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The Motherhood Earnings Penalty:

A study of inequity between daycare providers and elementary school teachers

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Motherhood Earnings Penalty

Scholars have conducted extensive studies surrounding inequalities in the workplace with respect to several variables including race, gender, age, ethnicity, religion, and class. Similarly, “inequality” can be interpreted on many levels and represented by several dependent variables such as earnings, job-related benefits, or the quality of employer-employee relationships. The current study looks specifically at inequalities between daycare providers and elementary school teachers with respect to the motherhood earnings penalty. This paper provides a review of similar research concerning the motherhood earnings penalty as well as inequalities suffered based on the earnings distribution among women. I will also discuss how my research will contribute to a more in-depth examination of the severity of the motherhood earnings penalty among two specific “care work” populations of women at opposing ends of the earnings distribution: daycare providers at childcare centers and teachers at the elementary school level.

Introduction

Throughout history, women have worked to overcome gender-based discrimination and inequality. Though women’s rights have come a long way in the past century, one area where inequality still persists is in the workplace. According to reports by the federal government, women still earn 75 cents to a man’s dollar for doing the same job (Kalleberg 2011). However, inequality for women in the workplace does not solely occur when earnings are compared to men’s, but also when compared with other women’s. While race, age, ethnicity, religion, sexual orientation, and disability are all among variables that are considered cause for discrimination in the workplace, the research under review in this paper looks specifically at motherhood as a variable that negatively affects the wages mothers earn as compared to women who do not have children.

The following reviewed research looks at the motherhood wage penalty with respect to the factors or mechanisms that contribute to it (Budig 2001), the factors that may lower the motherhood wage penalty (such as policy supports for working mothers) (Gash 2009), as well as the effect of marriage and race on the motherhood wage penalty (Glauber 2007). In the subsequent sections, research involving the differences and similarities between the virtues and goals of childcare and elementary school level teaching provides insight into what makes one a “good job” and one a “bad job” (England 2002, Brostrom 2006, and Kalleberg 2011). Research on the variations of the motherhood earnings penalty across white women’s earnings distribution (Budig 2010) connects the two aforementioned elements of this review and carries it in the direction of my research question: how does the motherhood earnings penalty vary between childcare workers and elementary school teachers?

The Motherhood Earnings Penalty

The motherhood earnings penalty is defined as a discrepancy in earnings or wages between women who have children and women who do not. Scholars have found that women who have children suffer negative earning consequences even having comparable jobs, qualifications, experience, and work hours to that of women who do not have children. Mechanisms associated with having children that contribute to the motherhood wage penalty include (1) losing job experience, (2) becoming less productive at work, (3) trading off higher wages for mother-friendly jobs, or (4) facing discrimination by employers (Budig 2001). Research results show that on average, women suffer a wage penalty of seven percent per child and that having a second child increases wage penalties from those suffered after the birth of a first child according to a study of data from the National Longitudinal Survey of Youth by Budig et al (2001). A study conducted by Glauber (2007), also utilizing the National Longitudinal

Survey of Youth, found that all white mothers pay a wage penalty regardless of marital status or the number of children they have. Gash (2009) found that while results concerning the motherhood wage penalty were steady throughout the United States and in the UK, studies on continental Europe did not consistently yield evidence of a significant motherhood earnings penalty indicating specific factors present (or not present) in the United States that make mothers more susceptible to a wage penalty. She indicated that policy supports for working mothers are more prevalent in Europe which decreases the impact of motherhood wage penalty. These supports work to counter the mechanisms involved with having children that contribute to the motherhood wage penalty. All three of these studies (Budig 2001, Glauber 2007, and Gash 2009) share a dependent variable of the motherhood wage penalty which will also serve as my dependent variable as I conduct my research.

There are limitations and weaknesses involved with the research of the motherhood earnings penalty. One limitation is that it is inconclusive whether or not the effects of motherhood on wages are actually causal. For example Budig et al (2001) found that years of past experience and seniority accounted for two of the seven percent of motherhood wage loss. Glauber (2007) found that racial differences created variance in the wage penalty paid by mothers concluding that Hispanic mothers do not pay any wage penalties. She also found that number of children is a factor in the occurrence of a motherhood wage penalty for African American women. It is difficult to control for all possible variables that could have spurious effects of motherhood on wages. Budig (2001) offers several possible explanations including that the “women who care less about affluence are more likely to have (more) children and are apt to trade earnings for other job values” (210) as an example that there are unmeasured factors within this research that could create the illusion of a causal relationship. Several studies deal with this

problem through explicit inclusion of control variables and/or using fixed-effects models (Budig 2010) which treats observed quantities of explanatory variables as if they are not random. When conducting my own research, I will employ similar methods such as controlling for variables including race and marital status to yield more accurate results surrounding my independent variables (working as a daycare provider vs. working as an elementary school teacher).

Daycare Providers vs. Elementary School Teachers

For the purposes of my research, the use of the term “daycare provider” will refer to a worker who is employed at a licensed childcare center and will exclude those workers who are self-employed. The use of the term “elementary school teacher” will include first through eighth grade teachers and exclude those involved with special education. This section will look at each of these two occupations and identify their similar goals and virtues while at the same time reveal the economic benefits (or lack thereof) that makes one a “good job” and one a “bad job” (Kalleberg 2011).

Both daycare providers and elementary school teachers are considered examples of “care work”—occupations where workers provide “face-to-face service that develops the human capabilities [mental and physical health, physical and cognitive skills, emotional skills] of the recipient” (England 2002: 455). Elementary school teachers work with children ages five to fourteen and provide education through specific and age-appropriate curriculum encompassing language arts, mathematics, science, and social studies. Daycare providers work with children ranging from infants to five years of age. It is their role to teach children according to an age appropriate curriculum while providing care similar to that of a parent- promoting health, nutrition, safety, and affection (Brostrom 2006). They differ in that elementary education is required by federal regulations while attendance at day care is not mandatory. However,

regardless of mandate, both jobs foster the intellectual and social development of children in a manner specific to and appropriate for the ages of the children which they serve. Another similarity between these two fields was explored in a study conducted by England (2002) which concluded that without considering any other factors, all people employed in “care work” already suffer a wage penalty when compared to those who are not employed in “care work” and that women make up the majority of employees who hold “care work” positions.

Despite the similarities concerning the virtues and goals of these two jobs, an elementary school teaching position is considered to be more of a “good job” than working as a daycare provider. According to Kalleberg (2011), a good job is one that pays well, offers benefits, and allows for a certain amount of control as an employee. Daycare providers, on average, make approximately \$18,200 per year for working at least 50 weeks of the year while elementary school teachers make an average of \$49,100 for 40-45 weeks of work per year (United States Department of Labor 2012). Benefits for daycare providers are considered minimal and, depending on the state, childcare centers might not provide any benefits at all for their employees. As far as “good” and “bad” jobs go, daycare providers and elementary school teachers are at opposing ends of the earnings distribution while at the same time providing similar “care work” to children. It is for this reason that I chose these two occupations to investigate specifically with regard to the motherhood earnings penalty.

Inequality Across the Earnings Distribution

The study conducted that is most similar in terms of independent and dependent variables to that of the research that I will be conducting was done by Budig et al (2010) concerning the variation in the motherhood wage penalty across white women’s earnings distribution. This study controlled for race and used a fixed-effects regression method to determine the disparity

between (1) the size of the motherhood wage penalty experienced by white women and (2) the mechanisms which contribute to the penalty for low-wage and high-wage workers. Budig et al (2010) found that the size of the motherhood wage penalty varies between low-wage and high-wage workers and that motherhood inflicts the largest wage penalty on low-wage workers. This study also concluded that the mechanisms responsible for the wage penalty varied between low- and high-wage workers. Family resources, work effort, and compensating differentials accounted for a greater portion of the penalty among low-wage workers while the penalties suffered by high-wage workers were due largely to lost human capital (defined by factors such as continued education, training, or experience).

The study by Budig (2010) used a quantile regression method of analysis and controlled for race after noticing that there were inconsistent patterns in motherhood wage penalties between different races as previously noted by Glauber's 2007 study. Budig et al used the NLSY to create a sample of 36,361 observations for analysis. The primary independent variable was the number of children supported by the respondent and the dependent variable was the natural logarithm of hourly wage in a respondents' current job (2010: 711). This research yielded results which reveal a higher wage penalty suffered by mothers with low-wage jobs.

Implications and Significance

The research conducted by Budig et al (2010) represents a more general study of the variables that I wish to examine in my own research. I use the 2010 American Community Survey to determine variations in the motherhood wage penalty between daycare providers and elementary school teachers while controlling for (at least) race. The limitations of Budig's research (2010), in terms of using it as a model for conducting my own, similar research, is that the quantile regression method of analysis can only be used on longitudinal data which the data

from ACS is not. The method of analysis used in this study uses very similar variables and a more simple regression method of analysis to yield similar and conclusive results concerning the motherhood wage penalty.

I expected my research would contribute a similar set of conclusions as did other studies on the motherhood earnings penalty. However, I also looked to have taken the research one step further in examining the severity of the motherhood wage penalty on two jobs at opposing ends of the earnings distribution but which have similar goals and virtues. I was hopeful that the results of my research would provide more concrete evidence supporting the conclusion that a variation between low-wage and high-wage workers' motherhood earnings penalties exists, while controlling for the nature of the jobs under examination. This would more conclusively determine that high or low placement in the earnings distribution can affect the severity of the motherhood earnings penalty suffered by women in the workplace.

Literature Review Summary

Discrimination and inequalities are present in many areas of life including the workplace and can be based on one or a number of factors including but not limited to race, gender, age, disability, sexual orientation, and religion. Motherhood is a variable that can only be experienced by women and one which can carry its own mechanisms for producing inequalities in the workplace. Scholars have found that women who earn lower wages experience a higher motherhood wage penalty than women who hold high-wage positions. Another study shows that all "care workers" experience an element of wage penalty as compared to those who do not work in care. My research will look to combine these two phenomena and investigate any variation between the motherhood earnings penalty experienced by daycare providers and the penalty experienced by elementary school teachers.

Hypotheses

Through my research, I expect to find evidence that supports findings in previous research of the existence of a motherhood earnings penalty. I expect that both mothers who are elementary school teachers and mothers who are daycare providers experience a wage penalty when compared to women without children and that the wage penalty increases the more children a woman has. Furthermore, based on previous research on the motherhood earnings penalty, I expect to derive similar results of wage discrepancies across the earnings distribution (Budig et al, 2010). I expect that women who are childcare providers will experience a higher motherhood earnings penalty than mothers who are elementary school teachers. I expect these hypotheses to be supported because, although they are both considered to be “care work,” elementary school teachers and daycare providers are positioned at opposing ends of the earnings distribution. My hope is that my research will contribute to previous work by offering evidence supporting other scholars’ claims while expanding the discussion of the motherhood earnings penalty by identifying occupations with similar care giving qualities and goals and opposing wages and benefits.

Data Source and Sample

For my research, I draw on data from the 2010 American Community Survey. This survey is ongoing, distributed by the United States Census Bureau, and provides updated data every year. The purpose of the study is to assist communities, state governments, and the federal government plan investments and services according to the unique statistics of given areas. The questions asked in the survey cover the topics of age, sex, race, family and relationships, disabilities, place of work and commute, place of residence, regular expenses, income and benefits, health insurance, education, and veteran status. The data set uses a series of monthly

samples to produce annually updated data for the same block groups previously surveyed by the census (American Community Survey, 2010). I chose this data set because it yields the highest number of cases in my sample of elementary school teachers and childcare providers which will yield more valid results.

My specific sample derived from the ACS, contains a total of 53,012 respondents. The sample was refined from the complete 2010 ACS to be composed of women who work in the education and childcare fields. The occupations are represented in the ACS data by a four digit code and comprised six categories of teachers including postsecondary teachers (2200), preschool and kindergarten teachers (2300), elementary and middle school teachers (2310), secondary school teachers (2320), other teachers and instructors (2340), and teacher assistants (2540). The occupation of childcare is represented by one category of childcare workers (4600). For the purposes of table organization, I have renamed the four digit code labels for my occupation variable. Postsecondary teachers are now labeled “PostSecondary,” preschool and kindergarten teachers are “PreK and K,” elementary and middle school teachers are “Elem & Middle,” secondary school teachers are “Secondary,” other teachers and instructors are “Other Teachers,” teacher assistants are “TAs,” and the occupation of childcare is “Childcare Worker.”

To make my sample most appropriately and accurately answer my research question, of the 53,012 women in the entire sample, full-time working women—defined by those who work 34 hours per week or more—in the childcare and education fields were extracted. My new sample consists of 31,703 respondents of which 27,563 work full time in the field of education while 4,140 work full time in the field of childcare. This refined sample with an N=31,703 represents all full-time working women in the education and childcare fields who participated in the 2010 ACS and will be the complete sample used for my analysis.

Because my sample size is fairly high, the margin of error—or the likelihood that my conclusions can be the result of chance or coincidence—is low. While the number of childcare workers represented in my sample is much smaller than the number of elementary school teachers, I believe that it is representative of the population as a whole. Because childcare is not mandatory and because its services are provided for a much smaller range of ages, it would make sense that childcare would make up a significantly smaller portion of “care work” when compared to elementary school teachers. Realizing that it is impossible to compile a sample of every elementary school teacher and childcare provider in the United States, the sample derived from the American Community Survey is as representative a sample as I could create.

Variables and Descriptive Statistics

In this section I will provide descriptive statistics for each of my variables. My independent variables (mothers working as daycare providers and mothers working as elementary school teachers) will be defined by number of children and controlled by race and marital status. For the purposes of Table 1, “care work” will be used to represent occupations that include each of the six categories involved with elementary education as well as childcare providers. My dependent variable (the motherhood earnings penalty) will be represented by yearly wage and salary income for mothers working full-time in the teaching and childcare fields. Using STATA, I will tabulate a description of each variable including the categories by which the variable is broken down, the frequency of each response, and the percentage of the total that that answer represents. I will provide a summary of each of the descriptive statistics tables highlighting the main points and any interesting phenomena associated with each variable.

Independent Variables

Table 1 below provides the descriptive statistics for women working full-time in both

elementary education and childcare work. This occupation variable is one component of my independent variable, describing all women regardless of their motherhood status. According to this output table, elementary and middle school teachers account for nearly half of women

Table 1: Descriptive Statistics for Women Working Full-Time in Care Work

| Occupation | Freq. | Percent | Cum. |
|-------------------|---------------|----------------|-------------|
| PostSecondary | 2,410 | 7.60 | 7.60 |
| PreK and K | 2,596 | 8.19 | 15.79 |
| Elem & Middle | 15,726 | 49.60 | 65.39 |
| Secondary | 2,529 | 7.98 | 73.37 |
| Other Teachers | 1,376 | 4.34 | 77.71 |
| TAS | 2,926 | 9.23 | 86.94 |
| Childcare worker | 4,140 | 13.06 | 100.00 |
| Total | 31,703 | 100.00 | |

involved in care work. Only 13.06% of women work in childcare meaning that the other nearly 87% of women in this sample who work full time in this sample of care work, work within the elementary education system. Middle and elementary school teachers is the largest category of my sample of care work occupation, representing 49.60% of the total and 43.12% of elementary education occupations.

Table 2 represents the descriptive statistics for the number of children of women who work full time in elementary education. It should be noted that the survey question on the ACS asks specifically for the number of children “present in their household.” Therefore, we leave a room for a slight margin of error understanding that it is possible for a woman to have a child but that that child is not living with them in their household. For example, a woman might have children but they are now old enough to not be living in the home, or a woman might answer that that do not have any (0) children living in her household, but she may actually be a mother of a

child living with his/her biological father. Also, the questions specifies for the women to only identify the number of “own children” present in the household. This means that a woman may play the role of a mother to children in her household that she does not have custody of (children of a boyfriend or other relative). That being said, because of the size of the sample, we can still make generalizations of the statistics provided by this table. Of women who work in elementary education, 41.99% do not have any children, 19.27% have one child, and 26.73% of women in this sample are mother to two children. This means that 97.35% of women have three

Table 2: Descriptive Statistics for Number of Children of Women Working Full-Time in Elementary Education

| Number of own children in the household | Freq. | Percent | Cum. |
|--|---------------|----------------|---------------|
| 0 children present | 11,574 | 41.99 | 41.99 |
| 1 child present | 5,340 | 19.37 | 61.36 |
| 2 | 7,368 | 26.73 | 88.10 |
| 3 | 2,551 | 9.26 | 97.35 |
| 4 | 572 | 2.08 | 99.43 |
| 5 | 105 | 0.38 | 99.81 |
| 6 | 36 | 0.13 | 99.94 |
| 7 | 10 | 0.04 | 99.97 |
| 8 | 4 | 0.01 | 99.99 |
| 9+ | 3 | 0.01 | 100.00 |
| Total | 27,563 | 100.00 | |

children or less and the remaining 2.65% have more than three children. I was pleased to see these statistics because mothers and non mothers are nearly equally represented in the data for elementary school teachers.

Table 3 represents the descriptive statistics for the number of children full-time childcare working women have. Understanding the same limitations to the survey question containing “own children” and “in the household” terminology, I found that the results from this table were

similar to that of elementary school teachers. This data says that 40.02% (as compared to 41.99%) of full-time childcare workers do not have children. Childcare workers seem to represent a higher number of mothers of three children and a slightly lower number of mothers of

Table 3: Descriptive Statistics for Number of Children of Women Working Full-Time in Child Care

| Number of own children in the household | Freq. | Percent | Cum. |
|---|--------------|---------------|--------|
| 0 children present | 1,657 | 40.02 | 40.02 |
| 1 child present | 767 | 18.53 | 58.55 |
| 2 | 933 | 22.54 | 81.09 |
| 3 | 529 | 12.78 | 93.86 |
| 4 | 179 | 4.32 | 98.19 |
| 5 | 52 | 1.26 | 99.44 |
| 6 | 15 | 0.36 | 99.81 |
| 7 | 4 | 0.10 | 99.90 |
| 8 | 2 | 0.05 | 99.95 |
| 9+ | 2 | 0.05 | 100.00 |
| Total | 4,140 | 100.00 | |

two children. Again, mothers represent an almost equal number of women in this sample of care workers when compared to non mothers.

Table 4 represents the descriptive statistics for the marital status of all women working full-time in elementary education in this sample. "Marital Status" is broken up into categories of "married, spouse present," "married, spouse not present," "separated," "divorced," "widowed," and "never married/single." Over half (62.47%) of full-time working women verified that they are married with a spouse present in the household. Divorced represents 7.17% of the women but

Table 4: Descriptive Statistics for Marital Status of Women Working Full-Time in Elementary Education

| Marital status | Freq. | Percent | Cum. |
|-------------------------|---------------|---------------|--------|
| Married, spouse present | 17,219 | 62.47 | 62.47 |
| Married, spouse absent | 365 | 1.32 | 63.80 |
| Separated | 450 | 1.63 | 65.43 |
| Divorced | 1,977 | 7.17 | 72.60 |
| Widowed | 109 | 0.40 | 73.00 |
| Never married/single | 7,443 | 27.00 | 100.00 |
| Total | 27,563 | 100.00 | |

the next highest category of women in this sample with respect to marital status is the category of “never married/single.” This statistic may account for the high number of women elementary school teachers who do not have any children—the fact that they identify as single.

Table 5 represents the descriptive statistics for the marital status of those women working full time in childcare. Childcare workers represented similar statistics to that of elementary school teachers with respect to the categories of “married, spouse absent,” “separated,” “divorced,” and “widowed.” However, childcare workers have a lower rate of married, spouse present (47.08%) and a higher rate of being never married or single (38.45%). This might be explained by the fact that childcare workers tend to be younger in age than elementary education

Table 5: Descriptive Statistics for Marital Status of Women Working Full-Time in Child Care

| Marital status | Freq. | Percent | Cum. |
|-------------------------|--------------|---------------|--------|
| Married, spouse present | 1,949 | 47.08 | 47.08 |
| Married, spouse absent | 101 | 2.44 | 49.52 |
| Separated | 160 | 3.86 | 53.38 |
| Divorced | 311 | 7.51 | 60.89 |
| Widowed | 27 | 0.65 | 61.55 |
| Never married/single | 1,592 | 38.45 | 100.00 |
| Total | 4,140 | 100.00 | |

teachers (American Community Survey, 2010). The higher number of single, full-time working childcare providers might also explain the number of non mothers present in this sample of childcare providers.

Table 6 represents the descriptive statistics for the races of women who are involved working full-time as elementary school educators. White women represent the overwhelming majority of elementary school educators, making up 83.40% of this sample. African American full-time working women make up 8.62% and all other races combined make up only a very small 6.02% of the sample. I am not surprised by this data because minorities represent a smaller

| Race [general version] | Freq. | Percent | Cum. |
|----------------------------------|---------------|----------------|-------------|
| White | 22,987 | 83.40 | 83.40 |
| Black/Negro | 2,375 | 8.62 | 92.01 |
| American Indian or Alaska Native | 185 | 0.67 | 92.69 |
| Chinese | 277 | 1.00 | 93.69 |
| Japanese | 65 | 0.24 | 93.93 |
| Other Asian or Pacific Islander | 575 | 2.09 | 96.01 |
| Other race, nec | 605 | 2.19 | 98.21 |
| Two major races | 450 | 1.63 | 99.84 |
| Three or more major races | 44 | 0.16 | 100.00 |
| Total | 27,563 | 100.00 | |

portion of the total population of the United States. Therefore, it would make sense that a similar phenomena would occur in my sample of care workers.

Table 7 represents the descriptive statistics for the race of women working full time in child care. While “other races” make up a similar percentage of childcare workers when compared to elementary school teachers, there are nearly 12% fewer full-time working white women in the daycare setting, and nearly 43% more full-time working African American women in the daycare setting than there are elementary school teachers. This phenomenon is most

Table 7: Descriptive Statistics for Race of Women Working Full-Time in Childcare

| Race [general version] | Freq. | Percent | Cum. |
|----------------------------------|--------------|---------------|--------|
| white | 3,034 | 73.29 | 73.29 |
| Black/Negro | 608 | 14.69 | 87.97 |
| American Indian or Alaska Native | 40 | 0.97 | 88.94 |
| Chinese | 16 | 0.39 | 89.32 |
| Japanese | 5 | 0.12 | 89.44 |
| Other Asian or Pacific Islander | 89 | 2.15 | 91.59 |
| Other race, nec | 262 | 6.33 | 97.92 |
| Two major races | 73 | 1.76 | 99.69 |
| Three or more major races | 13 | 0.31 | 100.00 |
| Total | 4,140 | 100.00 | |

likely due to the same phenomenon that Budig et al (2010 and 2001) identify as a reason for controlling for race in their research: because of a history of discrimination, African Americans tend to more heavily populate lower paying occupations than higher paying occupations due a tendency to have lower education and/or opportunities to occupy higher paying positions. Childcare work is a much lower paying job than elementary school educators and therefore, according to a history of this phenomenon, it makes sense that African Americans would more heavily populate this occupation.

Dependent Variables

Because a tabulation of the yearly salary of this sample's women who work full time in elementary education and childcare would be an inefficient representation of the variable (due to the large number of categories of income), but a summary and a graph were used to describe my independent variable. First, Table 8 represents the summary of the income variable for women working full time in care work. According to the ACS, the average yearly income for elementary school teachers is approximately \$40,000. This number is lower than the documented \$48,000 as previously cited. This is most likely due to the fact that my sample from ASC is more broad and

inclusive of teaching positions that pay a lower wage or that do not pay at all in the form of income (for example, TAs). Also, my sample is restricted to that of women in the field whereas the average includes the income of men. Because we know that men typically enjoy a higher

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|-----------------|--------------|-----------------|------------------|------------|---------------|
| incwage | 27563 | 38891.55 | 21193.27 | 0 | 498000 |

salary than women for the same job, this would explain the result in an average that was lower than the national average.

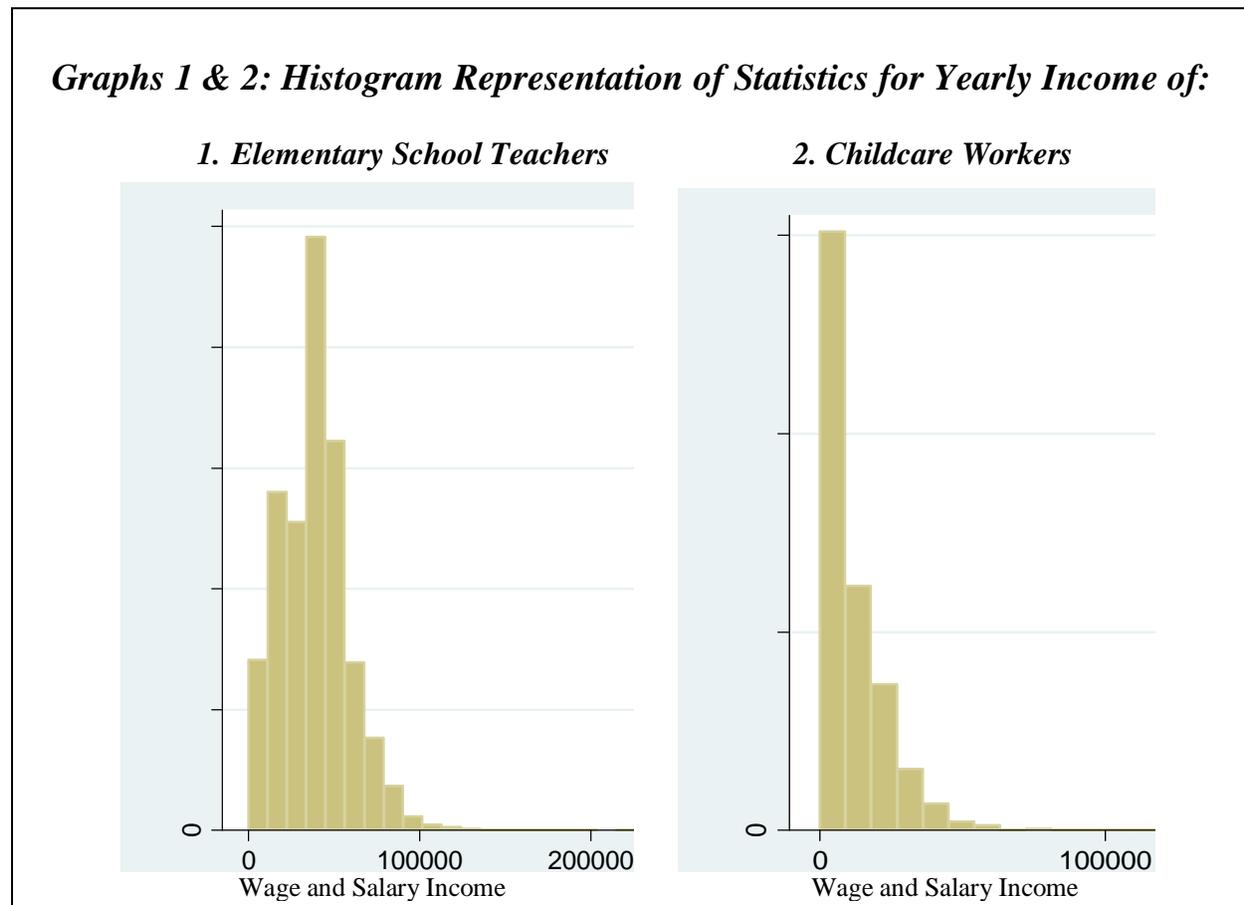
Table 9 represents the summary statistics of yearly income for women working full time in childcare. This summary shows that the average yearly income for women working in childcare is about \$11,000 per year which is again, lower than the national average cited previously. Similar to that of elementary school teachers, this could be due to the fact that this

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|-----------------|-------------|-----------------|------------------|------------|---------------|
| incwage | 4140 | 10893.08 | 15209.59 | 0 | 325000 |

sample of childcare workers is restricted to women which is, as previously stated, another reason that the average income derived from my ACS sample for childcare is lower than that of the national average.

Next, Graph 1 is a histogram representation of the income that women earn per year working as elementary school teachers and Graph 2 is a histogram representation of the yearly

income of women working full-time in childcare. Wage and salary income follows a more normal curve for elementary school teachers than for childcare workers. This means that there



are women who earn above and below the average at a fairly even distribution. The majority of childcare workers, however, according to Graph 2, fall below the national average which is then brought up by outliers above the national average. Both graphs, however, illustrate the fact that elementary school teachers fall higher on the earnings distribution than do childcare workers.

In the current study, with a thorough understanding of the variables being used in my analysis, I used each of my independent variables to represent my broad independent variable: mothers working full-time in elementary education and in childcare as compared to non mothers in the same fields. Through my research, I use them find the occurrence of the motherhood earnings penalty within my sample and then compare the motherhood earnings penalty between

two occupations (elementary school teachers and childcare workers) at opposing ends of the earnings distribution.

Methods and Results

Using the data from the ASC and the variables described above, I used STATA Statistics/Data Analysis 11.0 to conduct my analysis. The current study uses regression models to analyze the income for women who work as elementary school teachers and women who work as daycare providers. Regression models allow for a deeper understanding of the relationship between independent and dependent variables and specifically illustrates how the dependent variable changes when one independent variable varies while other independent variables remain fixed, therefore controlling for these variables. For each regression, two linear predictions (one for mothers one for non mothers) were made giving the estimated income for these women at three specific ages—age 25, age 30, and age 35 years old—for a total of six linear predictions for both elementary school teachers and childcare providers. I chose these ages because I wished to represent women who might be just starting to have children, those who may no longer having children, as well as women who might be in the middle. The variables that are controlled for in my regression model are income being greater than \$0, number of hours worked, marital status, race, and age which is specifically controlled for through the linear predictions because they are made for three specific ages. The independent variable that is changing is the motherhood status of each of the women (mother vs. non mother). The following tables represent the raw output from STATA with a more thorough analysis to follow in the results and discussion section.

Table 10 represents a regression analysis for childcare providers including all of my control variables. This analysis yielded statistically significant results that the variance between mothers and non mothers has a negative coefficient of 1071.65, meaning that the income for

mothers is significantly less than that of non mothers in the same occupation. The linear

Table 10: Regression Analysis for Childcare Providers

| Source | SS | df | MS | | | |
|----------|------------|------|------------|-----------------|--------|--|
| Model | 2.5604e+11 | 5 | 5.1207e+10 | Number of obs = | 6079 | |
| Residual | 7.3792e+11 | 6073 | 121508943 | F(5, 6073) = | 421.43 | |
| Total | 9.9396e+11 | 6078 | 163533920 | Prob > F = | 0.0000 | |
| | | | | R-squared = | 0.2576 | |
| | | | | Adj R-squared = | 0.2570 | |
| | | | | Root MSE = | 11023 | |

| incwage | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] | |
|----------|-----------|-----------|--------|-------|----------------------|-----------|
| mom | -1071.645 | 386.517 | -2.77 | 0.006 | -1829.355 | -313.9342 |
| age | 302.3155 | 21.44237 | 14.10 | 0.000 | 260.2808 | 344.3501 |
| uhrswork | 402.7669 | 10.33347 | 38.98 | 0.000 | 382.5096 | 423.0241 |
| marst | -38.64961 | 82.31099 | -0.47 | 0.639 | -200.0083 | 122.7091 |
| race | 67.54411 | 77.58177 | 0.87 | 0.384 | -84.54369 | 219.6319 |
| _cons | -8732.613 | 822.973 | -10.61 | 0.000 | -10345.93 | -7119.294 |

Table 10a: Linear Prediction for Mothers- Age 25

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| All | xb |
|-----|---------|
| | 9389.57 |

Key: xb = Linear Prediction

Table 10b: Linear Predictions for Non Mothers- Age 25

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| All | xb |
|-----|---------|
| | 11246.4 |

Key: xb = Linear Prediction

Table 10c: Linear Predictions for Mothers- Age 30

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| All | xb |
|-----|---------|
| | 11137.9 |

Key: xb = Linear Prediction

Table 10d: Linear Predictions for Non Mothers- Age 30

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| All | xb |
|-----|-------|
| | 14650 |

Key: xb = Linear Prediction

Table 10e: Linear Predictions for Mothers- Age 40

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| All | xb |
|-----|-------|
| | 13876 |

Key: xb = Linear Prediction

Table 10f: Linear Predictions for Non Mothers- Age 40

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| All | xb |
|-----|---------|
| | 16506.5 |

Key: xb = Linear Prediction

predictions for mothers and non mothers at age 25, age 30, and age 40 represented in tables 10a through 10f, give the estimated yearly income for a woman in each of those categories. First, it can be seen in the STATA output that those women who are of a younger age make less than older women. This phenomenon is most likely due to the fact that women who are older might have more education or may have been in the childcare profession longer and have therefore acquired an element of seniority. More pertinent to my research, the output shows that the

predicted income for mothers is significantly less than for non mothers in the childcare profession. Regardless of race, marital status, number of hours worked, or the age is under analysis, the motherhood wage penalty appears to significantly affect women in the childcare profession.

Table 11 represents a regression analysis for elementary school teachers including all of the control variables used in the previous regression. This analysis yielded statistically significant results that the variance between mothers and non mothers has a negative coefficient of 3562.44, meaning that the income for mothers is significantly less than that of non mothers in the same occupation. The linear predictions for Elementary School Teachers yielded results

Table 11: Regression Analysis for Elementary School Teachers

| Source | SS | df | MS | | | |
|----------|------------|-------|------------|-----------------|---------|--|
| Model | 6.6167e+12 | 5 | 1.3233e+12 | Number of obs = | 37913 | |
| Residual | 1.3410e+13 | 37907 | 353755368 | F(5, 37907) = | 3740.84 | |
| Total | 2.0027e+13 | 37912 | 528236959 | Prob > F = | 0.0000 | |
| | | | | R-squared = | 0.3304 | |
| | | | | Adj R-squared = | 0.3303 | |
| | | | | Root MSE = | 18808 | |

| incwage | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] | |
|----------|-----------|-----------|--------|-------|----------------------|-----------|
| mom | -3562.438 | 259.6572 | -13.72 | 0.000 | -4071.373 | -3053.503 |
| age | 654.2725 | 15.40125 | 42.48 | 0.000 | 624.0857 | 684.4594 |
| uhrswork | 947.2528 | 7.848771 | 120.69 | 0.000 | 931.869 | 962.6366 |
| marst | -573.843 | 54.31303 | -10.57 | 0.000 | -680.298 | -467.388 |
| race | 69.70253 | 61.7827 | 1.13 | 0.259 | -51.39319 | 190.7983 |
| _cons | -21588.7 | 623.9438 | -34.60 | 0.000 | -22811.65 | -20365.75 |

Table 11a: Linear Prediction for Mothers- Age 25

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| | |
|-----|---------|
| A11 | xb |
| | 23384.8 |

Key: xb = Linear Prediction

Table 11b: Linear Prediction for Non Mothers- Age 25

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| A11 | xb |
|-----|-------|
| | 27986 |

Key: xb = Linear Prediction

Table 11c: Linear Prediction for Mothers- Age 30

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| A11 | xb |
|-----|---------|
| | 27930.4 |

Key: xb = Linear Prediction

Table 11d: Linear Predictions for Non Mothers- Age 30

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| A11 | xb |
|-----|-------|
| | 33425 |

Key: xb = Linear Prediction

Table 11e: Linear Predictions for Mothers- Age 40

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| A11 | xb |
|-----|---------|
| | 33792.3 |

Key: xb = Linear Prediction

Table 11f: Linear Predictions for Non Mothers- Age 40

Dependent variable: incwage Command: regress
 Variables left as is: mom, age, marst, race, uhrswork

| A11 | xb |
|-----|---------|
| | 40951.5 |

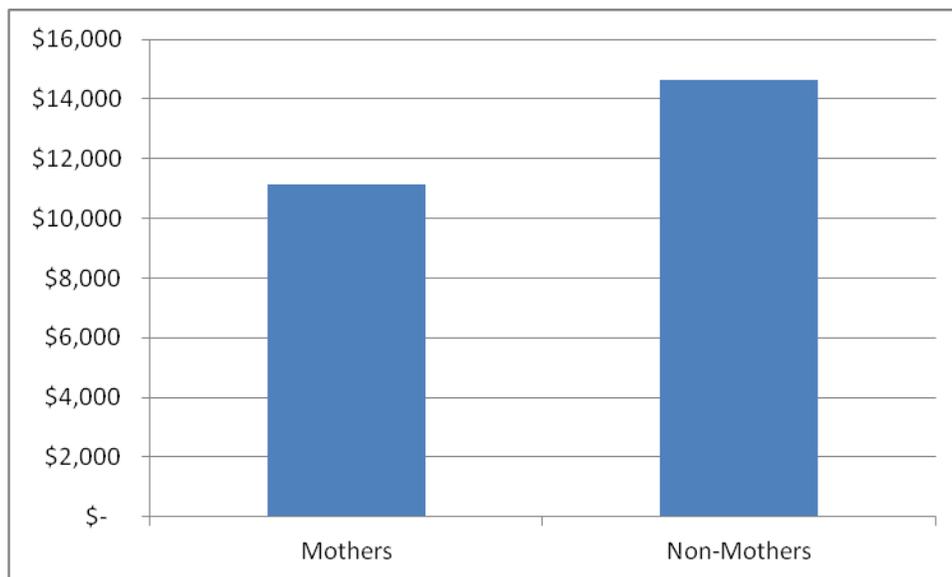
Key: xb = Linear Prediction

similar to that of the results for childcare providers, as seen in tables 11a through 11f. The output reveals that these categories of women experience higher income with increased age, and that mothers experience a significantly lower income than do non mothers.

Results and Discussion

In this section, I will discuss what was found in the raw output from STATA and illustrate the findings in a more comprehensive manner. Because the results for each age category represented a similar disparity between mothers and non mothers, I chose to create illustrations only for women age 30. The disparity in income can be illustrated numerically using histograms- one representing the Income for childcare workers at age 30, and the other representing elementary school teachers at age 30. Graph 3 shows that the motherhood earnings penalty for childcare workers exists in the difference in income that mothers make each year

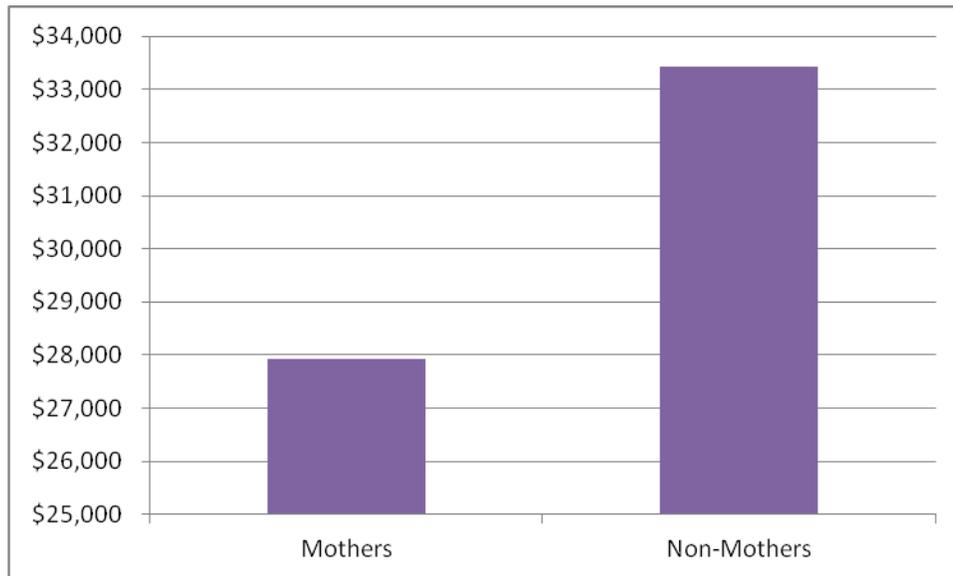
Graph 3: Histogram Representation of Linear Prediction for Income of Childcare Workers- Age 30



when compared to non mothers. According to this linear prediction, mothers who are childcare providers experience an earnings penalty of \$1,061 when compare to non mothers. Graph 4

represents the motherhood earnings penalty for elementary school teacher in the same manner as graph 3- through the linear prediction made for 30-year-old women in the teaching profession.

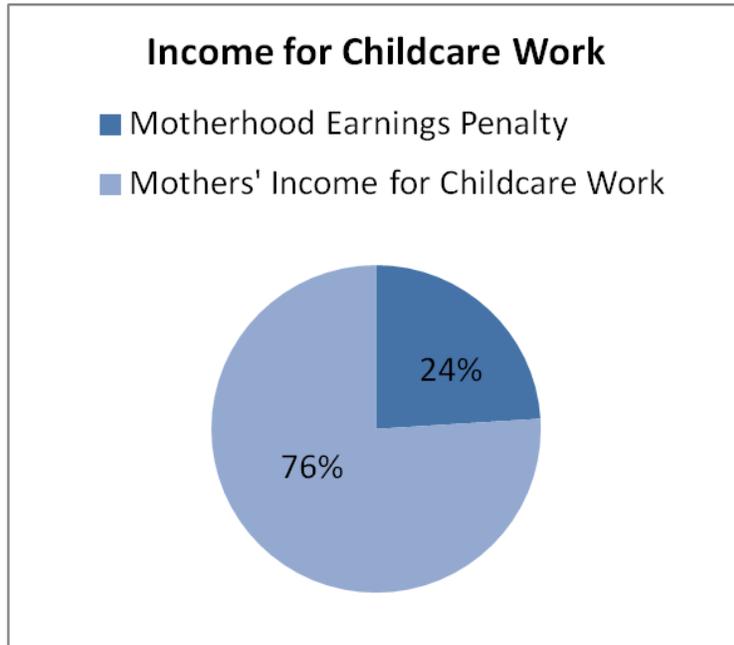
Graph 4: Histogram Representation of Linear Prediction for Income of Elementary School Teachers- Age 30



According to the linear prediction for income of elementary school teachers at age 30, mothers appear to suffer a penalty of \$3,364 when compared to non mothers.

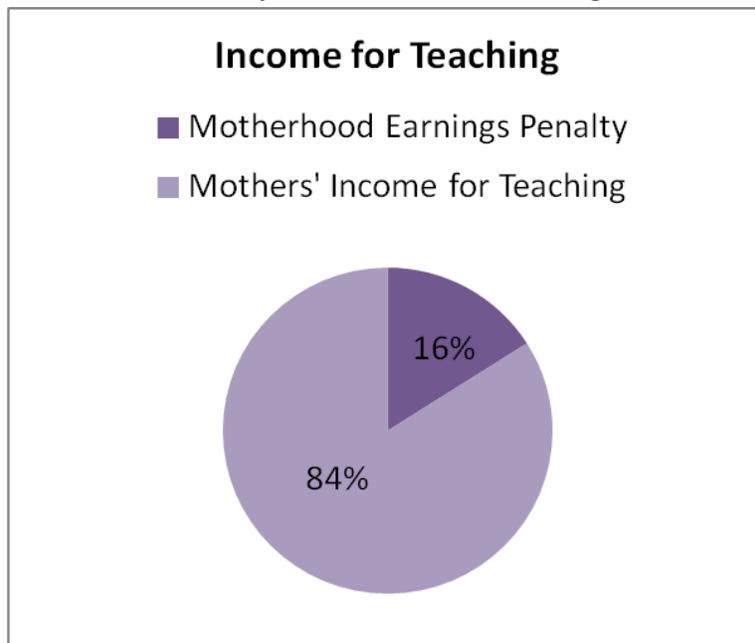
While it would appear, according to graphs 3 and 4, that elementary school teachers suffer a greater motherhood earnings penalty than do childcare workers, because childcare workers earn a lower annual income, the percentage loss is actually greater for mothers who are childcare workers than for mothers who are elementary school teachers. The motherhood earnings penalty can be represented a percentage for both elementary school teachers and for childcare providers. For age 30, I created a pie chart representing the estimated percentage of annual income earned by mothers compared to non mothers and therefore illustrate the percentage of annual income lost due to the motherhood earnings penalty. As seen in Graph 5, mothers only earn 76% of what non mothers earn in the occupation of childcare meaning that

Graph 5: Pie Chart Representation of Motherhood Earnings Penalty for Childcare Workers- Age 30



24% of what is predicted to be the income for a woman working in childcare at age 30, is lost due to the motherhood earnings penalty. According to graph 6, mothers who are elementary

Graph 6: Pie Chart Representation of Motherhood Earnings Penalty for Elementary School Teachers- Age 30



school teachers only make 84% of the predicted income for elementary school teachers meaning that the motherhood earnings penalty subtracts 16% of the estimated annual income for a 30-year-old elementary school teacher.

Comparing linear predictions is like comparing means except that they let allow for the inclusion of control variables. The linear predictions derived from my research provide evidence of the motherhood wage penalty for both childcare providers and elementary school teachers regardless of age, race, hours worked, or marital status. These results support those found in the previous research mentioned above including studies conducted by Budig (2001), England (2002), and Glauber (2007). Furthermore, the results yielded from this study support findings made by Budig (2010) that women who are at the lower end of the earnings distribution suffer a higher motherhood earnings penalty than women at the higher end of the earnings distribution. All of the results in the current study were found to be statistically significant.

In addition to supporting previous findings, the results from this study also contribute more knowledge to what is already known about the motherhood earnings penalty. Prior to the conducting my research, I thought that the differences in the motherhood wage penalty between high and low ends of the earnings distribution might be due to the type of work being analyzed. For this reason, I chose to examine two occupations that are in the same category of “care work” but that are at opposing ends of the earnings distribution to control for this variable. The results from the study show that the motherhood earnings penalty affects mothers in the same manner that Budig discovered in her 2010 study: mothers at the lower end of the earnings distribution experience a higher motherhood earnings penalty regardless of the type of work that they do.

The big picture in terms of what the findings of this study and other similar studies contribute is that variables that might be considered mechanisms in the motherhood earnings

penalty are being eliminated. It does not appear that the type of work changes the occurrence of the motherhood earnings penalty in care work. This leaves us with the mechanisms cited by Budig in her 2001 study: (1) losing job experience, (2) becoming less productive at work, (3) trading off higher wages for mother-friendly jobs, or (4) facing discrimination by employers. A study would have to be completed controlling for each of these variables to see how much each mechanism truly contribute to the motherhood earnings penalty and discover how much of a role pure discrimination plays. The larger implications of these findings is that, similar to Europe, mothers in the United States might benefit from policies specifically protecting them from suffering from the motherhood earnings penalty.

Conclusion

The results of this study found evidence indicating the occurrence of the motherhood earnings penalty. Linear predictions showed that 30-year-old mothers who work as childcare providers can suffer up to a 24% earnings penalty and that 30-year-old mothers who work as elementary school teachers can a penalty of 16% of the predicted annual income when compared to non mothers. These results support previous findings that mothers who work at the lower end of the earnings distribution suffer a higher motherhood wage penalty than those mothers at the higher end of the earnings distribution. An additional contribution provided by this study is that this phenomenon was still found to be true when controlling for the type of work that a woman does. In conclusion, this study found that women involved in low-income care work (childcare) suffer more greatly from the motherhood earnings penalty than do women involved in higher-income care work such as teaching in elementary schools.

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