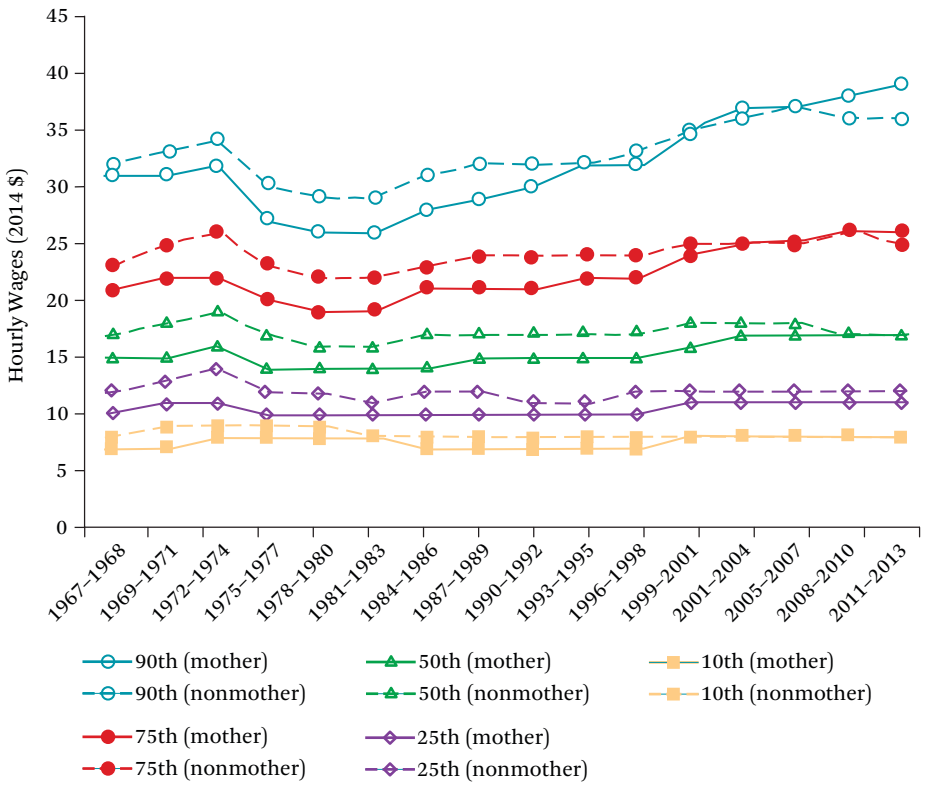
The methods to be used to correct for selection into motherhood have certain limitations.[12] Our estimates could still be biased by selection on unobservable variables. Nevertheless, we hope they will help shed light both on recent trends in the family gap in pay and possible factors that might help explain them. We are especially interested in the role of welfare reforms and changes in the labor market. In particular, we would like to know whether the timing of changes in the family gap for unmarried mothers coincide with welfare reforms, and how the family gap changes, both for women overall and for different groups, during different portions of the economic cycle.

RESULTS

Figure 1 shows the unadjusted mean wages of mothers and nonmothers over the sixteen periods in our study. In the earliest years, moth-

12. Another challenge to causal estimation is selection into employment. Women, and particularly those with children, do not always participate in the labor market, and thus at any single point in time, the wage sample will contain a selected group of wage-earners. If that selection is correlated with wages (for example, if the

Figure 2. Distribution of Hourly Wages of Mothers and Nonmothers

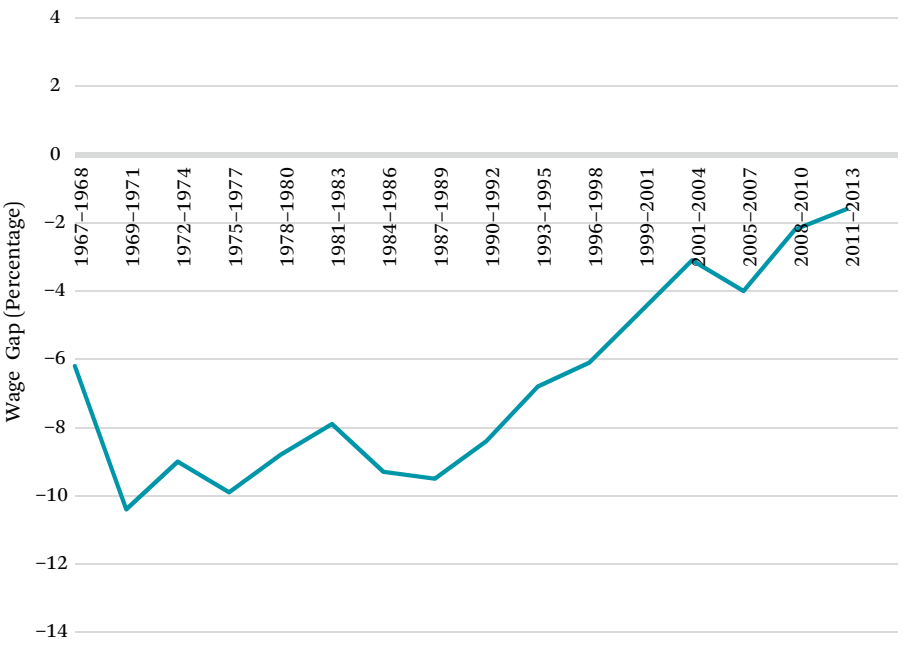


Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Wages in 2014 dollars. Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household. Sample statistics, unweighted.

ers' hourly wages on average are below those of nonmothers, but over time the gap closes, mothers' hourly wages on average exceeding those of nonmothers in the last two periods, from 2008 to 2010 and from 2011 to 2013. Figure 2 displays a more detailed picture of the gaps between mothers' and nonmothers' hourly wages at the 10th, 25th, 50th, 75th, and 90th percentiles. For women at each of these points in the distribution, mothers' hourly wages trail nonmothers' until about the end of the 1990s. For each of these percentiles, it appears that the gap is decreasing over time. However, over time, the trends also appear to diverge, mothers in the 10th and 25th percentile almost catching up to nonmothers at the end of the period, but with a small gap remaining. In contrast, comparison of median wages shows the gap disappearing by the end of the period. Finally, for the 75th and 90th percentiles, moth-

mothers who work are those who face the smallest wage penalties), estimates that do not take it into account will be biased. The standard method in the family gap literature to address such bias is the use of a selection correction model (Heckman 1979). However, such models have important limitations. They may not address all the factors associated with selection into employment and in particular those that are not observable. In addition, they rely on assumptions about the exogeneity of the predictors used in the selection regression (most commonly other household income), and their results may be sensitive to which predictors are included. For this reason, we do not estimate such models.

Figure 3. Family Wage Gap



Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Results from OLS regression of ln hourly wages (in 2014 dollars) on *mother* dummy variable. Sample is restricted to prime working age, twenty-five to forty-four years; Motherhood status is defined by the presence of children under age eighteen in the household. All models include controls for age, age_squared, and dummies for education, race, married, as well as year. All coefficients on mother are significant at $p < 0.001$, except for 2012 through 2014, where it is significant at $p < 0.01$. Please see figure A3 for a graph showing estimated coefficients on mother and confidence intervals and figures A4 for supplemental results comparing OLS with AIPW models.

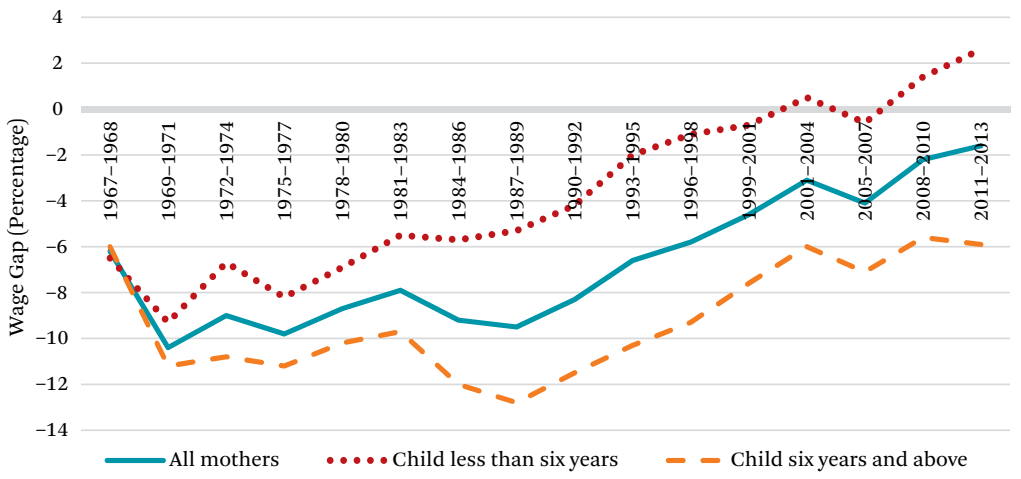
ers appear to overtake nonmothers over time, the positive wage differential being more distinct in the 90th percentile.

Although they provide a glimpse of the trends in the family gap in pay, these descriptive results do not tell us how wages compare holding constant differences in characteristics between mothers and nonmothers (for full descriptive statistics of these characteristics for mothers and nonmothers for each period, see tables A2 through A4).

Accordingly, figure 3 shows results from our regression models. The OLS results indicate a significant wage gap for mothers in each period that declines in magnitude over time, from 6.2 percent in 1967 and 1968 to 1 percent in 2011 through 2013. As a robustness check, we also provide AIPW estimates in figure A4; these models show a similar trend (though with slightly smaller magnitudes and only a marginally significant less than 1 percent wage gap in the most recent period).

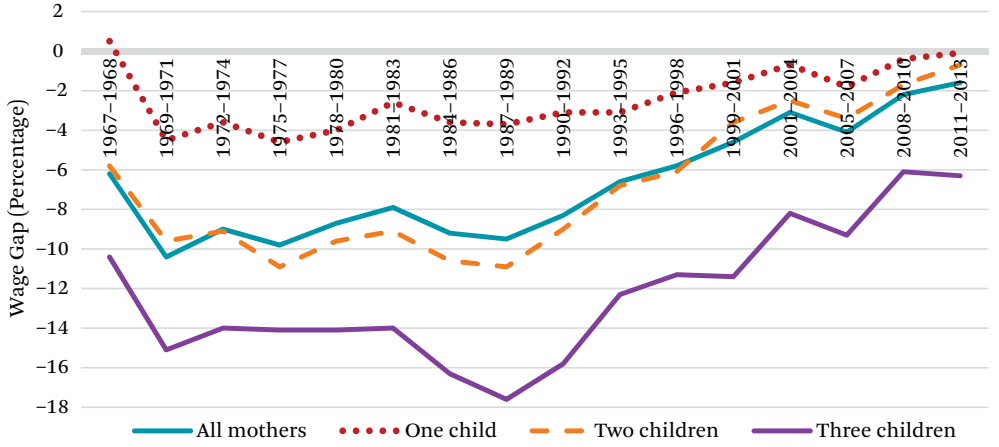
We also examine trends in the motherhood wage differential by number and age of children in figures 4 and 5. Figure 4 shows that, over time, the family wage gaps for mothers whose youngest child is less than six years old and those whose youngest child is more than six years old, have diverged substantially. Both groups were facing a 6 percent negative wage differential in 1967 and 1968. Over time, however, the gap decreased for the former group, who started facing a positive wage differential toward the end of the period under study. For the latter group, the wage gap increased over the 1970s and 1980s, and then decreased to 6

Figure 4. Family Wage Gap, Age of Youngest Child



Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Results from OLS regression of ln hourly wages (in 2014 dollars) on *mother* dummy variable. Sample is restricted to prime working age, twenty-five to forty-four years; Motherhood status is defined by the presence of children under age eighteen in the household. All models include controls for age, age_squared, and dummies for education, race, married, as well as year.

Figure 5. Family Wage Gap, Number of Children

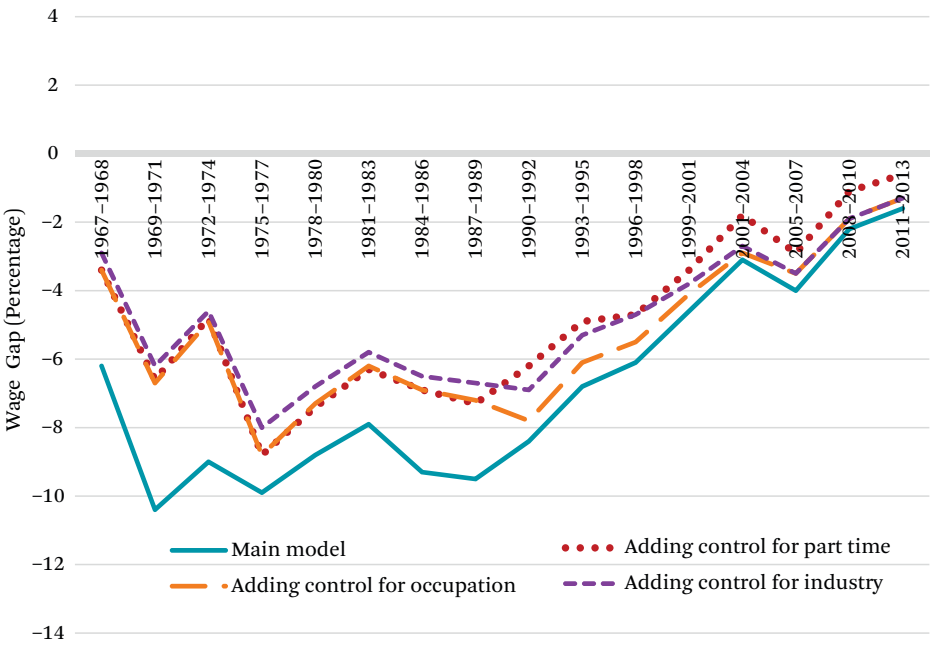


Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: See notes to figure 4.

percent in 2011 to 2013. Figure 5 shows the wage differential by number of children. As expected, mothers with three or more children face the largest negative differentials in each period, though the gap itself appears to decrease over time. Trends for mothers with two children closely mirror the main model. Mothers with only one child, though, face a wage gap lower than the average for all mothers in each period, and no significant gaps in the most recent periods.

In figure 6, we successively add controls for part-time work, occupation, and industry. We find, as expected, that the differential associ-

Figure 6. Family Wage Gap, Controlling for Part Time, Occupation, and Industry



Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Results from OLS regression of ln hourly wages (in 2014 dollars) on *mother* dummy variable. Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household. All models include controls for age, age_squared, and dummies for education, race, married, as well as year. Main model (figure 3) is included for comparison. Controls for part time, occupation, and industry are added successively. Coefficients on mother from all three models are significant at $p < 0.001$, except in the last two years, where it is significant at $p < 0.01$ or $p < 0.05$. Coefficient on mother for 2011 to 2013 in the model including control for part time only, is not significant. Graphs showing estimated coefficients on *mother* and confidence intervals available on request.

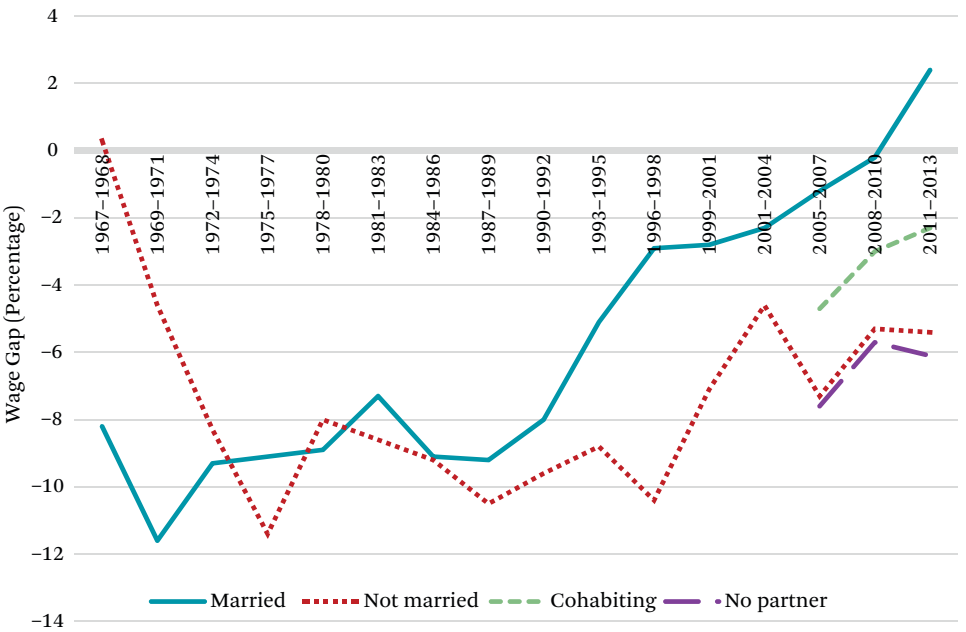
ated with motherhood is smaller when we control for part-time work (because a portion of mothers' lower average wages is accounted for by their higher propensity to work in lower-paid part-time jobs). In the most recent period, the wage gap is no longer significant. Controlling for occupation and for industry does not make much of a difference to the results.

Trends by Subgroup

We next examine the extent to which the family gap varies across groups and whether that variation has changed over time. We therefore repeat our main models (OLS) for subgroups defined by marital status, education, race-ethnicity, and immigration status (figures 7, 8, 9, and A5).[13] The most striking difference is between mothers who are married and those who are not. As shown in figure 6, for married mothers, the family gap in pay declined and was replaced by a positive wage differential in the most recent period; for unmarried mothers, however, the negative wage differential persisted throughout the period (with the exception of 1967 to 1968 when it was essentially zero), even rising to 10 percent over the 1996 to

13. We do not include controls for part-time work, occupation, or industry in our subgroup analyses. For analyses by occupation and work hours, see—in this volume—Buchmann and McDaniel and Weeden, Cha, and Bucca.

Figure 7. Family Wage Gap, Relationship Status



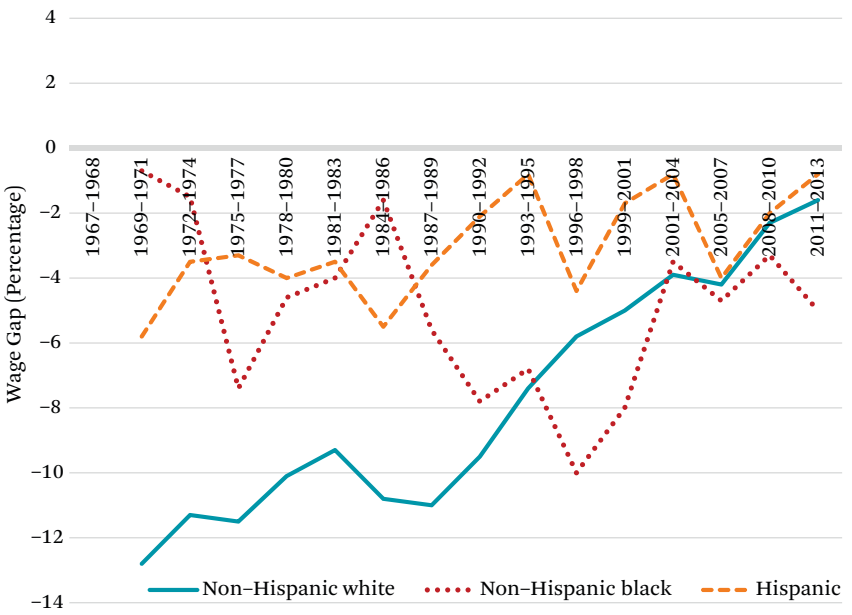
Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Results from OLS regression of ln hourly wages (in 2014 dollars) on *mother* dummy variable. Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household. All models include controls for age, age_squared, and dummies for education, race, as well as year. Coefficients on mother from all three models are significant at $p < 0.001$, except in the last two years, where it is significant at $p < 0.01$ or $p < 0.05$. Coefficient on mother for 2011–2013 in the model including control for part time only is not significant. Graphs showing estimated coefficients on *mother* and confidence intervals available on request.

1998 period.[14] These results are consistent with Buchmann and MacDaniel in this volume.

Examining the trends by race and ethnicity (figure 8), we again find considerable differences across subgroups. Comparing non-Hispanic white mothers with non-Hispanic black mothers presents some interesting trends. Until the beginning of the 1990s, black mothers faced smaller percentage gaps than their white counterparts, but this pattern reverses between 1996 and 2001 as the family gap narrows for white mothers and increases for black mothers to reach 8 to 10 percent. After this, the declining trend continues for white mothers such that between 2011 and 2013, they face a marginally significant 1.6 percent wage gap; the gap for black mothers, on the other hand, seems to fluctuate between 3 and 5 percent over the same period. For Hispanic mothers, the insignificant wage gap in the early years was followed by a significant 3 to 5 percent gap from 1975 to 1986, but no significant gaps after that, except from 1996 to 1998 and from 2005 to 2007, which each had a 4 percent gap. These results are consistent with the expectation from prior studies that examine the

14. For the last three periods, we are able to split the nonmarried mothers into two groups, cohabiting mothers and single mothers, and find that trends in the wage gap for nonmarried mothers are driven by single mothers, who face persistent negative wage penalties that reach a maximum of 10 to 11 percent from 1996 to 1998. Cohabiting mothers appear to face about a 7 percent wage gap in the earliest two periods, but no significant penalties thereafter, except from 2008 to 2010.

Figure 8. Family Wage Gap, Race-Ethnicity

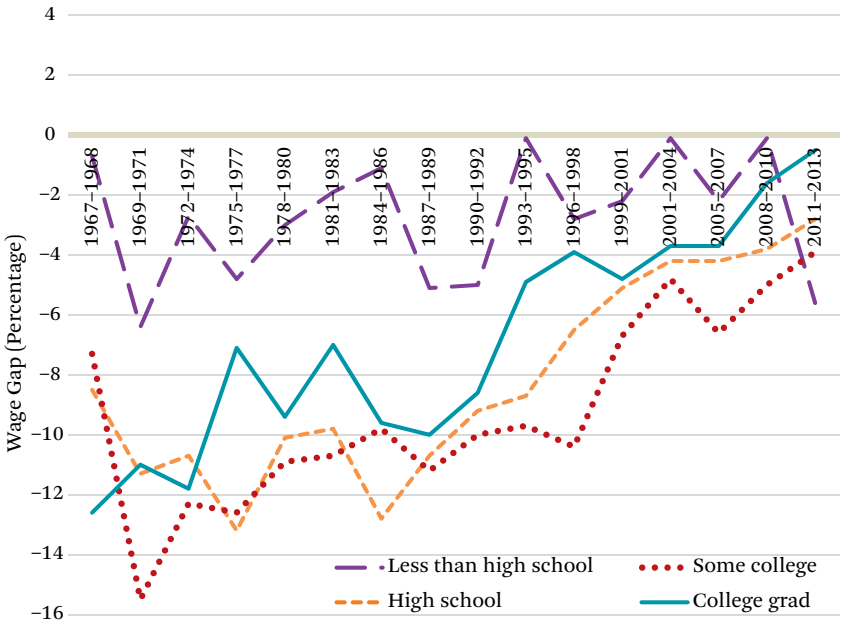


Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Results from OLS regression of ln hourly wages (in 2014 dollars) on *mother* dummy variable. Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household. All models include controls for age, age_squared, and dummies for education, married, as well as year.
Information on Hispanic identity is not available prior to 1970.
The wage gap is not significant or only marginally significant ($p < 0.10$) for Hispanic mothers throughout the time period, except in 1996–1998, 2006–2008, and in the decade 1975–1986. Coefficients are also not significant for models showing the gap for non-Hispanic black mothers in the first two periods. All other coefficients are significant. Graphs showing estimated coefficients on *mother* and confidence intervals available on request.

family wage gap for shorter periods or at specific times and find that Hispanic mothers tend to face no wage gap or smaller differentials than other groups, and that black mothers tend to face smaller differentials than their white counterparts (Waldfogel 1997; Budig and England 2001; Glauber 2007; but see Anderson, Binder, and Krause 2003). Turning to education subgroups (in figure 9), we find little evidence of a significant motherhood wage gap among those with less than a high school education throughout the period under study. In contrast, we find significant gaps for the three more-educated groups but that these decline over the period. Women with the highest level of education (college graduates) tend to face the smallest gaps among the three more-educated groups: their wage gap fluctuates between 4 and 12 percent, falling to 2 percent from 2008 to 2010 and finally vanishing in the most recent period. For those with just a high school education and those with some college, we find a gradual decline in the wage gap over time from as much as 13 to 16 percent in the beginning of the period to 2 to 3 percent in the end.

Results by immigration status (figure A5) show the absence of a family wage gap for foreign-born mothers through most of the period during which we can identify them (from 1993 onward), and a 4 percent positive differential in the most recent data, among foreign-born mothers. These results are consistent with the only other study that has looked at the

Figure 9. Family Wage Gap, Education



Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Results from OLS regression of ln hourly wages (in 2014 dollars) on *mother* dummy variable. Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household. All models include controls for age, age_squared, and dummies for race, married, as well as year.
Coefficients are not significant in models for women with less than a high school diploma. All other coefficients are significant. Graphs showing estimated coefficients on *mother* and confidence intervals available on request.

family wage gap by immigration status (Srivastava and Rodgers 2013).

DISCUSSION

Several explanations for a family wage gap at any given time are plausible. Drawing mainly on the work of Gary Becker (1981, 1985), researchers have emphasized three, which are not mutually exclusive. First, mothers and nonmothers may differ in terms of their human capital. In addition to differences that may precede and be associated with the selection into motherhood, differences may arise subsequent to and as a result of motherhood. Chief among these would be reductions in work experience and job-specific tenure, switches into part-time jobs, and reductions in effort or motivation, which follow directly from Becker's model of household specialization. Theoretically, women's comparative biological advantage in care work might make it more efficient for them to put more resources such as time and effort into the household economy; in turn, this would imply less time and effort available for the market economy, which might be reflected in reduced work hours and lower wages. Second, mothers and nonmothers may work in different types of jobs, mothers being more likely to be concentrated in more family-friendly occupations or industries.[15] Third, employers may discriminate against mothers, assuming or perceiving them to be less dedicated or career focused (Correll, Benard, and Paik 2007; Benard and Correll 2010). Individually and to-

15. Budig and England (2001), however, find no evidence of occupational characteristics influencing mothers' pay, once part-time work is accounted for.

gether, each of these ideas may explain the presence of a family wage gap (except in the most recent periods for certain subgroups). These theories provide a useful framework for understanding the family gap in pay but may not fully explain how or why it changed during the period under study because of the role of several potentially contradictory socioeconomic and policy forces.

First, changes in women's labor-force participation over the last several decades have been dramatic. Most notably, mothers are returning to work sooner after childbirth than they did in the 1960s and 1970s. Among women with a first birth, only 10 percent were working three months after birth; slightly more than 10 percent were working twelve months after birth between 1961 and 1965; these proportions increased to 44 percent and 64 percent between 2005 and 2007 (Laughlin 2011). Inasmuch as employment continuity as well as work experience are critical to wages, mothers' increased labor-force attachment could explain the narrowing of the family wage gap, at least for married mothers and those who have at least a high school diploma, and especially those with a college degree.

Second, over the past several decades, men's role in childrearing and home production has changed. Even though parenting has become more intensive, both mothers and fathers spending more time in childrearing than they did in earlier decades, the increase for fathers has been greater, almost tripling between the 1965–1985 and 2003–2008 periods (Bianchi 2011; Parker and Wang 2013). Moreover, mothers' time in household work has declined sharply over time and father's household work time has correspondingly increased (Parker and Wang 2013). These shifts might have helped close the wage gap between mothers and nonmothers by enabling mothers to conserve the effort that they would have earlier expended on nonmarket work. In addition, fathers' greater involvement in childcare and household work may have facilitated mothers' increased attachment to the labor force (Raley, Bianchi, and Wang 2012). These developments would be expected to lead to a decline in the family wage gap over the past forty years. Our results for married mothers are consistent with this expectation.

On the other hand, changes in the composition of the workforce could negatively affect trends in the family gap. In particular, the 1996 federal welfare reform (following earlier federal and state reforms that began in the late 1980s and early 1990s) pushed low-income single mothers into the labor market in large numbers. If those newly entering the labor market had lower human capital (including unobserved factors that might lead to a larger wage differential for mothers) than the women who worked before welfare reform, this change could have led to an increase in the family gap, particularly in the 1990s. We find some evidence of this in our results for black and Hispanic women (who are more likely than non-Hispanic white women to be low income), and further evidence when we estimate our models separately for unmarried women (who are most likely to be affected by welfare policy).[16]

Finally, policies to help mothers reconcile work and family have been fairly stagnant in the United States over the past several decades. Although the enactment of the Family and Medical Leave Act in 1994 was much heralded, the United States remains the only developed country without any national paid leave policy or universal childcare provision. Cross-national research shows that motherhood wage gaps are likely to be relatively lower in countries with stronger work-family reconciliation policies (Gornick and Meyers 2003; Misra, Budig, and Moller 2007; Budig, Misra, and Boeckman 2012). Other research shows that a moderate duration of paid parental leave has a positive effect on women's wages, and that mothers who have leave coverage and use it to take leave and return to work received a wage premium almost large enough to offset the negative differential associated with having a child (Ruhm

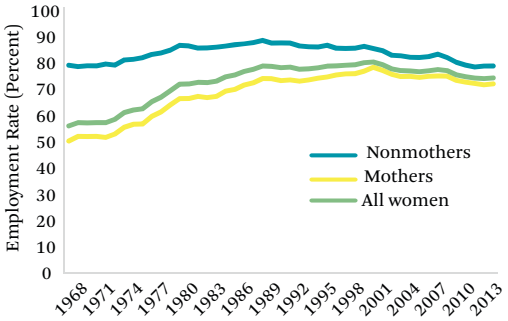
16. Another possibly relevant change in the composition of the workforce is the increase in highly skilled women opting out of the labor market in the 2000s. However, according to Heather Boushey (2008), this trend has been primarily driven by the weak economy and has affected both nonmothers and mothers, suggesting that it is not likely to explain changes in the wage gap between mothers and nonmothers (see also Byker in this volume).

1998; Waldfogel 1998b). On the other hand, researchers testing the effect of the Family and Medical Leave Act—which provides eligible mothers only an unpaid leave of twelve weeks—have found no such positive effect (Waldfogel 1999; Baum 2003). These results support the idea that childbirth requires reallocation of time, resources, and effort within the family. It therefore follows that in the absence of strong labor-market attachment and employment protection policies, childbirth may become a potential point of temporary or permanent exit for women (Becker 1981, 1985; Blau and Kahn 2013). Leaving the labor market reduces women's cumulative work experience and lowers their chances of advancement within a profession, factors that contribute to lower earnings for women with children. Given the importance of continued labor-force attachment and better job matches for wages, the lack of strong work-family policies is likely to have a negative effect on the wages of women with children. These developments (or lack) thus predict an increasing, or at best, a stagnating family wage gap. We find these ideas helpful in explaining the divergent trends in the family wage gap by number of children.

Although we cannot formally test explanations for what we find in terms of both change and lack of change in the family gap over time, we hope that our results will shed light on the role of these various factors. More immediately, they also provide some information about potential winners and losers as U.S. gender and work roles continue to evolve. The good news is that married women who have children seem to face much smaller gaps than they did in the past—indeed, their wages are now on a par or above those of married women without children. But the bad news is that unmarried mothers seem to face larger family gaps than their married peers and larger gaps than their group faced in the past. Given single women's heavy reliance on their own earnings, it is particularly concerning that they should face lower wages when they have children. Unlike in married families, we cannot look to their spouses to help take up the slack. We can however look to employer and public policies, including in the all important domains of paid leave, childcare, and workplace flexibility.

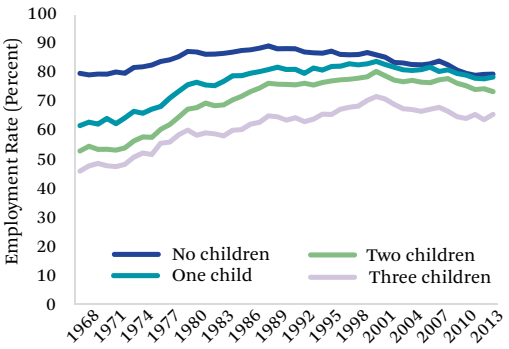
APPENDIX

Figure A1. Women's Employment Rates (%), Motherhood Status



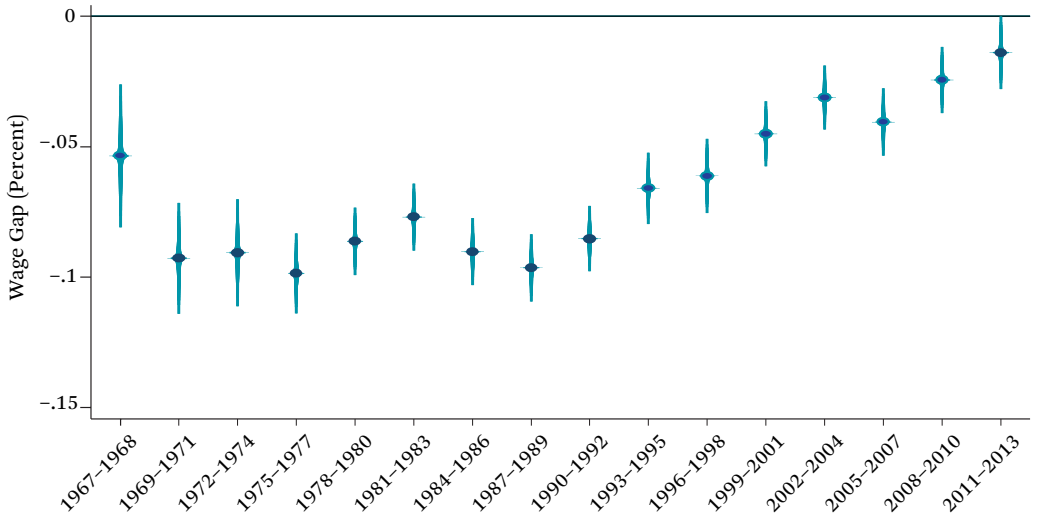
Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Note: Sample is restricted to prime working age, twenty-five to forty-four years; employment rate = (No. of respondents reporting >0 weeks worked last year / Total no. of respondents) * 100; motherhood status is defined by the presence of children under age eighteen in the household.

Figure A2. Women's Employment Rates (%), Number of Children



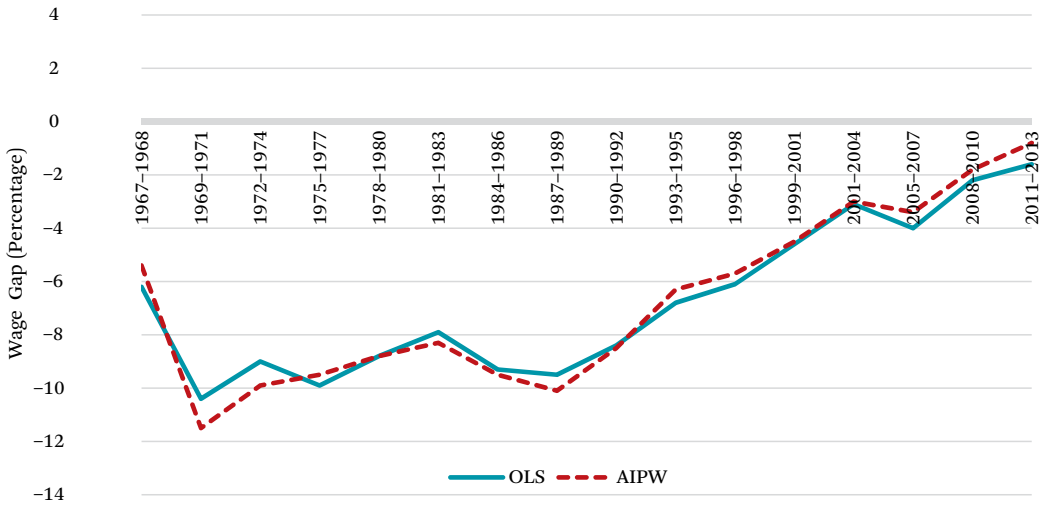
Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Note: See note to figure A1.

Figure A3. Family Wage Gap, Coefficients on Mother from OLS Regression on ln Hourly Wage with Confidence Intervals



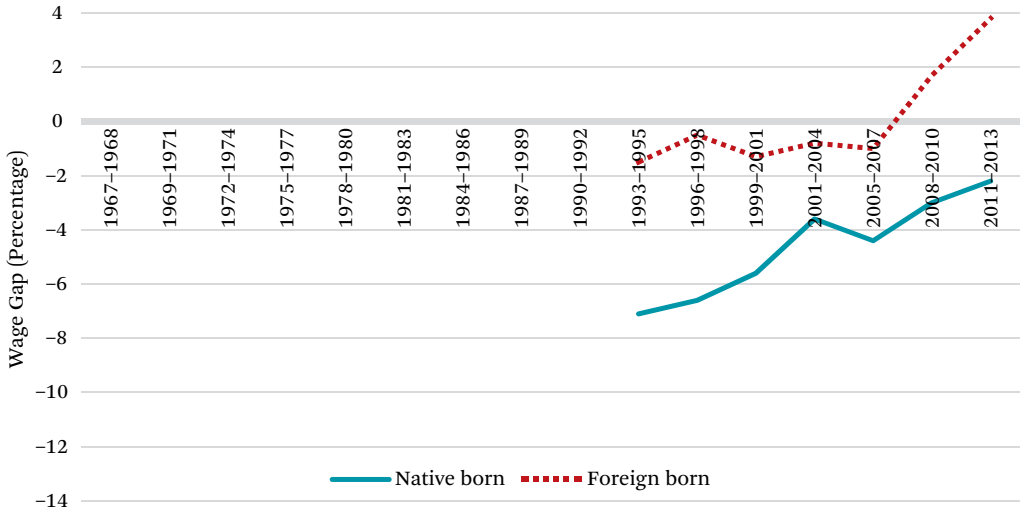
Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Results from OLS regression of ln hourly wages (in 2014 dollars) on *mother* dummy variable. Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household. All models (including selection models) include controls for age, age_squared, and dummies for education, married, as well as year.

Figure A4. Family Wage Gap, OLS and AIPW Models



Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: See notes to figure A3.

Figure A5. Family Wage Gap, Immigration Status



Source: Authors' calculations based on CPS data (sourced from King et al. 2010).
Notes: Results from OLS regression of ln hourly wages (in 2014 dollars) on *mother* dummy variable. Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household. All models include controls for age, age_squared, and dummies for race, married, education as well as year. Coefficients are not significant in models for foreign-born women (except between 2011 and 2013) All other coefficients are significant. Graphs showing estimated coefficients on *mother* and confidence intervals available on request.

Table A1. Descriptive Statistics, 1967–1977

	1967–1968		1969–1971		1972–1974		1975–1977	
	Mother	Nonmother	Mother	Nonmother	Mother	Nonmother	Mother	Nonmother
Age	34.6 (0.05)	34.1 (0.09)	34.5 (0.04)	33. 5 (0.077)	34.0 (0.04)	32.4 (0.072)	33.9 (0.04)	31.8 (0.059)
Hours worked	32.3 (0.093)	37.1 (0.122)	31.9 (0.078)	36.7 (0.107)	32.3 (0.077)	36.9 (0.103)	33.9 (0.073)	38.6 (0.076)
Weeks worked	37.8 (0.147)	44.9 (0.165)	37.7 (0.121)	44.8 (0.140)	38.3 (0.119)	45.2 (0.130)	38.7 (0.107)	45.5 (0.117)
Education								
Less than high school	33%	23%	29%	21%	24%	16%	21%	12%
High school	47%	44%	49%	43%	50%	39%	49%	36%
Some college	10%	13%	12%	14%	14%	17%	16%	20%
Graduate	10%	20%	10%	22%	13%	29%	14%	32%
Relationship								
Married	84%	50%	84%	49%	81%	51%	80%	48%
Not married	16%	50%	16%	51%	19%	49%	20%	52%
Race								
White	85%	84%	85%	84%	85%	87%	86%	87%
Black	14%	14%	14%	14%	13%	11%	12%	10%
Full time	73%	91%	71%	91%	72%	90%	68%	88%
Part time	27%	9%	29%	9%	28%	10%	32%	13%
Observation	12,472	5,308	18,496	7,621	18,514	8,311	24,009	11,237

Source: Authors' compilation based on CPS data (sources from King et al. 2010).
Note: Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household.

Table A2. Descriptive Statistics, 1978–1989

	1978–1980		1981–1983		1984–1986		1987–1989	
	Mother	Nonmother	Mother	Nonmother	Mother	Nonmother	Mother	Nonmother
Age	33.8	31.8	33.9	32.2	34.2	32.6	34.4	33.1
	(0.03)	(0.048)	(0.03)	(0.045)	(0.03)	(0.043)	(0.02)	(0.043)
Hours worked	34.2	38.7	34.1	38.5	34.5	39.2	35.0	39.7
	(0.063)	(0.067)	(0.063)	(0.066)	(0.061)	(0.062)	(0.060)	(0.060)
Weeks worked	40.0	45.9	41.3	46.3	42.3	46.9	43.1	47.7
	(0.091)	(0.094)	(0.089)	(0.088)	(0.083)	(0.078)	(0.080)	(0.071)
Education								
Less than high school	17%	10%	14%	8%	12%	8%	11%	7%
High school	48%	36%	47%	36%	46%	36%	46%	35%
Some college	19%	21%	21%	22%	22%	23%	23%	23%
Graduate	16%	33%	18%	34%	20%	34%	20%	35%
Relationship								
Married	79%	45%	78%	43%	78%	43%	77%	43%
Not married	21%	55%	22%	57%	22%	58%	23%	57%
Race								
White	86%	87%	85%	87%	85%	87%	85%	87%
Black	11%	10%	11%	9%	11%	10%	12%	10%
Full time	69%	87%	68%	86%	69%	87%	70%	88%
Part time	31%	13%	32%	14%	31%	13%	30%	12%
Observation	30,957	16,052	30,248	17,659	32,325	20,007	33,110	20,783

Source: Authors' compilation based on CPS data (sources from King et al. 2010).
Note: Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household.

Table A3. Descriptive Statistics, 1990–2001

	1990–1992		1993–1995		1996–1998		1999–2001	
	Mother	Nonmother	Mother	Nonmother	Mother	Nonmother	Mother	Nonmother
Age	34.9	33.6	35.1	33.6	35.3	33. 9	35.6	34.1
	(0.029)	(0.042)	(0.030)	(0.045)	(0.032)	(0.048)	(0.025)	(0.043)
Hours worked	35.4	39.7	35.6	39.9	36.1	40.0	36.3	40.2
	(0.058)	(0.060)	(0.062)	(0.068)	(0.063)	(0.071)	(0.050)	(0.063)
Weeks worked	43.8	47.4	44.3	47.6	45.0	47.8	45.7	48.1
	(0.076)	(0.071)	(0.078)	(0.076)	(0.078)	(0.078)	(0.059)	(0.068)
Education								
Less than high school	10%	7%	10%	7%	10%	6%	9%	7%
High school	40%	31%	35%	28%	35%	27%	32%	26%
Some college	28%	27%	33%	29%	32%	29%	33%	29%
Graduate	21%	35%	23%	36%	23%	38%	26%	38%
Relationship								
Married	77%	42%	75%	41%	74%	39%	73%	38%
Not married	24%	58%	25%	59%	27%	61%	27%	63%
Race								
White	84%	86%	83%	84%	84%	84%	83%	78%
Black	11%	10%	11%	10%	12%	11%	12%	14%
Full time	71%	87%	71%	87%	74%	87%	74%	88%
Part time	29%	13%	29%	13%	26%	13%	26%	12%
Observation	33,537	21,693	30,682	18,802	28,002	17,060	44,336	21,287

Source: Authors' compilation based on CPS data (sources from King et al. 2010).
Note: Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household.

Table A4. Descriptive Statistics, 2002–2013

	2002–2004		2005–2007		2008–2010		2011–2013	
	Mother	Nonmother	Mother	Nonmother	Mother	Nonmother	Mother	Nonmother
Age	35.7	34.2	35.6	33.7	35.6	33.3	35.6	33.2
	(0.025)	(0.043)	(0.026)	(0.044)	(0.026)	(0.043)	(0.029)	(0.044)
Hours worked	36.1	39.6	36.6	39.8	36.4	39.3	36.7	39.1
	(0.049)	(0.062)	(0.049)	(0.063)	(0.050)	(0.065)	(0.055)	(0.069)
Weeks worked	46.0	47.9	46.4	48.4	46.3	47.9	46.6	48.1
	(0.056)	(0.070)	(0.057)	(0.067)	(0.059)	(0.071)	(0.063)	(0.073)
Education								
Less than high school	8%	7%	8%	6%	8%	6%	7%	5%
High school	30%	26%	28%	24%	25%	22%	22%	20%
Some college	34%	27%	33%	28%	33%	27%	32%	27%
Graduate	28%	40%	31%	42%	35%	45%	38%	48%
Relationship								
Married	72%	37%	71%	35%	71%	33%	69%	31%
Not married	28%	63%	29%	65%	29%	67%	31%	69%
Race								
White	82%	76%	81%	74%	80%	73%	80%	73%
Black	12%	15%	12%	15%	12%	15%	12%	14%
Full time	74%	87%	76%	87%	75%	85%	75%	84%
Part time	26%	13%	25%	13%	25%	15%	25%	16%
Observation	47,392	21,626	43,892	20,470	41,488	21,065	33,704	18,839

Source: Authors' compilation based on CPS data (sources from King et al. 2010).
Note: Sample is restricted to prime working age, twenty-five to forty-four years; motherhood status is defined by the presence of children under age eighteen in the household.

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