

Preliminary Draft of paper forthcoming in The Russell Sage Foundation Journal of the Social Sciences
Special Issue on the Changing Role and Status of Women
Please do not cite without permission

**The Family Gap in Pay:
New Evidence for 1993 to 2013**

Ipshita Pal
Jane Waldfogel

Columbia University

Paper prepared for presentation at
The Russell Sage Foundation
Conference on "The Changing Roles and Status of Women and Effects on Society and the Economy",
January 9, 2015
New York

Abstract

This paper provides new evidence on the family gap in pay – the differential in hourly wages between women with children and women without children. We focus on the period 1993 to 2013, two decades that include important welfare 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 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 6-7% in 1993-1995 to about 1% in 2011-2013. 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 penalty declined for married mothers and was replaced by a wage bonus in the most recent time period, whereas for unmarried mothers, a wage penalty persisted throughout the two decades, rising to a notable high of 10% in the period 1996-1998.

Introduction

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. A series of 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 *recent trends in the family gap in pay*. Our previous work, analyzing data from 1977, 1987, 1997, and 2007, suggests that the motherhood penalty has fallen in recent decades for some groups (non-Hispanic whites, and married women), while increasing for others (Hispanics, and never married women) (Pal & Waldfogel, 2014). In this paper, we focus on the period 1993 to 2013, two decades that included include important welfare reforms as well as contrasting economic cycles (Krueger and Solow, 2002; Holzer and Hlavec, 2011). We extend our previous work in three main ways. First, we include several more recent years of data, since our prior analyses ended in 2007, before the Great Recession, and we include all the years of data in these two decades rather than selected time points, so that we can describe trends in the family gap more precisely. Second, we analyze more specific sub-groups (e.g. immigrant vs. non-immigrant women), taking advantage of the more detailed data for this period. Finally, we analyze variation in the wage gap by occupation and temporal flexibility.

To our knowledge, there is no existing research examining trends in the motherhood wage penalty in the US over the last two decades, and very limited research on the gap for the 21st century. Our primary goal is to learn to what extent 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, March 1994 – March 2014, we estimate ordinary

least square models, controlling for various human capital, demographic and family characteristics. We also employ augmented inverse probability of treatment weighting (AIPW), the standard doubly robust estimator (Robins, Rotnitzky and Zhao, 1994; Scharfstein, Rotnitzky and Robins, 1999; Robins, Rotnitzky and van der Laan, 2000; Wooldridge, 2007; Rotnitzky, Lei, Sued, and Robins, 2012; Słoczyński and Wooldridge, 2014).

To briefly preview our preliminary results, we find a decline in the family gap in pay, from 6-7% in 1993-1995 to about 1% in 2011-2013. 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 wage penalty declined for married mothers and was replaced by a wage bonus in the most recent time period, whereas for unmarried mothers, the wage penalty persisted throughout the two decades, even rising to 10% in the period 1996-1998.

Prior Research

Researchers have long argued that at least a portion of the gender wage gap is attributable to the presence of children and that there is significant difference in the hourly pay between women with children and women without children (Hill, 1979; Fuchs 1988)¹. The earliest studies directly estimating the effect of children on women's wages found a family wage gap of 10-15% (Korenman and Neumark 1992; Waldfogel 1997) and evidence of an increasing gap over 1980-1990 even as the gender wage gap was declining. 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

¹ Fuchs used Census data from 1960 and CPS data from 1986 and showed that women with children earn 7-9% less than childless women.

pooled Ordinary Least Squares and Fixed Effects models, as well as Instrumental Variables models to gauge the effect of motherhood on wages (Korenman and Neumark 1992; Taniguchi 1999; Budig and England 2001; Anderson, Binder, Krause 2002; Baum II 2002; Avellar and Smock 2003; Amuedo-Dorantes and Kimmel 2008; Winder 2008). Most recently, in a cross-national study, Cooke (2014) uses 2004 LIS data for the US and re-centered influence function (RIF) regressions, to find a striking 18% penalty at the 10th percentile, none at the 90th , and a 2-6% penalty at different points of the earnings distribution in between.²

There now exist credible estimates of the wage gap at different time periods, from both cross-sectional and longitudinal datasets, and for various economic and demographic sub-groups of interest. At the same time however, comparing estimates across studies and gauging changes in the gap over time from these studies has become increasingly challenging. The research on variation by education and skill level, for instance, is inconclusive so far –some researchers have found the penalty to be smaller (Taniguchi 1999; Todd 2001) or even absent (Anderson, Binder, and Krause 2003; Amuedo-Dorantes and Kimmel 2005) at the highest end of the educational attainment distribution and larger in the middle (Anderson et al 2003, Todd 2001). Contrary to these findings, other researchers have found no penalties for the least educated mothers (Anderson, Binder, and Krause 2002) and the largest penalties for women with the highest skill levels (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 penalty (Glauber 2007) or smaller penalties than other groups (Budig and England 2001); Black mothers also tend to face smaller penalties (Waldfogel 1997; Glauber 2007; but see also Anderson, Binder, and Krause 2003). With regard to variation by marital status, some evidence has linked marriage to a larger

² There are many other studies that examine the family gap in other countries, and across countries (see e.g. Todd 2001; Harkness and Waldfogel 2003; Sigle-Rushton and Waldfogel 2007; Gangl and Ziefle 2009; Cooke, 2014).

motherhood penalty (Budig and England 2001; Glauber 2007; Loughran and Zissimopoulos 2009) while others have found the opposite (Glauber 2013; Pal & Waldfogel, 2013)³. Finally, one study has also looked at the variation by immigration status and found a lower wage penalty for immigrant women than for native-born women (Srivastava and Rodgers III, 2013).

Most of the above mentioned studies have examined the wage gap for a specific point in time or for a short period of time. Only a few published studies have examined trends in the family gap *over* time (Waldfogel, 1998a; Avellar and Smock, 2003).⁴

Data and Methods

Our data is drawn from the 1994 through 2014 March Current Population Survey (CPS), a nationally representative survey of the non-institutionalized population in the U.S., which provides retrospective data on earnings in the prior year as well as comprehensive information on individual characteristics and family demographics⁵.

Our primary analysis sample consists of women age 25 to 44 years 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 we exclude the self-employed.⁶ The percentage of mothers who are employed is relatively stable in our samples, from 74% in 1993-1995 to 72% in 2011-2013, with a high of 79% in 1999-2001.

³ Budig and Hodges (2010) included interactions of marital status with the number of children at different income quantiles and found that never married women earned lower penalties (compared to both the married and the divorced/separated) in the bottom quantiles only, while ever-married women at the top earnings quantiles earned a motherhood bonus. See also Killewald and Bearak (2014) for a re-analysis using unconditional quantile regressions and the original researchers' response in Budig and Hodges (2014).

⁴ Pal and Waldfogel (2014) 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 penalty in 2007 is not significantly different to that in 1977, at about 5-6%. We also find variation by race/ethnicity, education level, and marital status; most importantly, we find that the magnitude of the family gap has over time for married mothers, but increased for never married mothers (Pal and Waldfogel, 2014). Similar trend differences by marital status are obtained by Glauber (2013) for the period 1980 – 2010.

⁵ Data used in this research is from Miriam King et al (2010), publicly available at <https://cps.ipums.org>.

⁶ We will carry out some supplementary analyses to test the robustness of our results to including younger and older workers, as well as including the self-employed

The proportion of non-mothers who are employed is stable, at around 86% over the 1990s and at 81%-83% over the 2000s, with a low of 79% in 2011-2013.

To create larger and more stable samples, we have pooled the data for 3 year time periods: wages for 1993-1995 (data from March 1994 to 1996 CPS), 1996-1998, 1999-2001, 2002-2004, 2005 -2007, 2008-2010, and 2011-2013. We did not pool together the entire 21 years of data because, as discussed below, 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 21 years of data is that the effects of characteristics in the model may have changed over time. To eliminate extreme values, we dropped observations where the hourly wage was <45% of the federal minimum wage for the year, and observations where the hourly wage was more than 200\$.⁷

Our focal outcome variable is the natural log of *hourly wages*. 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 adjust wages for inflation using the annual average CPI-U (Consumer Price Index, all Urban Consumers, provided by the Bureau of Labor Statistics). Our key independent variable is a dummy variable for *mother*, which we define based on the presence of own children under the age of 18 in the household⁸.

Estimating the causal effect of children on women's wages is complicated by selection into motherhood. Women who have children (or have more children) may differ from other women in ways

⁷ Prior estimates find the maximum hourly wages in the US for 2011 to be 175\$ (Mishel and Shierholz, 2011). In our sample, we find 62% of the >200 hourly wage observations in the 2013 survey year, and 83% in the 2014 survey year, to include improbable hours or weeks of work reported, so they likely involve errors. See also Schmitt, 2003; Larrimore, Burkhauser, Feng, and Zayatz, 2008. We will conduct a sensitivity analysis where we see if results change if we bring the extreme wage values back in.

⁸ We will also estimate some models allowing the effect of motherhood to vary by number of children, and by the age of children.

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 ordinary least squares (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 will adopt this approach in our first set of models.

$$\ln(\text{Wage})_i = \beta_0 + \beta_1 \text{Mother}_i + \sum \beta_j X_{ji} + \varepsilon_i \quad (1)$$

where $\ln(\text{Wage})$ is the natural log of hourly wage (in 2013 dollars) for the i -th respondent; Mother is a dummy variable denoting whether a woman is a mother or not (as defined above); X is the covariate vector and includes j demographic, family, and human capital variables (*age* and *age squared*, and dummies denoting *educational attainment*, *family status*, and *race and ethnicity*) as well as dummy variables for *year*. We will use four categories for *educational attainment*: less than high school, high school only, some college, or college degree or more. We will use two categories for *family status*: married or unmarried⁹). We will use the following four categories for *race/ethnicity*: non-Hispanic White, non-Hispanic Black, Hispanic, and Other. β_1 is our coefficient of interest in Eq.1 and provides an estimate of the percentage difference in wages between mothers and non-mothers in the given period. All models also include a control for year since each sample pools data for a three-year time period¹⁰.

⁹ The way that cohabitators are identified is not completely consistent over the 21 year 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 will further divide unmarried women into those who are likely cohabiting and those who are not cohabiting.

¹⁰ In our main models, we assume the effect of motherhood is constant within each of the three-year periods; but, as a robustness check, we will also estimate models where we let the effect of motherhood vary by year within each period (by interacting the *Mother* and *year* variables).

A more refined approach to addressing selection, now quite commonly used although until recently not on this topic, is the estimation of propensity score matching or weighting models. 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 pre-treatment covariates.

$$Mother_i = \beta_0 + \sum \beta_j X_{ji} + u_i \quad (2)$$

where, *Mother* is the binary treatment (Mother or Non-Mother); X_j 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 re-weighted sample allows us to place more weight on those non-mothers who had a higher propensity score.

Specifically, drawing from a growing body of literature on doubly robust causal estimation techniques, we employ augmented inverse probability of treatment weighting (AIPW) (Robins and Rotnitzky 1995; Robins, Rotnitzky, and Zhao 1995; van der Laan and Robins 2003; Bang and Robins 2005; Tsiatis 2006; Wooldridge 2007; 2010; Tan 2010; Funk et al, 2011; most recently summarized in Woolridge and Slozynsky 2014). 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, Westreich, Wiesen, Stürmer, Brookhart, and Davidian, 2011).

In our case, we assume that our treatment model *could* be mis-specified but that our outcome model is correctly specified and therefore apply the augmented inverse probability of treatment weighting (AIPW).¹¹ The AIPW estimator thus offers us a theoretical advantage over simple IPW because it remains unbiased even if the treatment model is mis-specified. It is an inverse-probability-weighted estimator but includes an augmentation term that corrects the estimator when the treatment model is mis-specified. If the treatment specification is correct, the augmentation term disappears as the sample size becomes large¹². The estimator requires the overlap assumption to be satisfied – i.e. each individual should have a positive probability of receiving each treatment level¹³.

A common limitation of both the OLS and the AIPW models is that they adjust only for observable differences between groups. There may still be unobservable differences 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.

As is evident from this discussion, there are limitations to the methods to be used to correct for selection into motherhood.¹⁴ Hence, we will view our estimates as primarily descriptive. Nevertheless,

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

¹² A recent and detailed explanation of the augmented inverse probability estimator and its double robustness property is given in Słoczyński and Wooldridge (2014).

¹³ Tested through overlap plots (to be included in an appendix).

¹⁴ 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 (e.g. if the 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 Heckman (1979) selection correction model. 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

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 particularly 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 also how the family gap changes, both for women overall and for different groups, during different portions of the economic cycle.

Results

Trends in the Family Penalty

Figure 1 shows the unadjusted mean wages of mothers and non-mothers in our seven time periods. In the earliest years in our study, 1993-1995, and 1996-1998, mothers' hourly wages on average are below those of non-mothers, but over time the gap closes, with mothers' hourly wages on average exceeding those of non-mothers in the last two time periods, 2008-2010 and 2011-2013. Figure 2 displays a more detailed picture of the gaps between mothers' and non-mothers' hourly wages at the 10th, 25th, 50th, 75th and 90th percentiles. For women at each of these points in the wage distribution, mothers' hourly wages trail non-mothers' until about the end of the 1990s and, for each of these percentiles, it appears that the gap is decreasing over time. However, over time, the trends appear to diverge, with mothers in the 10th and 25th percentile almost catching up to non-mothers 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, mothers appear to overtake non-mothers over time, with the wage bonus being more distinct in the 90th percentile.

(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 but will provide some selection corrected estimates in an appendix.

While they provide a glimpse of the recent trends in the family gap in pay, these descriptive results do not tell us how earnings compare holding constant differences in characteristics between mothers and non-mothers (full descriptive statistics these characteristics for mothers and non-mothers, for each time period, are provided in Appendix B).

Accordingly, in Table 1 we shows results from our regression models. The OLS results indicate a significant penalty to motherhood in each time period that is declining in magnitude over time, from 6% in 1993-1995 to 1% in 2011-2013. Our preferred AIPW estimates show a similar trend, but with slightly smaller magnitudes and only a marginally significant less than 1% penalty in the most recent time period.

In Table 2, we add controls for part-time work, occupation, and industry. We find, as expected, that the direct effect of motherhood is slightly lower when we control for part-time (since a portion of mothers' lower average wages is accounted for by their higher propensity to work in lower-paid part-time jobs) and in the most recent time period (the two most recent time periods in AIPW models), there is no longer a significant penalty. Further controlling for occupation and for industry decreases the motherhood penalty in most of the years and helps explain some of the family gap.

Trends by Sub-Group

We next examine to what extent the family gap varies across groups and whether that variation has changed over time. We therefore repeat our main models (OLS and AIPW) for sub-groups defined by marital status, education, race/ethnicity, immigration status, occupation, and temporal flexibility. The most striking difference we find is between mothers who are married and those who are not. For married mothers, the family penalty declined and was replaced by a wage bonus in the most recent time period,

whereas for unmarried mothers, the wage penalty persisted throughout the two decades, even rising to 10% in the period 1996-1998¹⁵.¹⁶

Examining the trends by race and ethnicity, we again find considerable differences across sub-groups. Comparing Non-Hispanic White mothers with Non-Hispanic Black mothers presents some interesting trends. In the beginning of the period, both groups appear to face similar percentage gaps, White mothers at 7-8% and Black mothers at a slightly lower penalty of 6%; their trajectories then appear to diverge over the period 1996-1998 and 1999-2001, narrowing for White mothers and increasing for Black mothers to reach 8-10%. Post this time period, the declining trend continues for White mothers such that in 2011-2013, they face a marginally significant 1.4% penalty; the penalty for Black mothers on the other hand seems to fluctuate between 3-5% over the same period. For Hispanic mothers, there is no penalty throughout the period except in 1996-1998 and 2005-2007, with a 4% penalty in each period.

Turning to education sub-groups, we find no evidence of a wage penalty to motherhood among those with less than a high school education throughout the period under study, except in the latest year (2011-2013). In contrast, for those with the highest level of education (college +), we find that the penalty fluctuates between 4 to 6%, falling to 2% in the period 2008-2010 and finally vanishing in the most recent period. For those with just a high school education as well as for those with some college

¹⁵ In supplementary analysis, we split the non-married mothers into two groups, cohabiting mothers and single mother (please see Appendix 4). We find that trends in the wage penalty for non-married mothers is driven by single mothers, who face persistent negative wage penalties that reach a maximum of 10-11% in 1996-1998. Cohabiting mothers appear to face about a 7% penalty in the earliest two time periods, but no significant penalties thereafter, except in 2008-2010.

¹⁶ We also examine results for 48 subgroups more precisely defined by education, race, age, and marital status pooling data for the most recent years, 2009-2013 (see Appendix 5). Results once again reflect the growing importance of having a partner at home, with single mothers (compared to married or cohabiting mothers), especially younger single mothers, consistently facing significant negative penalties.

education, we find a gradual decline in the penalty over time from 8-10% in the beginning of the period to 2-3% in the end.

Results by immigration status show the absence of a family penalty through most of the period under consideration, and a 4% bonus in the most recent data, among foreign-born mothers.

We then examine the variation in the family gap (as well as variation in the trend) among 6 broad occupational categories. For the first three categories of employees, “Professional and Technical”, “Managers, Officials, and Proprietors” and “Clerical and Sales”, we find evidence of the penalty reducing over time, such that in 2011-2013, it is either gone or a marginally significant 2%. For the “Farmers and Craftsmen” group as well as for the “Operatives and Laborers” group, we do not find any evidence of a wage penalty except in 1999-2001 for the latter. The penalty for “Service Workers”, in contrast, appears to fluctuate over this period – it is 5-6% in the earliest time periods, then disappears over the 1999-2001 and 2002-2004 time periods and once again re-appears after this period.

Finally, we examine variation in the wage gap by dividing workers into three categories denoting decreasing temporal flexibility enjoyed at the job – those who usually worked less than 40 hours a week, those who usually worked a 40 hour week, and those who usually worked more than 40 hours a week. We find that for those with most and least time flexibility, the wage gap has gradually become insignificant. However, for those working more than 40 hours a week, the gap has only closed in the last two time periods, while for those on the opposite end, the gap has been negligible since 1999-2001. The 40 hour week workers mimic the overall trend for mothers, which is unsurprising since they constitute the bulk of our sample.

Discussion/ Conclusion

[TO BE ADDED]

References

- Amuedo-Dorantes, Catalina, and Jean Kimmel. 2005. "The Motherhood Wage Gap for Women in the United States: The Importance of College and Fertility Delay." *Review of Economics of the Household* 3(1): 17-48.
- Amuedo-Dorantes, Catalina, and Jean Kimmel. 2008. "New Evidence on the Motherhood Wage Gap". *IZA Discussion Papers* 3662.
- Anderson, Deborah J., Melissa Binder, and Kate Krause. 2002. "The Motherhood Wage Penalty: Which Mothers Pay it and Why?" *American Economic Review* 354-358.
- Anderson, Deborah J., Melissa Binder, and Kate Krause. 2002. "Motherhood Wage Penalty Revisited: Experience, Heterogeneity, Work Effort, and Work-Schedule Flexibility." *The Industrial and Labor Relations Review*. 56 273.
- Avellar, Sarah, and Pamela J. Smock. 2003. "Has the Price of Motherhood Declined Over Time? A Cross-Cohort Comparison of the Motherhood Wage Penalty." *Journal of Marriage and Family* 65 (3): 597-607.
- Austin, Peter C. 2011. "An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies" *Multivariate Behavioral Research* 46(3):399-424.
- Bang, H., and J. M. Robins. 2005. Doubly robust estimation in missing data and causal inference models. *Biometrics* 61: 962–972
- Blank, Rebecca. 2002. "Evaluating Welfare Reform in the United States." *Journal of Economic Literature* 40(4): 1105–1066.
- Baum II, Charles L. 2002. "The Effect of Work Interruptions on Women's Wages". *Labour* 16(1), 1-37.
- Baum II, Charles L. 2003. "The Effect of State Maternity Leave Legislation and the 1993 Family and Medical Leave Act on Employment and Wages." *Labour Economics* 10(5): 573-596.
- Becker, Gary. S. .1985. "Human Capital, Effort, and the Sexual Division of Labor". *Journal o Labor Economics* S33-S58.
- Becker, Gary. S. 1981. *A Treatise on the Family*. Harvard University Press.
- Bianchi, Suzanne. M. 2011. Family Change and Time Allocation in American Families. *The ANNALS of the American Academy of Political and Social Science*, 638(1): 21-44.
- Borjas, George. 2007. "Immigration Policy and Human Capital." In *Reshaping the American Workforce in a Changing Economy*, edited by H. Holzer and D. Nightingale. Washington, DC: Urban Institute Press.

Briscoe, Forrest. 2006. "Temporal Flexibility and Careers: The Role of Large-Scale Organizations for Physicians." *Industrial and Labor Relations Review* 60 (1): 88–104.

Briscoe, Forrest. 2007. "From Iron Cage to Iron Shield? How Bureaucracy Enables Temporal Flexibility for Professional Service Workers." *Organization Science* 18 (2): 297–314.

Budig, Michelle J., & Melissa J. Hodges. 2010. Differences in Disadvantage: Variation in the Motherhood Penalty across White Women's Earnings Distribution. *American Sociological Review* 75(5): 705-728.

Budig, Michelle J., Joya Misra, and Irene Boeckmann. 2012. "How Cultural Attitudes and Work-Family Policies Combine to Predict Maternal Earnings Cross-Nationally." Paper presented at the Population Association of America annual meetings (San Francisco)

Budig, Michelle J., and Melissa J. Hodges. 2014. "Statistical Models and Empirical Evidence for Differences in the Motherhood Penalty across the Earnings Distribution." *American Sociological Review* 79(2) : 358-364.

Cooke, Lynn Prince. "Gendered parenthood penalties and premiums across the earnings distribution in Australia, the United Kingdom, and the United States." *European Sociological Review* 30, no. 3 (2014): 360-372.

Derya Uysal, S. "Doubly Robust Estimation of Causal Effects with Multivalued Treatments: An Application to the Returns to Schooling." *Journal of Applied Econometrics* (2014).

Elsby, Michael, Bart Hobijn, and Aysegul Sahin. 2010. "The Labor Market Consequences of the Great Recession." Working Paper, National Bureau of Economic Research.

Fuchs, Victor. R. 1988. *Women's Quest for Economic Equality*. Harvard University Press.

Funk, Michele Jonsson, Daniel Westreich, Chris Wiesen, Til Stürmer, M. Alan Brookhart, and Marie Davidian. "Doubly robust estimation of causal effects." *American journal of epidemiology* 173, no. 7 (2011): 761-767.

Gangl, Markus, and Andrea Ziefle. 2009. Motherhood, Labor Force Behavior, and Women's Careers: An Empirical Assessment of the Wage Penalty for Motherhood in Britain, Germany, and the United States. *Demography* 46(2): 341-369.

Glass, Jennifer. 2004. "Blessing or Curse? Work-Family Policies and Mother's Wage Growth over Time." *Work and Occupations* 31(3): 367-394.

Glauber, Rebecca. 2007. "Marriage and the Motherhood Wage Penalty among African Americans, Hispanics, and Whites." *Journal of Marriage and Family*, 69(4), 951-961.

Glauber, Rebecca. 2013. "Increasing Inequality: Trends in the Motherhood Wage Penalty, 1980-

2010.” Paper presented at the Population Association of America Annual Meeting, New Orleans, April 12, 2013.

Glynn, Adam N. and Quinn, Kevin M. An Introduction to the Augmented Inverse Propensity Weighted Estimator *Political Analysis* (2010) 18 (1): 36-56

Goldin, Claudia. "A grand gender convergence: Its last chapter." *The American Economic Review* 104, no. 4 (2014): 1091-1119.

Gornick, Janet C. and Marcia K. Meyers. 2003. "Families that Work: Policies for Reconciling Parenthood and Employment". *Russell Sage Foundation*.

Gough, Margaret, and Mary Noonan. 2013. "A Review of the Motherhood Wage Penalty in the United States". *Sociology Compass* 7(4), 328-342.

Harkness, Susan and Jane Waldfogel. 2003. "The Family Gap in Pay: Evidence from Seven 29 Industrialized Countries." *Research in Labor Economics*, 22, 369-413.

Hattori, Satoshi, and Masayuki Henmi. "Stratified doubly robust estimators for the average causal effect." *Biometrics* (2014).

Heckman, James J. 1979. Sample Selection Bias as a Specification Error. *Econometrica: Journal of the Econometric Society* 153-161.

Hill, Martha. 1979. "The Wage Effects of Marital Status and Children." *Journal of Human Resources* 14:579-94.

Holzer, Harry J., and Marek Hlavac. 2011. *An Uneven Road and Then a Cliff: U.S. Labor Markets, 2000–10*. US2010 Policy Brief, Russell Sage Foundation.

Holzer, Harry J., and Marek Hlavac. (2012) "A Very Uneven Road: U.S. Labor Markets in the Past 30 Years" IRP Discussion Paper. 1400-12; Later published in John R. Logan, editor, *The Lost Decade? Social Change in the U.S. After 2000*, forthcoming, Russell Sage Foundation, 2013

Huber, Martin. "Treatment evaluation in the presence of sample selection." *Econometric Reviews* 33, no. 8 (2014): 869-905.

Jaeger, David A. 1997. "Reconciling the Old and New Census Bureau Education Questions: Recommendations for Researchers". *Journal of Business & Economic Statistics* 15(3) 300-309.

Jaeger, David A. 2003. "Estimating the Returns to Education Using the Newest Current Population Survey Education Questions". *Economics Letters* 78(3): 385-394.

Killewald, Alexandra, and Jonathan Bearak. 2014. "Is the Motherhood Penalty Larger for Low-Wage Women? A Comment on Quantile Regression." *American Sociological Review* 79(2): 350-357.

King, Miriam., Steven Ruggles, J. Trent Alexander, Sarah Flood, Katie Genadek, Matthew B. Schroeder, Brandon Trampe, & Rebecca Vick. 2010. *Integrated Public Use Microdata Series, Current Population Survey: Version 3.0*. [Machine-readable database]. Minneapolis: University of Minnesota.

Korenman, Sanders, and David Neumark. 1992. "Marriage, Motherhood, and Wages". *Journal of Human Resources* 27(2): 233-255.

Krueger, Alan, and Robert Solow, eds. 2002. *The Roaring Nineties*. New York: Russell Sage Foundation.

Larrimore, Jeff, Richard V. Burkhauser, Shuaizhang Feng, and Laura Zayatz. 2008. "Consistent Cell Means for Topcoded Incomes in the Public Use March CPS (1976–2007)." *Journal of Economic and Social Measurement* 33: 89–128.

Loughran, David S., and Julie M. Zissimopoulos. 2009. "Why Wait? The Effect of Marriage and Childbearing on the Wages of Men and Women". *Journal of Human Resources* 44(2), 326-349.

Mishel, Lawrence, and Heidi Shierholz. 2011. *State of Working America*. Washington, D.: Economic Policy Institute.

Robins, J. M., Rotnitzky, A., and Zhao, L. P. (1994). Estimation of regression coefficients when some regressors are not always observed. *Journal of the American Statistical Association*, 89:846-866.

Robins, J. M., Rotnitzky, A., and van der Laan, M. (2000). Comment. *Journal of the American Statistical Association*, 95:477{482.

Robins, J. M., M. Sued, Q. Lei-Gomez, and A. Rotnitzky. 2007. Comment: Performance of double-robust estimators when "inverse probability" weights are highly variable. *Statistical Science* 22: 544–559.

Rosenbaum, Paul R. and Donald B. Rubin. 1983. "The Central Role of The Propensity Score in Observational Studies for Causal Effects." *Biometrika* 70(1), 41-55.

Rosenbaum, Paul R. and Donald B. Rubin. 1984. "Reducing Bias in Observational Studies using Sub-Classification on the Propensity Score." *Journal of the American Statistical Association*, 79(387), 516-524.

Rosenbaum, Paul R. and Donald B. Rubin. 1985. "Constructing a Control Group Using Multivariate Matched Sampling Methods that Incorporate the Propensity Score". *The American Statistician* 39(1): 33-38.

Rotnitzky, Andrea, Quanhong Lei, Mariela Sued, and James M. Robins. "Improved double-robust estimation in missing data and causal inference models." *Biometrika* 99, no. 2 (2012): 439-456.

Scharfstein, D. O., Rotnitzky, A., and Robins, J. M. (1999). Rejoinder. *Journal of*

the American Statistical Association, 94:1135{1146.

Schmitt, John. 2003. "Creating a Consistent Hourly Wage Series from the Current Population Survey's Outgoing Rotation Group, 1979–2002." Center for Economic and Policy Research: Washington, DC.

Srivastava, Anjali and William M. Rodgers III (2013) "The Motherhood Wage Gap for U.S. First-generation Immigrant and Native Women" National Poverty Center Working Paper Series #13-08. June 2013 http://www.npc.umich.edu/publications/working_papers/

Słoczyński, Tymon and Jeffrey M. Wooldridge "A General Double Robustness Result for Estimating Average Treatment Effects" IZA Discussion Paper No. 8084, March 2014

Sigle-Rushton, Wendy and Jane Waldfogel. 2007. "Motherhood and Women's Earnings in Anglo-American, Continental European, and Nordic countries". *Feminist Economics*, 13(2), 55-91.

Simonsen, Marianne and Lars Skipper. 2006. "The Costs of Motherhood: An Analysis Using Matching Estimators." *Journal of Applied Econometrics*, 21(7), 919-934.

Tan, Z. 2010. Bounded, efficient and doubly robust estimation with inverse weighting. *Biometrika* 97: 661–682.:

Taniguchi, Hiromi. 1999. "The Timing of Childbearing and Women's Wages". *Journal of Marriage and the Family*: 1008-1019.

Todd, Erin. L. 2001. "Educational Attainment and Family Gaps in Women's Wages: Evidence from Five Industrialized Countries". *Luxembourg Income Study*. Working Paper No. 246

Tsiatis, A. A. 2006. *Semiparametric Theory and Missing Data*. New York: Springer.

Waldfogel, Jane. 1997. "The Effect of Children on Women's Wages." *American Sociological Review* 209-217.

Waldfogel, Jane. 1998a. "Understanding the Family Gap in Pay for Women with Children". *The* 32

Waldfogel, Jane. 1998b. "The Family Gap for Young Women in the United States and Britain: Can Maternity Leave Make a Difference?" *Journal of Labor Economics* 16(3): 505-545.

Wilde, Elizabeth Ty, Lily Batchelder, and David T. Ellwood. 2010. "The Mommy Track Divides: The Impact of Childbearing on Wages of Women of Differing Skill Levels". *National Bureau of Economic Research* w16582

Winder, Katie L. 2008. *Endogenous Fertility and the Motherhood Wage Penalty*. Technical Report, University of California, Merced.

Wooldridge, J. M. 2010. *Econometric Analysis of Cross Section and Panel Data*. 2nd ed. Cambridge, MA: MIT Press.

Wooldridge, J. M. 2007 Inverse probability weighted estimation for general missing data problems.
Journal of Econometrics 141:1281–1301.

Figure 1: Mean hourly wages for mothers and non-mothers in each time period

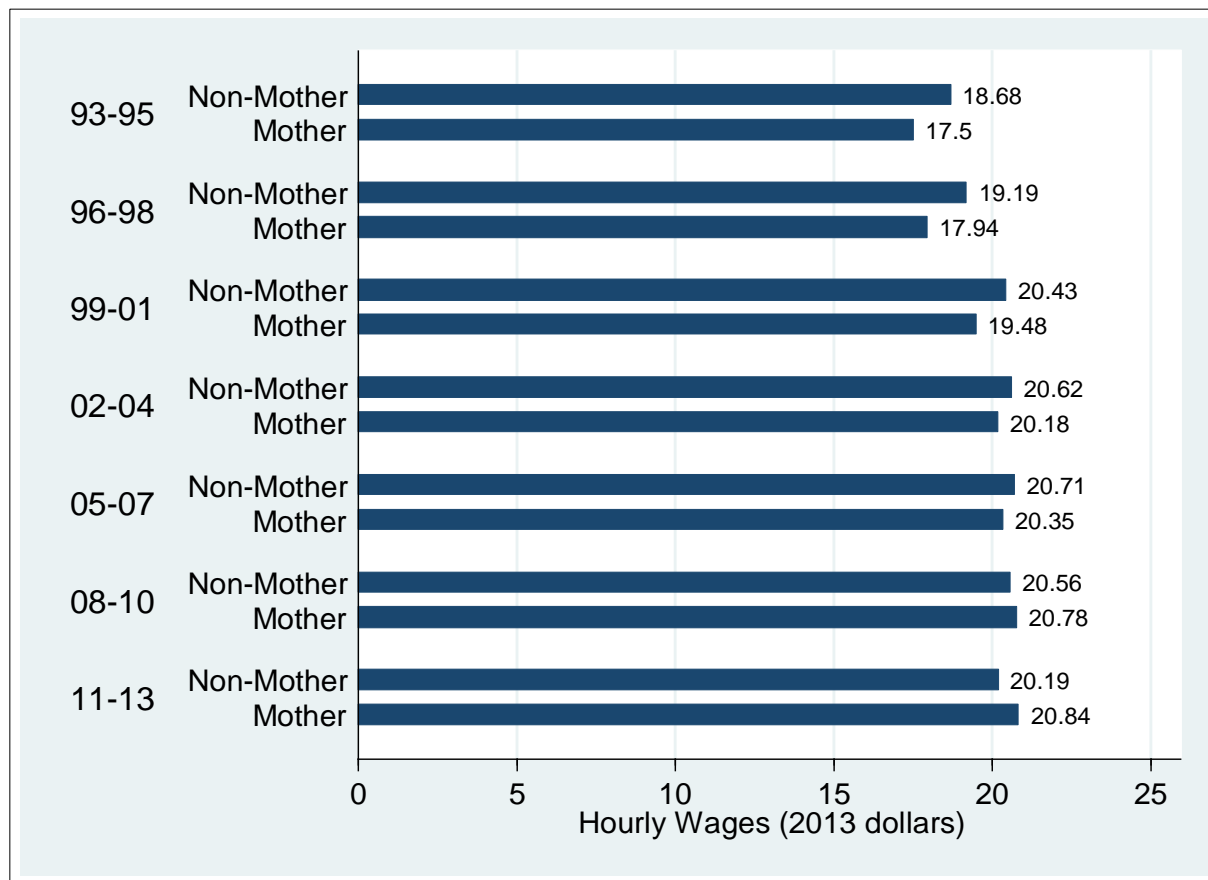


Figure 2: Distribution of hourly wages for mothers and non-mothers over time (10th, 25th, 50th, 75th, and 90th percentiles)

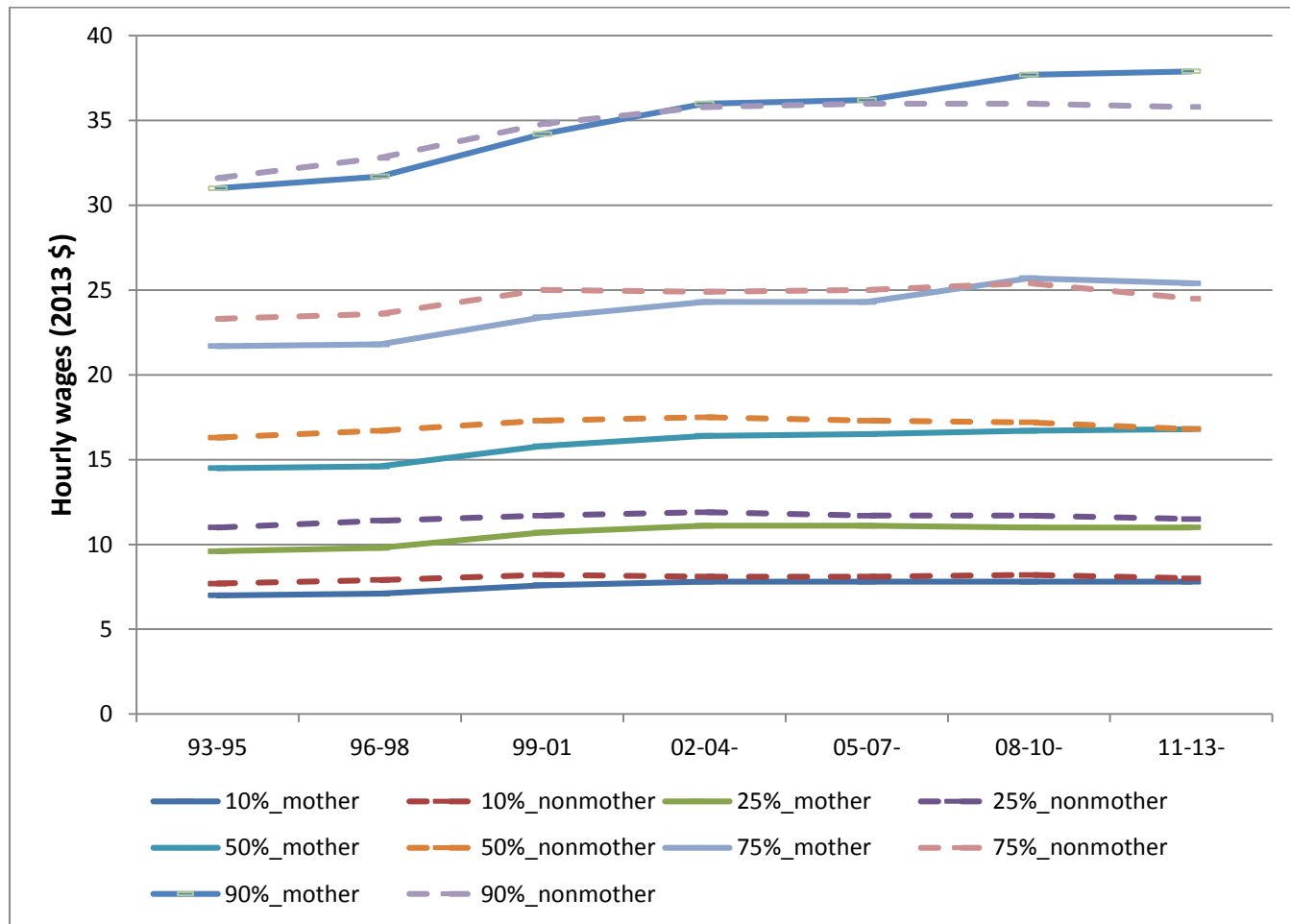


Table 1: Motherhood penalties from OLS and AIPW regressions

	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
OLS	-0.065*** (0.005)	-0.059*** (0.006)	-0.047*** (0.005)	-0.031*** (0.005)	-0.040*** (0.005)	-0.023*** (0.005)	-0.012* (0.005)
AIPW	-0.061*** (0.005)	-0.053*** (0.006)	-0.043*** (0.005)	-0.028*** (0.005)	-0.034*** (0.005)	-0.018*** (0.005)	-0.009+ (0.006)
N	49,485	45,064	65,625	69,023	64,379	62,554	52,547

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1; Dependent variable is ln hourly wages (in 2013\$). All models include controls for age, age_squared, and dummies for education, race/ethnicity, married, as well as year.

Table 2: Motherhood penalties from OLS and AIPW regressions adding controls for part-time, occupation, and industry

	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
Baseline							
OLS	-0.065*** (0.005)	-0.059*** (0.006)	-0.047*** (0.005)	-0.031*** (0.005)	-0.040*** (0.005)	-0.023*** (0.005)	-0.012* (0.005)
AIPW	-0.061*** (0.005)	-0.053*** (0.006)	-0.043*** (0.005)	-0.028*** (0.005)	-0.034*** (0.005)	-0.018*** (0.005)	-0.009+ (0.006)
+Part-time							
OLS	-0.047*** (0.005)	-0.046*** (0.006)	-0.035*** (0.005)	-0.018*** (0.005)	-0.029*** (0.005)	-0.012* (0.005)	-0.003 (0.005)
AIPW	-0.038*** (0.006)	-0.038*** (0.006)	-0.026*** (0.005)	-0.012* (0.005)	-0.018** (0.006)	-0.004 (0.005)	0.001 (0.006)
+Part-time, Occupation							
OLS	-0.048*** (0.005)	-0.045*** (0.005)	-0.036*** (0.005)	-0.021*** (0.005)	-0.028*** (0.005)	-0.013** (0.005)	-0.004 (0.005)
AIPW	-0.040*** (0.006)	-0.040*** (0.006)	-0.029*** (0.005)	-0.017** (0.005)	-0.019*** (0.006)	-0.008 (0.005)	-0.002 (0.006)
+Part-time, Occupation, Industry							
OLS	-0.045*** (0.005)	-0.041*** (0.005)	-0.037*** (0.005)	-0.022*** (0.005)	-0.030*** (0.005)	-0.016*** (0.005)	-0.007 (0.005)
AIPW	-0.036*** (0.005)	-0.036*** (0.006)	-0.031*** (0.005)	-0.020*** (0.005)	-0.022*** (0.005)	-0.011* (0.005)	-0.005 (0.006)
N	49,485	45,064	65,625	69,023	64,379	62,554	52,547

See note to Table 1. Models include the same controls as Table 1 plus part-time, occupation, and industry as indicated above.

Table 3: Motherhood penalties from OLS and AIPW models, by marital status

	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
Married							
OLS	-0.050*** (0.007)	-0.026*** (0.008)	-0.029*** (0.007)	-0.023*** (0.007)	-0.013+ (0.007)	0.002 (0.007)	0.023** (0.008)
AIPW	-0.052*** (0.007)	-0.028*** (0.007)	-0.031*** (0.007)	-0.025*** (0.007)	-0.016* (0.007)	0.000 (0.007)	0.019* (0.008)
N	30,684	27,251	40,296	42,061	38,539	36,278	29,164
Not married							
OLS	-0.086*** (0.008)	-0.102*** (0.008)	-0.072*** (0.007)	-0.046*** (0.007)	-0.073*** (0.007)	-0.052*** (0.007)	-0.053*** (0.007)
AIPW	-0.084*** (0.009)	-0.099*** (0.009)	-0.071*** (0.007)	-0.044*** (0.007)	-0.072*** (0.007)	-0.051*** (0.007)	-0.055*** (0.008)
N	18,801	17,813	25,329	26,962	25,840	26,276	23,383

See Note to Table 1.

Table 4: Motherhood penalties from OLS and AIPW, by race/ethnicity

	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
White							
OLS	-0.076*** (0.006)	-0.061*** (0.007)	-0.051*** (0.006)	-0.036*** (0.006)	-0.039*** (0.007)	-0.025*** (0.007)	-0.014+ (0.007)
AIPW	-0.072*** (0.006)	-0.057*** (0.007)	-0.048*** (0.006)	-0.034*** (0.006)	-0.033*** (0.007)	-0.020** (0.007)	-0.008 (0.007)
N	35,751	31,169	44,042	46,212	41,054	38,907	31,838
Black							
OLS	-0.063*** (0.016)	-0.101*** (0.016)	-0.080*** (0.013)	-0.036** (0.012)	-0.047*** (0.013)	-0.029* (0.012)	-0.044** (0.014)
AIPW	-0.061*** (0.016)	-0.095*** (0.016)	-0.075*** (0.013)	-0.031* (0.012)	-0.040** (0.013)	-0.027* (0.013)	-0.044** (0.014)
N	5,142	4,895	7,884	8,224	7,783	7,482	6,159
Hispanic							
OLS	0.011 (0.015)	-0.041** (0.014)	-0.015 (0.012)	-0.012 (0.012)	-0.043*** (0.012)	-0.017 (0.011)	0.001 (0.012)
AIPW	0.012 (0.015)	-0.034* (0.015)	-0.011 (0.013)	-0.007 (0.013)	-0.043** (0.013)	-0.017 (0.012)	-0.001 (0.012)
N	6,307	6,898	9,847	9,635	10,362	10,546	9,670
Other							
OLS	-0.065* (0.027)	0.012 (0.029)	-0.020 (0.021)	-0.022 (0.018)	-0.035+ (0.019)	-0.019 (0.017)	0.012 (0.018)
AIPW	-0.079** (0.027)	0.007 (0.030)	-0.012 (0.022)	-0.025 (0.019)	-0.037* (0.019)	-0.014 (0.019)	0.013 (0.020)
N	2,285	2,102	3,852	4,952	5,180	5,619	4,880

See Note to Table 1.

Table 5: Motherhood penalties from OLS and AIPW models, by education

	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
Less than High School							
OLS	0.009 (0.018)	-0.012 (0.019)	-0.021 (0.016)	-0.003 (0.016)	-0.018 (0.017)	-0.000 (0.017)	-0.050* (0.019)
AIPW	0.014 (0.018)	-0.000 (0.019)	-0.017 (0.018)	0.008 (0.018)	-0.009 (0.019)	0.006 (0.017)	-0.041* (0.021)
N	4,153	3,827	5,526	5,461	4,901	4,332	3,472
High School Diploma							
OLS	-0.081*** (0.009)	-0.063*** (0.010)	-0.049*** (0.009)	-0.040*** (0.008)	-0.041*** (0.009)	-0.032*** (0.009)	-0.021* (0.011)
AIPW	-0.080*** (0.009)	-0.056*** (0.010)	-0.049*** (0.009)	-0.038*** (0.009)	-0.043*** (0.010)	-0.030** (0.010)	-0.019+ (0.011)
N	16,120	14,218	19,689	19,798	16,911	14,818	11,306
Some College							
OLS	-0.100*** (0.010)	-0.104*** (0.010)	-0.067*** (0.009)	-0.046*** (0.009)	-0.063*** (0.009)	-0.049*** (0.009)	-0.031** (0.009)
AIPW	-0.097*** (0.010)	-0.100*** (0.010)	-0.061*** (0.009)	-0.046*** (0.009)	-0.052*** (0.009)	-0.051*** (0.009)	-0.028** (0.010)
N	15,458	13,938	20,878	21,802	20,149	19,450	15,976
College +							
OLS	-0.049*** (0.011)	-0.041*** (0.011)	-0.057*** (0.010)	-0.045*** (0.009)	-0.041*** (0.010)	-0.024** (0.009)	-0.009 (0.010)
AIPW	-0.041** (0.014)	-0.047*** (0.013)	-0.054*** (0.011)	-0.041*** (0.010)	-0.041*** (0.010)	-0.020+ (0.010)	-0.012 (0.011)
N	13,754	13,081	19,532	21,962	22,418	23,954	21,793

See Note to Table 1.

Table 6: Motherhood penalties from OLS and AIPW models, by immigration status

	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
Native Born							
OLS	-0.071*** (0.006)	-0.066*** (0.006)	-0.056*** (0.005)	-0.036*** (0.005)	-0.044*** (0.005)	-0.030*** (0.005)	-0.022*** (0.006)
AIPW	-0.067*** (0.006)	-0.061*** (0.006)	-0.051*** (0.005)	-0.033*** (0.005)	-0.038*** (0.006)	-0.028*** (0.006)	-0.019** (0.006)
N	43,633	38,715	56,139	58,569	53,558	51,465	42,864
Foreign Born							
OLS	-0.015 (0.016)	-0.005 (0.016)	0.013 (0.013)	0.008 (0.013)	-0.010 (0.013)	0.017 (0.012)	0.038** (0.013)
AIPW	-0.014 (0.017)	-0.000 (0.016)	0.016 (0.014)	0.010 (0.013)	-0.007 (0.014)	0.026* (0.012)	0.035** (0.013)
N	5,852	6,349	9,486	10,454	10,821	11,089	9,683

See Note to Table 1.

Table 7: Motherhood penalties from OLS and AIPW models, by temporal flexibility

	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
<40 hours/wk							
OLS	-0.046*** (0.011)	-0.036** (0.012)	-0.011 (0.011)	-0.014 (0.011)	-0.014 (0.011)	-0.009 (0.010)	0.005 (0.011)
AIPW	-0.041*** (0.012)	-0.041** (0.013)	0.005 (0.013)	0.007 (0.012)	0.007 (0.014)	0.016 (0.012)	0.025* (0.012)
N	16,505	13,836	19,849	22,038	19,417	19,932	16,567
40 hrs/wk							
OLS	-0.043*** (0.006)	-0.037*** (0.006)	-0.040*** (0.005)	-0.024*** (0.005)	-0.038*** (0.006)	-0.023*** (0.006)	-0.013* (0.006)
AIPW	-0.044*** (0.007)	-0.033*** (0.007)	-0.032*** (0.006)	-0.020*** (0.006)	-0.031*** (0.006)	-0.018** (0.006)	-0.008 (0.007)
N	24,898	23,732	35,425	37,018	35,281	33,543	28,236
>40 hours/wk							
OLS	-0.059*** (0.011)	-0.059*** (0.012)	-0.061*** (0.011)	-0.035** (0.011)	-0.033** (0.012)	-0.017 (0.012)	-0.017 (0.013)
AIPW	-0.072*** (0.013)	-0.071*** (0.014)	-0.067*** (0.012)	-0.037** (0.012)	-0.025* (0.013)	-0.011 (0.014)	-0.014 (0.015)
N	8,082	7,496	10,351	9,967	9,681	9,079	7,744

See Note to Table 1.

Table 8: Motherhood penalties from OLS and AIPW models, by occupation

	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
Professional & Technical							
OLS	-0.075*** (0.010)	-0.052*** (0.011)	-0.042*** (0.009)	-0.044*** (0.009)	-0.038*** (0.010)	-0.027** (0.009)	-0.018+ (0.010)
AIPW	-0.068*** (0.011)	-0.041*** (0.012)	-0.035*** (0.010)	-0.047*** (0.009)	-0.031** (0.010)	-0.027** (0.010)	-0.021* (0.011)
N	13,128	12,202	18,675	20,569	20,181	21,265	18,766
Managers Officials Proprietors							
OLS	-0.033* (0.014)	-0.039** (0.014)	-0.039** (0.013)	-0.029* (0.014)	-0.001 (0.015)	-0.023 (0.014)	0.005 (0.016)
AIPW	-0.027+ (0.015)	-0.035* (0.015)	-0.031* (0.013)	-0.029* (0.014)	-0.002 (0.015)	-0.017 (0.015)	0.011 (0.016)
N	5,782	5,750	8,612	7,112	6,693	6,618	5,711
Clerical & Sales							
OLS	-0.084*** (0.009)	-0.074*** (0.009)	-0.065*** (0.008)	-0.033*** (0.008)	-0.046*** (0.008)	-0.022** (0.008)	-0.010 (0.009)
AIPW	-0.080*** (0.009)	-0.068*** (0.009)	-0.057*** (0.008)	-0.027*** (0.008)	-0.042*** (0.009)	-0.024** (0.008)	-0.010 (0.009)
N	16,853	14,810	20,879	23,272	21,062	19,135	15,218
Farmers & Craftsmen							
OLS	-0.023 (0.014)	-0.023 (0.014)	-0.023 (0.014)	-0.021 (0.014)	-0.022 (0.014)	-0.020 (0.014)	-0.021 (0.014)
AIPW	-0.017 (0.014)	-0.017 (0.014)	-0.017 (0.014)	-0.016 (0.014)	-0.016 (0.014)	-0.015 (0.014)	-0.016 (0.014)
N	6,474	6,471	6,490	6,506	6,477	6,477	6,476
Service workers							
OLS	-0.051*** (0.014)	-0.061*** (0.014)	-0.021+ (0.012)	-0.014 (0.011)	-0.045*** (0.012)	-0.028* (0.011)	-0.033** (0.012)
AIPW	-0.047*** (0.014)	-0.057*** (0.014)	-0.022+ (0.013)	-0.015 (0.012)	-0.037** (0.013)	-0.021+ (0.012)	-0.031* (0.012)
N	7,961	7,227	10,575	11,851	11,119	11,067	9,293
Operatives & Laborers							
OLS	-0.012 (0.016)	-0.028 (0.017)	-0.032* (0.015)	-0.018 (0.016)	-0.034+ (0.017)	-0.023 (0.018)	0.009 (0.021)
AIPW	-0.016 (0.016)	-0.016 (0.017)	-0.040** (0.015)	-0.017 (0.017)	-0.020 (0.018)	-0.009 (0.019)	0.012 (0.021)
N	4,835	4,230	5,708	5,009	4,350	3,620	2,916

See Note to Table 1.

APPENDICES:

Appendix 1: Percentage of women aged 25-44 employed and in the wage sample for each time period

	1993-1995		1996-1998		1999-2001		2002-2004		2005-2007		2008-2010		2011-2013	
	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother
Employed (%)	74.3	86.5	75.9	85.7	77.8	85.6	75.3	82.8	75.0	82.8	73.9	80.7	72.1	78.9
Wage Sample (%)	66.3	80.3	68.2	79.7	70.5	80.0	68.1	77.5	68.0	77.6	67.2	76.0	65.6	74.4
N	46,253	23,418	41,036	21,410	62,869	26,599	69,607	27,920	64,606	26,373	61,704	27,706	51,362	25,325

Appendix 2: Descriptive Statistics

	1993-1995		1996-1998		1999-2001		2002-2004		2005-2007		2008-2010		2011-2013	
	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother	Mother	Non Mother
Age	35.108 (0.030)	33.637 (0.045)	35.291 (0.032)	33.894 (0.048)	35.590 (0.025)	34.100 (0.043)	35.682 (0.025)	34.203 (0.043)	35.643 (0.026)	33.689 (0.044)	35.564 (0.026)	33.281 (0.043)	35.639 (0.029)	33.158 (0.044)
Hours Worked per week	35.594 (0.062)	39.920 (0.068)	36.140 (0.063)	40.032 (0.071)	36.320 (0.050)	40.237 (0.063)	36.054 (0.049)	39.596 (0.062)	36.605 (0.049)	39.770 (0.063)	36.419 (0.050)	39.271 (0.065)	36.684 (0.055)	39.053 (0.069)
Weeks Worked per year	44.327 (0.078)	47.609 (0.076)	44.982 (0.078)	47.810 (0.078)	45.744 (0.059)	48.110 (0.068)	46.001 (0.056)	47.875 (0.070)	46.394 (0.057)	48.365 (0.067)	46.314 (0.059)	47.851 (0.071)	46.635 (0.063)	48.060 (0.073)
Annual Wage & Salary Income	18,194.51 (83.128)	23,134.64 (115.533)	20,657.02 (107.347)	25,878.55 (151.806)	24,478.23 (99.753)	29,905.85 (166.262)	26,889.17 (103.636)	31,594.99 (171.592)	30,631.02 (131.289)	35,214.88 (201.941)	33,420.33 (145.425)	36,703.18 (204.793)	36,162.68 (172.249)	38,119.39 (215.961)
Hourly Wage (2013\$)	17.504 (0.071)	18.680 (0.085)	17.943 (0.080)	19.190 (0.097)	19.477 (0.070)	20.434 (0.099)	20.175 (0.070)	20.615 (0.097)	20.350 (0.076)	20.708 (0.103)	20.779 (0.077)	20.561 (0.099)	20.843 (0.087)	20.189 (0.103)
Education (%)														
Less_HS	9.5	6.5	9.8	6.3	9	7.2	8.3	7	8.3	6.2	7.6	5.6	7.4	5.2
HighSchool	35.3	28.2	34.7	26.5	32	25.8	30	25.8	27.5	23.7	24.7	21.6	22.2	20.3
Some Coll	32.7	28.9	32.1	28.9	33.4	28.5	33.5	27.4	32.9	27.9	33	27.4	32.4	26.8
College+	22.5	36.4	23.4	38.3	25.6	38.4	28.1	39.9	31.4	42.2	34.7	45.4	38	47.8
Family (%)														
Married	74.9	41	73.5	39.1	72.9	37.5	71.9	37	71.4	35.1	70.8	32.8	69.2	31
Not Married	25.1	59	26.5	60.9	27.1	62.5	28.1	63	28.6	64.9	29.2	67.2	30.8	69
Partnership (among unmarried)														
Cohabiting	0.7	3.1	1	6	1.2	7.5	1.3	8.2	1.1	9.6	1.2	11	1.2	12.3
No_Partner	24.4	55.9	25.5	54.9	25.9	55	26.8	54.8	27.4	55.4	28	56.2	29.6	56.7

Race/Ethnicity (%)														
White	71	74.3	67.7	71.6	68.5	64.2	68.8	62.9	65.9	59.1	64.4	57.8	62.9	56.4
Black	10.7	9.9	11.3	10.1	11.4	13.3	11	14	11.2	14.1	10.9	14	10.8	13.3
Hispanic	13.9	10.9	16.7	13	15	15.1	14	14	16.2	15.9	17.1	16.4	18.6	18.1
Other	4.4	5	4.3	5.3	5.1	7.5	6.3	9.2	6.7	10.9	7.5	11.8	7.7	12.2
Immigration (%)														
native_bom	87.6	89.1	85.1	87.3	86	84.5	85.2	84	83.6	82.3	82.3	82.2	81.2	82.3
foreign_bom	12.4	10.9	14.9	12.7	14	15.5	14.8	16	16.4	17.7	17.7	17.8	18.8	17.7
<hr/>														
Fulltime (%)	71.3	86.8	73.8	87	74.4	88.2	73.6	87.1	75.5	87.1	74.9	85	75.3	84.3
Part time(%)	28.7	13.2	26.2	13	25.6	11.8	26.4	12.9	24.5	12.9	25.1	15	24.7	15.7
Hours/week (%)														
<40	39.6	23.2	36.2	21.7	35.2	19.8	36.5	21.9	34.5	20.9	35.7	24.2	35	25.3
40	47.8	54.3	50.8	55.7	51.9	58.3	51.2	59	52.6	59.6	51.8	57.3	52	56.9
>40	12.6	22.5	13	22.6	12.9	21.8	12.3	19.1	12.9	19.5	12.5	18.5	13	17.9
Occupation (%)														
occ1	25.7	27.9	25.7	29.3	27.8	29.8	29.4	30.6	30.8	32.6	33.7	34.6	35.9	35.4
occ2	0	0	0	0	0.1	0	0.1	0.1	0	0	0	0.1	0	0.1
occ3	10.2	14.1	11.5	14.8	12.2	15	9.7	11.5	9.8	11.6	10.1	11.6	10.4	11.7
occ4	34.5	33.3	33.6	31.7	32.6	30.2	34.4	32.3	33.4	31.2	31.1	29.5	29	28.8
occ5	1.8	1.9	1.8	2	1.7	1.9	1.6	1.8	1.4	1.6	1.3	1.4	1.1	1.4
occ6	17.3	14.1	17.2	14.1	16.6	15	17.3	16.8	17.6	16.6	18	17.1	17.9	17.2
occ7	10.4	8.7	10.1	8.2	9	8.1	7.5	6.8	6.9	6.4	5.8	5.7	5.7	5.3
Industry(%)														
Ind1	1.3	1.4	1.6	1.5	1.5	1.4	1.6	1.7	1.8	1.6	1.5	1.5	1.3	1.4
Ind2	6.3	6.4	6.3	6.4	5.9	6.1	4.6	4.7	4.2	4.2	3.5	3.3	3.1	3.4
Ind3	6.5	6.7	5.7	5.8	4.8	5.3	4.7	5	4.2	4.5	3.6	3.6	3.5	3
Ind4	3.4	4.5	3.6	4.4	3.8	4.4	3	3.2	3	3.1	2.6	2.7	2.5	2.7
Ind5	18.6	18.4	19.2	18.4	18.3	19.1	18.1	18.5	17.8	18.9	17.7	19.8	17.3	20.2
Ind6	8.3	9.7	8.4	10	8.6	9.3	9	8.8	8.8	8.7	8.4	7.8	8	8
Ind7	54.5	51.8	54	52.5	55.9	53.2	58	57.3	59.2	58.1	61.9	60.1	63.2	60.1
N	30,682	18,803	28,004	17,060	44,336	21,289	47,397	21,626	43,905	20,474	41,489	21,065	33,708	18,839

Occupation Categories 1 – 7: 1 Professional & Technical; 2 Farmers; 3 Manager Officials Proprietors; 4 Clerical & sales workers; 5 Craftsmen, 6 Service

Preliminary Draft of paper forthcoming in The Russell Sage Foundation Journal of the Social Sciences
Special Issue on the Changing Role and Status of Women
Please do not cite without permission

workers; 7 Operatives & Laborers;

Industry Categories: 1-7: 1 Agriculture Forestry and Fishing", 2 Manufacturing durables; 3 manufacturing non durables; 4 transportation communication utilities;
5 Wholesale & Retail Trade; 6 Finance, Insurance & Real estate; 7 Personal & Professional services
Cohab/No partner refer to women who are unmarried.

Appendix 3A:

Full set of coefficients and standard errors from Ordinary Least Square Regression of Ln hourly wages on family, demographic and education variables for women aged 25-44

OLS	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
Mother	-0.065*** (0.005)	-0.058*** (0.006)	-0.047*** (0.005)	-0.031*** (0.005)	-0.041*** (0.005)	-0.024*** (0.005)	-0.014** (0.005)
age	0.086*** (0.006)	0.083*** (0.006)	0.074*** (0.005)	0.066*** (0.005)	0.076*** (0.005)	0.081*** (0.005)	0.078*** (0.006)
age_sq/100	-1.073*** (0.081)	-1.016*** (0.085)	-0.920*** (0.072)	-0.792*** (0.070)	-0.932*** (0.073)	-0.995*** (0.073)	-0.925*** (0.080)
High School	0.250*** (0.009)	0.248*** (0.010)	0.229*** (0.008)	0.227*** (0.008)	0.220*** (0.009)	0.250*** (0.009)	0.212*** (0.011)
Some College	0.432*** (0.009)	0.425*** (0.010)	0.407*** (0.008)	0.400*** (0.008)	0.400*** (0.009)	0.418*** (0.009)	0.377*** (0.010)
College +	0.764*** (0.010)	0.759*** (0.010)	0.775*** (0.009)	0.779*** (0.009)	0.780*** (0.009)	0.825*** (0.009)	0.787*** (0.010)
Not Married	-0.048*** (0.005)	-0.055*** (0.005)	-0.049*** (0.005)	-0.068*** (0.005)	-0.067*** (0.005)	-0.078*** (0.005)	-0.072*** (0.005)
NonHispanicBlack	-0.069*** (0.008)	-0.042*** (0.008)	-0.035*** (0.007)	-0.041*** (0.007)	-0.022** (0.007)	-0.028*** (0.007)	-0.052*** (0.008)
Hispanic	-0.050*** (0.007)	-0.079*** (0.007)	-0.076*** (0.006)	-0.076*** (0.006)	-0.075*** (0.006)	-0.052*** (0.006)	-0.080*** (0.007)
Other	-0.024* (0.011)	0.007 (0.012)	-0.032*** (0.009)	-0.026** (0.008)	-0.014+ (0.008)	0.029*** (0.008)	0.031*** (0.008)
Year 2	-0.008 (0.006)	-0.021*** (0.006)	-0.019*** (0.005)	0.017*** (0.005)	0.005 (0.005)	-0.010+ (0.005)	0.006 (0.005)
Year 3	-0.013* (0.006)	0.022*** (0.006)	0.001 (0.005)	0.016** (0.005)	0.008 (0.005)	0.009+ (0.005)	-0.002 (0.006)
Constant	0.695*** (0.096)	0.762*** (0.100)	1.007*** (0.086)	1.138*** (0.083)	0.942*** (0.087)	0.802*** (0.086)	0.851*** (0.096)
Observations	49,485	45,064	65,625	69,023	64,379	62,554	52,547
R-squared	0.200	0.207	0.208	0.213	0.220	0.246	0.246

Standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Appendix 3B: Detailed Results from Augmented Inverse Probability Weighted Models of Ln_Hourly Wages

In all following models of Treatment-effects estimation,
 Estimator : augmented IPW
 Outcome model: linear by ML
 Treatment model: probit

	Coefficient	Robust SE	z	P> z	[95% confidence interval]	
1993-1995						
N= 49485						
Average Treatment Effect (1 Mother vs. 0 Non Mother)	-.0611122	.005392	-11.33	0.000	-.0716816	-.0505429
Potential-Outcome Mean (0 Non Mother)	2.751101	.0043961	625.81	0.000	2.742484	2.759717
<hr/>						
1996-1998						
N= 45064						
Average Treatment Effect (1 Mother vs. 0 Non Mother)	-.0530082	.0056038	-9.46	0.000	-.0639914	-.0420251
Potential-Outcome Mean (0 Non Mother)	2.765435	.0046044	600.61	0.000	2.756411	2.774459
<hr/>						
1999-2001						
N= 65625						
Average Treatment Effect (1 Mother vs. 0 Non Mother)	-.0425317	.0049334	-8.62	0.000	-.052201	-.0328624
Potential-Outcome Mean (0 Non Mother)	2.824758	.0042566	663.62	0.000	2.816415	2.8331
<hr/>						
2002-2004						
N= 69023						
Average Treatment Effect (1 Mother vs. 0 Non Mother)	-.0284422	.0048755	-5.83	0.000	-.0379981	-.0188864
Potential-Outcome Mean (0 Non Mother)	2.841413	.0042641	666.36	0.000	2.833055	2.84977
<hr/>						
2005-2007						
N= 64379						
Average Treatment Effect (1 Mother vs. 0 Non Mother)	-.0344308	.0053027	-6.49	0.000	-.044824	-.0240377
Potential-Outcome Mean (0 Non Mother)	2.842986	.0046585	610.28	0.000	2.833855	2.852116

	Coefficient	Robust SE	z	P> z	[95% confidence interval]	
2008-2010						
Number of obs. 62554						
Average Treatment Effect (1 Mother vs. 0 Non Mother)	-0.0184524	.0051263	-3.60	0.000	-.0284998	-.0084051
Potential-Outcome Mean (0 Non Mother)	2.848019	.0044305	642.83	0.000	2.839335	2.856702
2011-2013						
N=52547						
Average Treatment Effect (1 Mother vs. 0 Non Mother)	-.0094363	.0055534	-1.70	0.089	-.0203207	.0014482
Potential-Outcome Mean 0 Non Mother	2.83085	.0046974	602.65	0.000	2.821644	2.840057

Appendix 4
Mother penalties from OLS and AIPW models, splitting the non-married into cohabiting vs. un-partnered

	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
Married							
OLS	-0.050*** (0.007)	-0.026*** (0.008)	-0.029*** (0.007)	-0.023*** (0.007)	-0.013+ (0.007)	0.002 (0.007)	0.023** (0.008)
AIPW	-0.052*** (0.007)	-0.028*** (0.007)	-0.031*** (0.007)	-0.025*** (0.007)	-0.016* (0.007)	0.000 (0.007)	0.019* (0.008)
N	30,684	27,251	40,296	42,061	38,539	36,278	29,164
Cohabiting							
OLS	-0.070+ (0.040)	-0.072* (0.035)	-0.012 (0.027)	-0.032 (0.025)	-0.008 (0.026)	-0.046+ (0.025)	-0.030 (0.028)
AIPW	-0.091* (0.042)	-0.098** (0.038)	-0.039 (0.034)	-0.021 (0.028)	-0.003 (0.031)	-0.072* (0.032)	-0.036 (0.034)
N	802	1,307	2,118	2,392	2,457	2,831	2,727
No Partner							
OLS	-0.087*** (0.008)	-0.106*** (0.009)	-0.077*** (0.007)	-0.046*** (0.007)	-0.076*** (0.007)	-0.051*** (0.007)	-0.054*** (0.008)
AIPW	-0.085*** (0.009)	-0.103*** (0.009)	-0.076*** (0.007)	-0.044*** (0.007)	-0.075*** (0.008)	-0.049*** (0.007)	-0.055*** (0.008)
N	17,999	16,506	23,211	24,570	23,383	23,445	20,656

See Note to Table 1.

Appendix 5 : Family Wage Gap for Employed Women in the 25-44 age group by Sub Groups of Education, Race and Ethnicity, Marital/Partnership Status and Age, 2009-2013

COLLEGE GRADUATE OR MORE

	NON HISPANIC WHITE				NON HISPANIC BLACK				HISPANIC				OTHER			
	MARRIED OR COHABITING PARTNER		NO PARTNER		MARRIED OR COHABITING PARTNER		NO PARTNER		MARRIED OR COHABITING PARTNER		NO PARTNER		MARRIED OR COHABITING PARTNER		NO PARTNER	
	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Mother	0.030** (0.011)	0.056*** (0.014)	-0.079** (0.025)	-0.079*** (0.022)	0.004 (0.041)	-0.010 (0.039)	-0.105** (0.035)	-0.073* (0.033)	-0.018 (0.032)	0.007 (0.036)	-0.043 (0.051)	-0.072 (0.053)	0.017 (0.032)	0.133*** (0.033)	-0.153* (0.077)	-0.083 (0.051)
Obs	9,238	11,238	3,458	2,387	676	883	1,019	892	1,121	1,206	784	491	1,372	1,602	962	516

SOME COLLEGE

	NON HISPANIC WHITE				NON HISPANIC BLACK				HISPANIC				OTHER			
	MARRIED OR COHABITING PARTNER		NO PARTNER		MARRIED OR COHABITING PARTNER		NO PARTNER		MARRIED OR COHABITING PARTNER		NO PARTNER		MARRIED OR COHABITING PARTNER		NO PARTNER	
	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44
	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
Mother	-0.010 (0.015)	-0.028+ (0.015)	-0.063** (0.020)	-0.080*** (0.021)	-0.030 (0.040)	0.028 (0.041)	-0.047+ (0.028)	-0.013 (0.030)	-0.028 (0.028)	0.005 (0.032)	-0.033 (0.029)	-0.041 (0.039)	0.028 (0.040)	-0.057 (0.047)	-0.070 (0.049)	-0.191*** (0.055)
Obs	6,007	7,119	2,617	2,399	654	813	1,371	1,162	1,356	1,345	1,143	755	622	669	470	314

HIGH SCHOOL OR LESS

	NON HISPANIC WHITE				NON HISPANIC BLACK				HISPANIC				OTHER			
	MARRIED OR COHABITING PARTNER		NO PARTNER		MARRIED OR COHABITING PARTNER		NO PARTNER		MARRIED OR COHABITING PARTNER		NO PARTNER		MARRIED OR COHABITING PARTNER		NO PARTNER	
	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44	25-34	35-44
	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
Mother	-0.044** (0.017)	0.008 (0.015)	-0.094*** (0.024)	0.001 (0.024)	0.005 (0.043)	-0.033 (0.039)	-0.095*** (0.029)	-0.052+ (0.028)	-0.019 (0.022)	-0.021 (0.019)	-0.003 (0.023)	-0.003 (0.026)	0.004 (0.045)	0.005 (0.041)	-0.104+ (0.059)	-0.158** (0.055)
Obs	4,001	5,248	1,912	1,828	557	701	1,255	1,101	2,320	2,889	1,691	1,592	591	805	383	320

Note: Coefficients on log hourly wages (2014\$) from ordinary least squares (OLS) regression on an unweighted sample of employed women from the Current Population Survey Annual Social and Economic Supplements (March) 2010-2014. Self-employed women, women reporting unpaid family work and women who report wages lower than 45% of federal minimum are excluded. All models control for age, age_squared, part time work, occupation, industry and year of survey. Robust standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05, + p<0.1