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The Motherhood Wage Penalty in America

Jennifer A. Boden
University of Northern Iowa

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ABSTRACT. The difference in pay between mothers and otherwise comparable non-mothers is called the family gap. Mothers are paid less than non-mothers on average. Is it because mothers are different than non-mothers or are mothers penalized because of their decisions to have children? Previous studies have found that after controlling for demographic and human capital characteristics, mothers are paid less than non-mothers on average. This study uses 2008 American Community Survey data and finds evidence that the family gap exists in the United States.

I. Introduction

Men are often paid more than women in the labor market. As women have increased their work experience and education relative to men this gender gap in pay has lessened but not completely disappeared. Various explanations have been offered to explain the gender gap, and many studies have tried to determine the causes. In recent years, gender gap studies have shifted focus. Instead of looking at wage differences *between* the genders, researchers have begun to look at wage differences *within* genders. Research has shown that "married men, most of whom have children, earn more than other men" (Waldfogel 1998, 143), and mothers earn less than other women (Fuchs 1989, 35). The difference in pay between parents and non-parents of the same gender is called the family gap. This study will focus on the family-induced wage gap among women.

Family gap studies are important for several reasons. First, if mothers are penalized in terms of wages because of their fertility decisions, then they may choose to participate less in the labor market. Fewer workers produce less output. This harms society because lower levels of output reduce the standard of living in a country. Second, well-raised children can be seen as "public goods" (Avellar and Smock, 2003, 605) for which the cost is "borne disproportionately by mothers" (Budig and England, 2001, 204). Children are our future work force, our future tax payers, and our future innovators. Children are more likely to become productive adults if they are raised in good home environments. If women earn less because they have children, then more women with higher earnings potential may opt to remain childless. Finally, if mothers are paid less

than non-mothers on average and more mothers are divorced or single than in years past, then mothers may be less able to support their children without the aid of welfare. Welfare itself may exacerbate the problem because some mothers may justify working fewer hours if they are able to collect welfare; this lowers work experience and thus labor market wages for these women (Budig and England 2001, 211).

A woman's life is forever changed when she becomes a mother. Even the dream of one day becoming a mother may influence a woman's educational and occupational choices. Once she becomes a mother is she penalized in terms of wages because of the choices she made or simply because she has children? Using empirical evidence, I control for educational and occupational choice to find that children do indeed lower a mother's wages.

II. Literature Review

The wage gap between mothers and non-mothers may be attributed to differences between the two groups of women or to discrimination. Some of these differences may be measurable such as levels of education, experience, and tenure (Budig and England 2001, 204). Other differences are more difficult or impossible to measure directly but may still account for part of the wage gap between mothers and non-mothers. The willingness to trade higher wages for other benefits, for example, may differ between the two groups of women (Budig and England 2001, 2004) and is difficult to measure (Budig and England 2001, 220). It is also possible that one of these groups may provide more effort or motivation towards market labor. Employers may even discriminate against one group or favor the other (Budig and England 2001, 2004). Previous studies have attempted to explain the family gap. Researchers have found that even after controlling for a variety of demographic and human capital variables, a wage gap still exists (Waldfogel 1998, 143). This indicates that women are penalized in the labor market for having children.

Mothers and non-mothers may choose to receive different amounts of schooling (Anderson et al. 2002, 355). A woman who desires to marry or have a family in the future may choose to reduce the overall amount of schooling she receives believing that it will be unnecessary in her role as a wife or mother (Fuchs 1989, 34). A mother may opt for less schooling because of the timing of childbearing. If a woman has a child before she finishes school, she may decide to drop out due to health or time and

money constraints (Anderson et al., 2002, 355). It is possible for mothers in this situation to increase their education by returning to school at a later time, but many do not. The reasons behind this choice are extensive and beyond the scope of this study. Because wages are expected to rise with the level of education, mothers are expected to earn less in the labor market if they invest less in their educations.

Waldfogel, using an Ordinary Least Squares (OLS) regression and data from the 1980 and 1991 National Longitudinal Surveys (NLS), finds that education became more important in predicting wages of young men and women (average age of 30 years) between 1980 and 1991. Additionally, she reports that young women increased their average amount of schooling during this period. Young mothers in particular may not be able to keep up with this trend of increased education and would therefore be penalized more in terms of wages (1998, 146).

Mothers are more likely to leave the labor market for extended periods of time (Budig and England 2001, 204). The physical recovery following childbirth requires some degree of maternity leave, and pregnancy-induced illnesses may require extended periods of bed rest to protect the health of the mother or child. Some mothers opt to leave the labor market until the child goes to school or is older. Since wages are expected to increase as work experience increases, reduced work experience caused by absences from the labor market are expected to reduce a mother's wages.

Waldfogel's OLS regressions compare the effect of work experience on wages in 1980 to the effect in 1991. She finds that the coefficient on work experience is 60% higher in 1991 than in 1980. This indicates the increased importance of work experience in predicting wages during this period (1998, 146). A woman who leaves the labor force lowers her work experience and is expected to have lower wages as a result.

Even if a mother chooses to stay in the labor force following the birth of her child, she may devote less time to her labor market activities (Budig and England 2001, 204). Part-time work, for example, may be more conducive to maintaining a well-functioning family. A mother who finds more satisfaction from being at home and doesn't need to work may choose part-time market labor because she wants to have extra spending money or sees it as a way to interact socially with other adults. In this case, a mother works more hours than if she had chosen not to work at all, but still less than she might have had she not had children. If the family needs additional income, the mother, especially if she is the primary

caregiver of the children, may have to choose between part-time employment and increased absences at a full-time position. Hotchkiss and Pitts find that women face a "sizable wage penalty for intermittent labor-market activity" (2003, 236) and that both frequency and duration of these absences affect this penalty (2003, 233). Part-time employment specifically has been found to pay lower wages (Waldfogel 1997, 215).

Switching to part time work is not necessarily an option at every workplace. A woman may be forced to leave her current employment in order to obtain a part-time work schedule elsewhere. Staying in the labor market is beneficial in that it raises a worker's experience, but staying with a specific company is beneficial in a slightly different way. Firm-specific work experience is often called seniority or tenure and allows a worker to be more flexible or productive in the workplace (Budig and England 2001, 205). Workers with higher levels of seniority may be given raises and promotions because they are more knowledgeable, productive, or just because they have been with the company for an extended period of time (Budig and England 2001, 206).

The need or desire to work part-time may force a woman to leave a job in which she is well matched (Anderson et. al. 2002, 354) to accept a job that does not use her abilities or education. Since higher-ability individuals with more education are typically rewarded with higher wages, jobs that do not require either of these characteristics will typically pay lower wages, all else equal.

Regardless of a mother's status as a full-time or part-time worker, the needs of a child may reduce the number of hours she is able to provide market labor. Doctor's appointments and care of a sick child often become a mother's responsibilities (Budig and England 2001, 207). Lack of childcare may also reduce the amount of time a mother is able to spend at work. Absences reduce the number of hours of work experience a mother is able to accrue, but may also signal to employers that she is less dedicated to her work than her childless counterpart. This signal may create a negative impression resulting in fewer raises or promotions.

Mothers may be less motivated or provide less effort towards market labor than non-mothers. In labor studies this is often called unobserved heterogeneity. It means that mothers and non-mothers are inherently different from each other in regard to characteristics that cannot be directly observed. Intuitively this means that once a woman has children, her behavior will change. It is reasonable to think that some women may become less career-driven after the birth of a child. Other women,

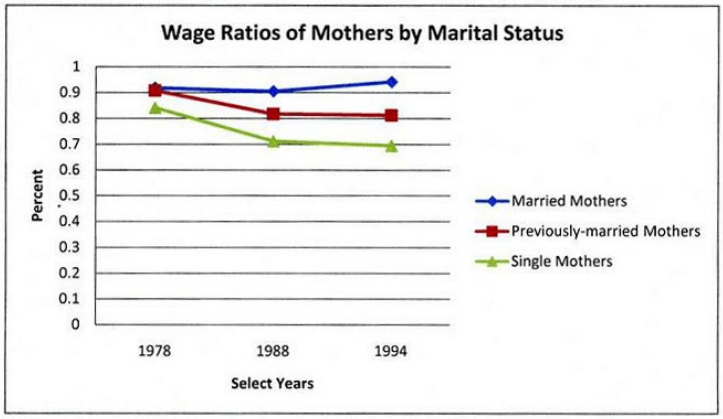
however, may be encouraged to work harder after bearing children because they are then financially responsible for someone besides themselves. Also, since the mother is traditionally the primary caregiver of a family, her domestic responsibilities may grow substantially following the birth of a child. An infant or toddler may leave his mother without a full night's sleep causing physical and mental fatigue. Even as children age, they require attention and energy that often comes from their mothers. The question then becomes: as a group, are mothers different then non-mothers when it comes to motivation and effort? Using a fixed effects model on individual mothers and non-mothers over a period of time, Waldfogel finds no evidence that mothers "systematically differ from non-mothers in ways that are not observed and that would affect their wages" (1997, 215).

Marital status is often controlled for in family gap studies. One reason might be that a mother's marital status may affect how much effort she is able to provide to her labor market activities. For example, a married mother can typically depend to some degree on her husband to help with the household or the children. Splitting the domestic responsibilities in this way frees some of a mother's energy or time for market labor (Budig and England 2001, 211). Depending on custody arrangements, a divorced mother may find that she has increased leisure time which may affect her wages positively. Single (never married) mothers are not likely to have either of these advantages. One researcher hypothesizes that the positive effect of marriage or divorce on wages is due to unobserved heterogeneity (Waldfogel 1997, 215-216). Not all studies find a positive effect of marriage on mothers' wages though. Budig and England find a larger wage penalty for married mothers (2001, 204).

Using Current Population Survey (CPS) data from 1978, 1988, and 1994, Waldfogel finds that a mother's marital status does affect her wages. All mothers are paid less than non-mothers on average, but Waldfogel discovers that wages of married mothers are most comparable to those of non-mothers. Single mothers have the lowest wages not only in comparison to non-mothers, but in comparison to married and previously married mothers as well. Perhaps the most alarming aspect of Waldfogel's study is the substantial decline she reports in the relative wages of single mothers over time. This decline, combined with the slight gains made by married mothers over this period, results in a widening wage gap among mothers (1998, 144).

Using data adapted from Waldfogel's study, Figure 1 presents the ratios of mothers' to non-mothers' wages in 1978, 1988, and 1994. Mothers' wages are divided into categories according to marital status. In 1978 the wage gap among mothers was relatively small with single mothers making approximately 92 percent of married mothers' wages. By 1994 single mothers were much worse off as they were paid only 74 percent of married mothers' wages (1998, 144). It is important to note that although we can observe the changes in the relative wages of mothers and non-mothers over time, we cannot make assumptions about why it has occurred. Single mothers may, on average, receive higher welfare benefits than in the past making it less necessary to maximize labor wages. Or, since there is some evidence that unobserved heterogeneity exists between women of different marital statuses, it is possible that single mothers and married mothers have become increasingly dissimilar over time. It is not clear if Waldfogel controlled for any human capital characteristics, so if single mothers have less overall education or experience than married mothers or non-mothers then it should be expected that their relative wages are lower.

Figure 1: *Mean Wages of Mothers as a Percentage of Non-Mothers' Wages*



Source: Data adapted from Waldfogel 1998, 144.

It is also possible that these results are biased. In comparison to all mothers, married mothers are the least likely to *need* to work outside of the home as many of them can rely on their husbands' incomes (Budig and England 2001, 211). If a married mother does not need to work but chooses to do so anyway, one reason she might make this is decision is if she has the ability to earn high wages. Waldfogel's regression results

may be biased if married woman who have the ability to earn the highest wages choose to work while married women with the ability to earn only low wages opt out of the labor market.

If a mother does have less motivation or provides less effort towards her job, it may also be true that mothers are less productive (Budig and England 2001, 204). Although it would be difficult to measure under most circumstances, it is possible that assuming the bulk of the childcare or domestic responsibilities may leave a woman tired or less focused as her attention is split among her many other responsibilities (Budig and England 2001, 204). If mothers are truly less productive then we are not comparing wages *ceteris paribus*.

One study attempts to measure whether mothers are as productive as non-mothers. Kalist uses data from the Ladies Professional Golf Association from 1980 to 2004 to examine this issue. The benefit of using this particular data set is that the earnings of women in the LPGA are not subject to discrimination as they are paid according to relative performance (2008, 219). The disadvantage is that it may be inappropriate to apply the results of the professional athletes in this study to women in more typical occupations.

Kalist finds that motherhood decreases earnings by decreasing performance. He goes one step further by testing whether a woman chooses to become a mother because her performance is declining or if her performance declines because she became a mother. Kalist finds no evidence to support the idea that women become mothers because their careers are already in decline (2008, 234).

Mothers may be discriminated against by employers (Budig and England 2001, 204). Several possible explanations for this exist. Mothers may be held to higher standards than their childless counterparts (Correll 2007, 1316). Some companies, in an effort to increase the number of women in the workplace, may place pressure on managers to hire more women, many of whom may be mothers. Managers may be resentful of being forced to hire people who they believe are not the best candidates for the job. Mothers may simply be seen as less committed to market labor (Correll 2007, 1319). However plausible it seems that mothers are discriminated against by employers, there is no hard evidence that this is actually the case (Waldfogel 1998, 149). Family gap research would benefit from further study in this area.

III. Data and Model

This cross-sectional study is a modified version of Jane Waldfogel's 1998 model. Over 187,000 observations were collected from the 2008 American Community Survey (ACS). The sample used includes only currently employed women 19-70 years of age. Wages in the 2008 ACS are reported as an individual's pre-tax work income for 2007 measured in 2007 dollars. Because wages are reported from the previous year, women who indicated that they are currently employed but did not report positive income were excluded from the study. Women actively engaged in formal education were excluded from the sample because their wages may not be representative of their true ability to earn.

Sociologist and family gap researcher Jane Waldfogel points out a drawback of cross-sectional studies: "…women for whom the negative effect of children is the greatest are the least likely to be employed and are also the least likely to be part of any given cross-sectional sample of labor-market participants" (1997, 211-212). She suggests using a pooled data set over a longer period of time to get a clearer idea of the true effect of children on mothers' wages. Comparing regression results found by using pooled data sets with cross-sectional studies, Waldfogel finds that the magnitude of cross-sectional coefficients is lower, possibly due to a selection bias (1997, 211-212). The goal of this study is to use a different and more current data set to determine if the negative effects of children on mothers' wages are still apparent. Cross-sectional data is adequate for this purpose.

The goal of this study is to determine if motherhood lowers a woman's wages. In this model the natural log of wages is the dependent variable. The empirical model is as follows:

$$LNWAGE = CONSTANT + \beta_1 CHU1 + \beta_2 1CH6 + \beta_3 O1CH + \beta_4 2PCH + \beta_5 AGE + \beta_6 AGESQ + \beta_7 MARR + \beta_8 WID + \beta_9 SEP + \beta_{10} DIV + \beta_{11} \#PHH + \beta_{12} ENGPROF + \beta_{13} HISP + \beta_{14} ASN + \beta_{15} BLK + \beta_{16} ONW + \beta_{17} PWEXP + \beta_{18} PEXPSQ + \beta_{19} YRSED + \beta_{20} HH + \epsilon$$

CHU1 is a dummy variable that has a value of 1 if a woman has a child under the age of one year and 0 otherwise. I will refer to these children as "babies." The ACS provides the ages of a woman's eldest and youngest children. Specific ages are given for children one year or

older. Otherwise, a child is listed as "less than 1." Each individual is determined to have a baby if she indicates that either the eldest or youngest child is under the age of one. A baby brings challenges that children of other ages typically do not. The physical and emotional recovery associated with pregnancy and childbirth, the difficulties involved in learning to care for a new baby and finding suitable childcare, and an erratic sleep schedule are a few of these challenges. Mothers of babies are expected to have less time, energy, and motivation to devote to their jobs. Because of this, the coefficient on CHU1 is expected to be negative.

1CH6 is a dummy variable that has a value of 1 if a mother has a child one year or older but under the age of six years. 1CH6 has a value of 0 otherwise. I will refer to these children as "preschoolers." Once again, the ages of the eldest and youngest children were used to determine whether a mother had a preschooler. Similar to the CHU1 variable, preschoolers present a unique set of challenges. Children tend to cost more at this age in terms of time and money. For example, preschools are often expensive relative to public elementary schools. Also, schooling for preschoolers is often only part of the day which requires a working mother to pay for both preschool and childcare. Finding someone available to transport the child to and from preschool can be expensive and challenging. To accommodate the difficult scheduling and transportation, mothers may be more likely to work part-time during this period. While infants are sedentary, preschoolers are not. Mothers of preschoolers spend more time entertaining their children and making sure they are safe. For these reasons, the coefficient on 1CH6 is also expected to be negative.

O1CH is a dummy variable that has a value of 1 if a mother has only one child and 0 otherwise. Because the total number of a mother's children is not reported in the ACS, the ages of the eldest and youngest children are used once again. If the ages of the eldest and youngest children were equal then the mother was determined to have only one child. This measurement may be a source of error in the model because a woman may have had a pregnancy resulting in multiple births or children less than one year apart. A woman with twins, for example, might show up in the sample as having only one child. Intuitively it would seem that a mother with multiple children of the same age would bias the estimated coefficient further away from zero than would a mother with a single child. Mothers of children with chronic illnesses or

disabilities may also bias the coefficient further away from zero. A mother with one child who also provides care for foster children, stepchildren, or grandchildren may also bias the magnitude of the O1CH coefficient upward. Because children over the age of 19 years were not treated as children in this model, a woman with multiple children but only one under the age of 19 was determined to have only one child.

The O1CH variable is included because the transition from having no children to having one is typically the most difficult for a woman. A mother's labor market choices change due to the arrival of the first child rather than subsequent children. For this reason, O1CH is expected to have a negative effect on a mother's wages. If a significant number of mothers providing care for children who are not their own or mothers with multiple births, chronically ill, or disabled children appear in the sample, then the magnitude of this coefficient may be biased upward.

2PCH is a dummy variable that has a value of 1 if a mother has two or more children and 0 otherwise. Once again, due to the lack of data on the exact number of children a woman has, eldest and youngest children's ages were used. A mother was determined to have two or more children if the age of the eldest child was not equal to the age of the youngest child. This variable is limited in its ability to predict wages in several ways. First, having the actual number of children in a household would have been preferred. For example, in this model a woman with two children is treated the same as a woman with eight children. Second, having access to the variance of the ages of the children may improve the results significantly. For example, a mother with two year old twins and a 16 year old will appear the same as a mother with a two year old and 16 year old twins even though the latter may have more household assistance. The coefficient on 2PCH is expected to be negative.

AGE and AGESQ are the reported age in years and the square of the reported age of a woman in the sample. Income is expected to increase as age increases, but the returns to age are diminishing. Therefore, the coefficient on AGE is expected to be positive, but the coefficient on AGESQ is expected to be negative.

MARR, WID, SEP, and DIV are a series of dummy variables controlling for whether an individual is married, widowed, separated, or divorced. Single/Never married is left out of the regression as the omitted category. Previous studies have found that being married is positively correlated with wages, which is the expected relationship here as well (Waldfogel 1997, 211-212, Waldfogel 1998, 147). The coefficients on

SEP and DIV are also expected to be positive. Women who are separated or divorced are likely to feel that it is necessary to work. Mothers may find that they have more free time when they are separated or divorced due to custody arrangements. They may use this newly acquired free time to better educate themselves or work. The expected coefficient on WID is ambiguous. A widowed woman may have increased motivation to earn higher wages, or she may have had no preparation for labor force participation resulting in low wages.

#PHH is the number of people who reportedly live in the household. A greater number of people living in a household may be able to split domestic responsibilities among themselves. This may allow a mother more time and energy to provide market labor or seek education. People don't necessarily split domestic labor equally though, so more people in the household may mean more work for the primary caregiver. Also, it is impossible to tell from the data set what the relationship of the people living in the household are to each other. A higher number for #PHH may indicate more children in the household or more adults that are willing to help with household labor. I anticipate that the potential for more division of domestic labor will be relatively small, resulting in a negative coefficient on #PHH.

ENGPROF is a dummy variable that has a value of 1 if a woman is considered proficient in English and 0 otherwise. The ACS allows five classifications in which respondents may indicate their ability to speak English. Only an individual who says that she "speaks only English" or "speaks [English] very well" is considered proficient in English for this study. Women with better communication skills are likely to have higher wages, so the coefficient on ENGPROF is expected to be positive.

HISP, ASN, BLK, and ONW are a series of dummy variables controlling for race as Hispanic, Asian, Black, and other races that are not considered white. The control for white women is the omitted category. I anticipate that the coefficient on BLK will be negative as many African-Americans earn less on average. Asian- Americans are often found to be highly skilled which would indicate higher wages. Minorities often have relatively low wages on average. For these reasons, the expected coefficient on ASN is positive while the expected coefficients on HISP and ONW are negative.

PWEXP and PEXPSQ are variables that indicate the amount of potential work experience in years and the amount of potential work experience squared. Wages are expected to increase as actual work

experience increases (Waldfogel 1997, 211). The ACS does not provide information in regard to how long an individual has actually worked, so potential work experience is used as a proxy for actual work experience. Potential work experience is calculated by subtracting the number of years of schooling from an individual's age and then subtracting five. The argument is that individuals five and younger or in school are not gaining work experience.

There is a great deal of room for error in this particular estimate. Since potential work experience is often a proxy for actual work experience in labor studies, one researcher determines the relationship between the two measurements for her sample. She finds that "actual work experience is about two-thirds of potential work experience, but this ratio varies a great deal by family status" (Waldfogel 1997, 211). Mothers who leave the labor market to focus on domestic responsibilities and then return to the labor market years later will be overestimated for work experience. We are trying to determine the cause of mothers' lower wages, but they are the people for whom we may have the poorest estimate of work experience (Waldfogel 1997, 210). Women who choose part-time work will also be overestimated in terms of work experience. Older women with the least amount of education will have the highest levels of potential work experience. Younger women with more education will have the lowest levels of potential work experience and thus the lowest predicted wages. Although this measurement is far from perfect, some measure of experience should be accounted for in the model. *Actual* work experience is expected to have a positive coefficient and *actual* work experience squared is expected to have a negative coefficient. Since PWEXP and PEXPSQ are proxy variables with severe limitations, the expected signs on the coefficients are ambiguous.

YRSED indicates the number of years each woman spent in formal education. The ACS provides an extensive list of educational attainment options. The options were then subjectively quantified as to the typical number of corresponding years that each particular level of education would require. Because this is a control variable and not the focus of this study, I will omit the specifications. Income is expected to increase as the number of years of education increase. Women who invest more in education may also be more likely to remain committed to their careers and less likely to bear children. The coefficient on the YRSED variable is expected to be positive.

HH is a dummy variable with a value of 1 if a woman indicates that she is the head of the household and 0 otherwise. A woman who considers herself the head of the household may be more likely to feel financially responsible for the household. As a result, she may exhibit more motivation and effort towards her labor market activities. A woman who is the head of the household may also have more domestic responsibilities. For these reasons, the expected sign on the coefficient for HH is ambiguous.

A variety of control variables have been used in the regression in an effort to improve the results. Seven variables were added to control for geographic region. It seems plausible that in some areas of the country, the New England states for example, the average wages may be higher than in other areas. Ten variables were included to control for industry because it is likely that women working in certain industries, like engineering for example, are paid higher wages than other women. The last control variable included in the regression indicates whether a woman lives in a larger city. Wages are expected to be higher on average in larger cities.

The following is general information about the sample used for this study: The ACS data provide the age of an individual's eldest and youngest child. If a woman indicates that her children are 19 years old or older, then she is considered to be a non-mother in this model. There are several arguments for this assumption. First, older children are typically more independent and do not require the same level of care that younger children do. For this reason, older children are assumed to have less effect on their mothers' current wages. Second, children 19 years old or older are more likely to live away from home where they do not add to the domestic responsibilities of their mothers. Obviously, these reasons do not hold true for every mother/child relationship. Some mothers are more inclined to maintain a more constant level of involvement in their children's lives regardless of the age of their children. Also, older children with disabilities may remain with their mothers longer and require a higher level of involvement throughout their lives. And still other children just aren't motivated to leave their mothers' homes until they are much older. On average though, older children will have less affect on a mother's ability to earn.

One study finds that even when children are not living in their mothers' homes they still negatively affect her wages (Waldfogel 1997, 211). This indicates that the effect of children on their mothers' wages

may be permanent. Finally, older children may be more helpful in regard to helping care for younger siblings, domestic responsibilities and may serve as a source of moral support for their mothers. Therefore, in this model, mothers with only older children are assumed to be more similar to non-mothers than they are to mothers with younger children.

IV. Results

Table 1 shows the summary statistics for the variables used in this regression. The average wage reported was $40,070.23. Mothers made up approximately 40 percent of the sample. The average age was close to 44 years, and 58 percent of the sample was married. 90 percent of the sample was proficient in English, and 75 percent was white. Respondents were able to choose multiple races to describe themselves, so the sum of the means for the race variables is greater than 100 percent. The mean number of years of education was 15, indicating that the average woman represented in the sample has less than a Bachelor's degree.

TABLE 1–Summary Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Wages (2007 dollars)	40070.23	39955.09	4.00	662971.00
CHU1	0.0264	0.1602	0.0000	1.0000
1CH6	0.1174	0.3219	0.0000	1.0000
O1CH	0.1909	0.3930	0.0000	1.0000
2PCH	0.1991	0.3993	0.0000	1.0000
AGE	43.8797	12.2001	19.0000	70.0000
AGESQ	2074.2720	1069.3160	361.0000	4900.0000
SNM	0.2053	0.4039	0.0000	1.0000
MARR	0.5838	0.4929	0.0000	1.0000
WID	0.0310	0.1732	0.0000	1.0000
SEP	0.0253	0.1571	0.0000	1.0000
DIV	0.1546	0.3615	0.0000	1.0000
#PHH	2.9973	1.5725	1.0000	20.0000
ENGPROF	0.9010	0.2986	0.0000	1.0000

Variable	Mean	Standard Deviation	Minimum	Maximum
WHT	0.7583	0.4281	0.0000	1.0000
HISP	0.1606	0.3672	0.0000	1.0000
ASN	0.0815	0.2736	0.0000	1.0000
BLK	0.1090	0.3117	0.0000	1.0000
ONW	0.0728	0.2598	0.0000	1.0000
PWEXP	22.8777	12.5771	0.0000	64.0000
PEXPSQ	681.5726	598.4112	0.0000	4096.0000
YRSED	15.0106	2.9491	0.0000	22.0000
HH	0.4837	0.4997	0.0000	1.0000
East South Central	0.1553	0.3622	0.0000	1.0000
New England	0.0374	0.1897	0.0000	1.0000
South Atlantic	0.2876	0.4527	0.0000	1.0000
East South Central	0.0441	0.2053	0.0000	1.0000
West South Central	0.0267	0.1612	0.0000	1.0000
Mountain	0.1195	0.3244	0.0000	1.0000
Pacific	0.3293	0.4700	0.0000	1.0000
City population	2095.2540	7747.6670	0.0000	38494.0000
Business/Finance	0.1530	0.3600	0.0000	1.0000
STEM	0.0332	0.1792	0.0000	1.0000
Education/Media	0.1498	0.3568	0.0000	1.0000
Health/Protection	0.1318	0.3382	0.0000	1.0000
Food/Service/Sales	0.2239	0.4169	0.0000	1.0000
Administration	0.2387	0.4263	0.0000	1.0000
Farm/Construction	0.0073	0.0849	0.0000	1.0000
Repair/Production	0.0168	0.1287	0.0000	1.0000
Manufacturing	0.0256	0.1578	0.0000	1.0000
Transportation	0.0200	0.1399	0.0000	1.0000

The regression results are presented in Table 2. Variables indicating that a mother has either a preschooler or a baby were not found to be significant. A possible explanation is that it may require more time for a mother's wages to react to her change in family status (Budig and England, 2001, 206). The variable denoting that a woman is of Hispanic

origin is significant at the 5 percent level. All other variables are significant at the 1 percent level.

There are several perverse signs in the regression results. The first is the marital status variable for separated. The expectation was that the signs on the coefficients for separated and divorced variables would be the same and positive as discussed previously. It is possible that divorced women may perceive their change in living arrangements as permanent and have had time to adapt to that change. The feeling of financial independence may provide divorced women the incentive to improve their money-making opportunities where they are able. It is possible that separated women are dealing with the uncertainty of what the future holds. The feeling of instability in their lives may contribute negatively to their earnings.

The second perverse sign is on the variable indicating that a woman is of Hispanic origin. The regression reports a positive coefficient but the expected sign was negative. The coefficient is quite small and is only significant at the 5 percent level. The unanticipated sign may possibly indicate that the Hispanic women in this sample are hard workers on average.

The third perverse sign is on the variable indicating years of education. The coefficient for the variable was expected to be positive as it is typically understood that wages increase as education increases. There is no intuitive explanation for the negative sign on this coefficient. An earlier study shows that mothers with higher levels of education are penalized more for having children then women with lower levels of education (Waldfogel 1997, 216). It is possible that there is a connection between the two findings. The ACS data does not indicate whether each woman is working full-time or part-time. If many of the highly educated women are working part-time or have more non-wage income, then their wages may appear artificially low, resulting in a perverse sign on education. Additionally, women with low levels of education and high wages may alter the sign on the education coefficient.

The most important variables to this study are O1CH and 2PCH which together indicate whether a woman is a mother or a non-mother. Both of the coefficients on these variables are negative as expected. The regression results show that even after controlling for age, marital status, race, education, industry, and geographic location, an American mother who has one child will have 7.2 percent lower wages. If a mother in the United States has two or more children her wages will be 15.4 percent

lower on average.

TABLE 2–Regression Results

Variable	Coefficient	Standard Error	T-Ratio	P-Value
Constant**	5.1698	0.1098	47.0900	0.0000
CHU1	0.0123	0.0125	0.9800	0.3260
1CH6	0.0027	0.0072	0.3800	0.7070
O1CH**	-0.0695	0.0059	-11.7900	0.0000
2PCH**	-0.1432	0.0072	-19.9600	0.0000
AGE**	0.3835	0.0168	22.7600	0.0000
AGESQ**	-0.0016	0.0000	-54.9700	0.0000
MARR**	0.0244	0.0061	4.0100	0.0000
WID**	-0.0993	0.0126	-7.8800	0.0000
SEP**	-0.0946	0.0132	-7.1700	0.0000
DIV**	0.0428	0.0073	5.8500	0.0000
#PHH**	-0.0308	0.0016	-18.9900	0.0000
ENGPROF**	0.1420	0.0078	18.2300	0.0000
HISP*	0.0167	0.0067	2.5000	0.0120
ASN**	0.0600	0.0078	7.6400	0.0000
BLK**	-0.0646	0.0066	-9.8100	0.0000
ONW**	-0.0301	0.0084	-3.6100	0.0000
PWEXP**	-0.2661	0.0168	-15.8000	0.0000
PEXPSQ**	0.0006	0.0000	21.2500	0.0000
YRSED**	-0.1640	0.0167	-9.8200	0.0000
HH**	0.1194	0.0044	27.120	0.0000
New England**	0.1857	0.0111	16.6600	0.0000
South Atlantic**	0.0422	0.0062	6.7800	0.0000
East South Central**	-0.0874	0.0105	-8.3300	0.0000
West South Central**	-0.1015	0.0128	-7.9200	0.0000
Mountain	-0.0090	0.0075	-1.1900	0.2320
Pacific**	0.1629	0.0062	26.3000	0.0000
City population**	0.0000	0.0000	9.9400	0.0000

Variable	Coefficient	Standard Error	T-Ratio	P-Value
STEM	0.0120	0.0117	1.0200	0.3070
Education/Media**	-0.4841	0.0071	-68.4500	0.0000
Health/Protection**	-0.2370	0.0073	-32.6000	0.0000
Food/Service/Sales**	-0.7692	0.0067	-114.6300	0.0000
Administration**	-0.4534	0.0065	-70.2600	0.0000
Farm/Construction**	-0.6258	0.0235	-26.5800	0.0000
Repair/Production**	-0.3946	0.0159	-24.8100	0.0000
Manufacturing**	-0.5252	0.0135	-38.9400	0.0000
Transportation**	-0.6894	0.0148	-46.6500	0.0000
Number of Observations	187,392			
Adjusted R squared	0.2553			

**Significant at the 1% level
* Significant at the 5% level

As stated previously, PWEXP and PEXPSQ are proxy variables intended to estimate actual work experience in the model. The coefficients on these proxy variables differ from what is expected for the actual variables. Because of this, an additional regression omitting PWEXP and PEXPSQ was run. The regression results are presented in Table 3.

TABLE 3–Regression Results Omitting PWEXP and PEXPSQ

Variable	Coefficient	Standard Error	T-Ratio	P-Value
Constant**	7.3768	0.0299	247.0100	0.0000
CHU1*	0.0288	0.0125	2.3000	0.0220
1CH6	0.0117	0.0072	1.6300	0.1020
O1CH**	-0.0744	0.0059	-12.6000	0.0000
2PCH**	-0.1509	0.0072	-21.0300	0.0000
AGE**	0.0985	0.0012	80.3300	0.0000
AGESQ**	-0.0011	0.0000	-77.9100	0.0000
MARR**	0.0298	0.0061	4.8800	0.0000
WID**	-0.0859	0.0126	-6.8100	0.0000
SEP**	-0.0949	0.0132	-7.1900	0.0000

Variable	Coefficient	Standard Error	T-Ratio	P-Value
DIV**	0.0414	0.0073	5.6500	0.0000
#PHH**	-0.0335	0.0016	-20.6700	0.0000
ENGPROF**	0.1405	0.0078	18.0200	0.0000
HISP*	0.0154	0.0067	2.3100	0.0210
ASN**	0.0714	0.0078	9.1100	0.0000
BLK**	-0.0661	0.0066	-10.0300	0.0000
ONW**	-0.0315	0.0084	-3.7700	0.0000
YRSED**	0.0714	0.0008	89.2200	0.0000
HH**	0.1216	0.0044	27.6000	0.0000
New England**	0.1834	0.0112	16.4200	0.0000
South Atlantic**	0.0421	0.0062	6.7500	0.0000
East South Central**	-0.0885	0.0105	-8.4200	0.0000
West South Central**	-0.1033	0.0128	-8.0500	0.0000
Mountain	-0.0108	0.0075	-1.4300	0.1530
Pacific**	0.1609	0.0062	25.9300	0.0000
City population**	0.0000	0.0000	10.8100	0.0000
STEM*	0.0237	0.0117	2.0200	0.0430
Education/Media**	-0.4803	0.0071	-67.8100	0.0000
Health/Protection**	-0.2379	0.0073	-32.6600	0.0000
Food/Service/Sales**	-0.7752	0.0067	-115.4200	0.0000
Administration**	-0.4596	0.0065	-71.1600	0.0000
Farm/Construction**	-0.6358	0.0236	-26.9700	0.0000
Repair/Production**	-0.3999	0.0159	-25.1000	0.0000
Manufacturing**	-0.5260	0.0135	-38.9400	0.0000
Transportation**	-0.6969	0.0148	-47.0900	0.0000
Number of Observations	187,392			
Adjusted R squared	0.2528			

**Significant at the 1% level
* Significant at the 5% level

The results for the second regression do not differ significantly from the first. There are, however, several points of interest. First, the variable controlling for whether a woman has a baby is now significant at the 5 percent level and has a positive coefficient. This means that if a woman has a baby she earns more on average than a woman without a baby. As previously discussed, wages are not necessarily expected to react

immediately to a woman having a baby (Budig and England, 2001, 206). Women with higher earnings may be more likely to continue working after the birth of a child which may explain the sign on this coefficient. Second, AGE has a much smaller coefficient in comparison to the first regression. Because age was used to determine PWEXP and PEXPSQ, multicolinearity between these variables in the first regression may account for the change in the size of the AGE coefficient in the second regression. Third, the control for the STEM (Science, Technology, Engineering, and Mathematics) industry is significant at the 5 percent level in the second regression and has a positive coefficient as expected. Finally, the coefficient on YRSED is now positive as originally expected. Like the differences in the AGE coefficients, YRSED may have changed due to multicolinearity issues with PWEXP and PEXPSQ in the first regression.

The most important aspect of the second regression is that the variables O1CH and 2PCH are still significant at the 1 percent level and retain their negative coefficients. The coefficient on O1CH is -.0744. This indicates that a woman with one child is paid 7.7 percent less than an otherwise comparable non-mother. The coefficient on 2PCH is -.1509 and means that a mother with two or more children is paid 16.3 percent less than her childless counterpart.

V. Conclusion

The family-induced wage gap among women exists in the United States. Research has repeatedly found that even after controlling for a host of demographic and human capital characteristics, a gap in wages remains between mothers and non-mothers. This study has used data from a different source than previous studies and has used more current data as well. Like previous studies, I find that a single child decreases his mother's wages by 7 to 8 percent, and two or more children decrease their mother's wage by 15 to 16 percent.

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