The Empirical Analysis of Motherhood Penalty: The Effect of Having Children on Women's Career

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Abstract:

This paper investigates the motherhood penalty as well as the fatherhood bonus. The Motherhood penalty is a phenomenon by which women's pay decreases once they become mothers. The fatherhood bonus refers to the advantages that working fathers get in terms of pay and perceived competence in comparison with working mothers and childless men. This study incorporates information on the effect a child has on a mother's income verse that of a father's, while also measuring how a woman's income is affected after having a child comparatively to that of a childless woman's. The results show that the income of Mother's was higher than that of non-mothers, but more glaringly, results showed fathers making substantially more than mothers which could more accurately explain the gender wage gap.

JEL Classification: J13, J16
Keywords: Motherhood Penalty, Fatherhood Bonus.

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1.0 INTRODUCTION

Despite mothers' high rates of labor force participation and the reliance of households on mothers' paid and unpaid work, many mothers do not have the support they need. This causes mothers to face considerable difficulty balancing caregiving and family responsibilities with economic participation. Though childbearing has economic benefits for our society, women are financially penalized for having children, which commonly referred to as the motherhood penalty.

This study aims to enhance understanding on how women's careers are impacted by having a child. From a policy perspective, this analysis is important because it validates the necessity for paid parental leave since, the United States, unlike most developed countries worldwide, does not guarantee paid annual leave, paid parental leave, or paid time off for illness or family care. The relevance of this study is that woman comprise almost half of the U.S. labor force, and many of those women are mothers, mothers whom earning potential is negatively affected just for having children. If ignored, it may undermine policy initiatives aiming to increase fertility rates in post-socialist countries, such as the costly "baby bonus," which is a government payment to new parents to assist with the costs of childrearing Nizalova (2017).

A child can greatly shift the economics of a household. Mothers' unpaid work is also crucial to their households and the economy. Mothers spend more time than fathers "orchestrating family life," including caring for children, transporting them to school and other activities, and doing housework. Despite the importance of mothers' economic contributions, the broader economy fails to support mothers in a variety of ways. The well-being of children is not only important for families, but also the future of the economy. Policies such as paid leave, affordable and high-quality childcare, and flexible schedules enable mothers to remain connected

to the labor market both as employees and as entrepreneurs gives motherhood the economic support that it needs.

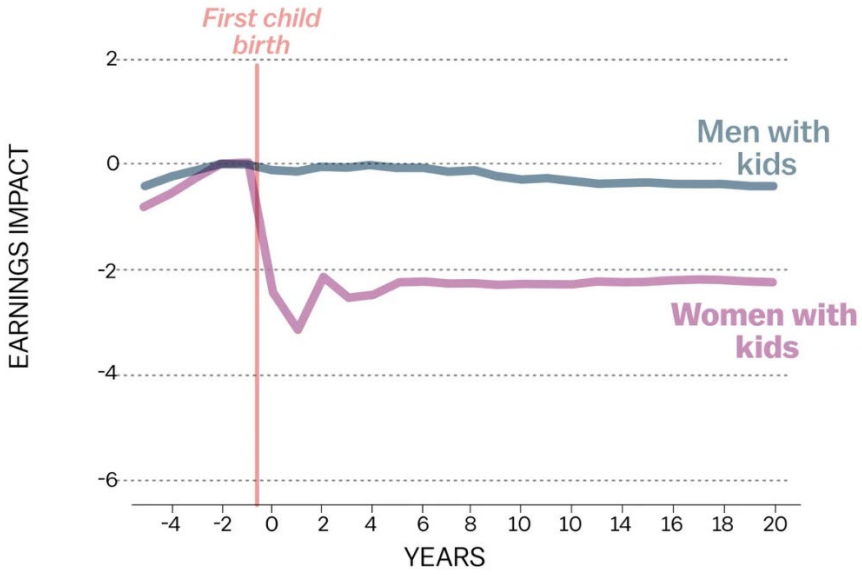
This paper was guided by three research objectives: How is a woman's income effected by children? How is a woman's vs a male's income effected by the addition of a child? How does the race/ethnicity, education level, and marital of a woman vs a male effect the motherhood penalty/fatherhood bonus comparatively?

The rest of the paper is organized as follows: Section 2 gives a brief literature review. Section 3 outlines the empirical model. Data and estimation methodology are discussed in section 4. Finally, section 5 presents and discusses the empirical results. This is followed by a conclusion in section 6.

2.0 TRENDS

Figure 1 shows that women with kids suffer a decrease in earning after the birth of their first child while males' earnings stay rather constant. Henrik Kleven, an economist at Princeton University who conducted this study, suggests what we often think of as a gender pay gap is more accurately discussed as a childbearing pay gap or motherhood penalty, which is illustrated in Figure 2. Childless women have earnings that are quite similar to men's salaries, while mothers experience a significant wage gap.

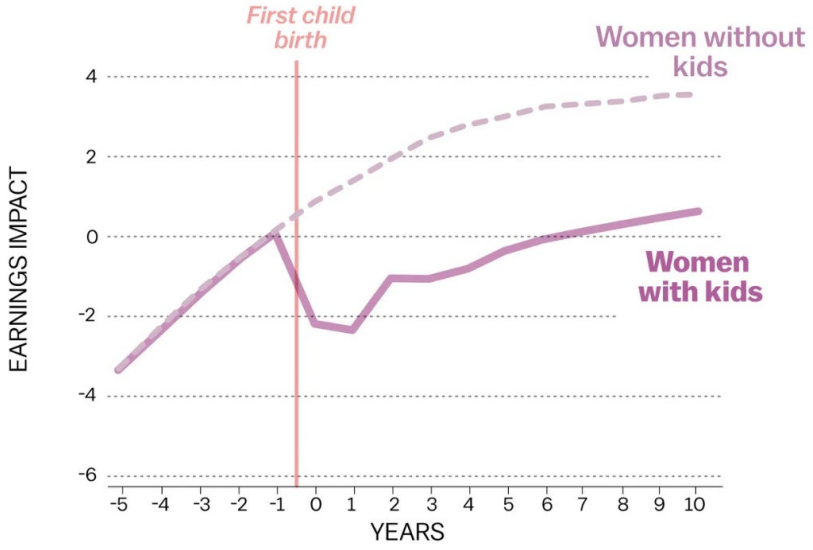
Figure 1: Effect of a Child on Women vs Men



Source: Children and Gender Inequality: Evidence from Denmark; National Bureau of Economic Research

Figure 2 shows the different earning trajectories for women who have children versus those who do not become mothers. The study estimated that childbearing, accounts for 80 percent of the gender wage gap in Denmark. Similar studies conducted in the United States have found similar results. For example, Harvard economist Claudia Goldin has found that women in their 30s incur the largest gender wage gap in America, which is their prime, childbearing years.

Figure 2: Motherhood Penalty

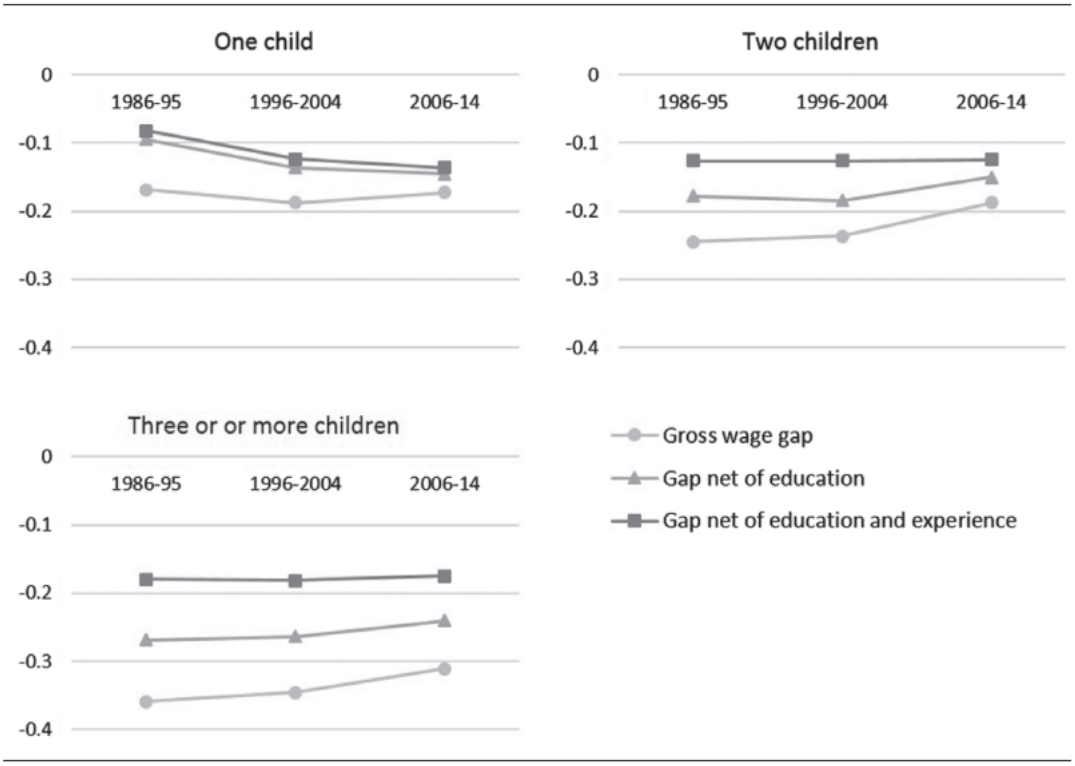


Source: Children and Gender Inequality: Evidence from Denmark; National Bureau of Economic Research

Figure 3 shows first the wage penalty for one child, the gross penalty was 16.9% in 1986 to 1995 and 17.3% in 2006 to 2014. The penalty net of differences in education was 9.5% in 1986 to 1995 and 14.5% in 2006 to 2014, and the penalty net of differences in education and labor market experience was 8.2% in 1986 to 1995 and 13.7% in 2006 to 2014. Figure 1, suggest an economically significant decrease in the pay of mothers of one child relative to childless women with comparable human capital. The gross penalty for two children was 24.5% in 1986 to 1995 and 18.8% in 2006 to 2014. The penalty net of education was 17.8% in 1986 to 1995 and 15% in 2006 to 2014. As mothers of two children improved their education and labor market experience, over time, the gross gap between their wages and the wages of childless women appears to have decreased. The net gap, the gap due to factors other than human capital, however possibly including labor market discrimination against mothers or unobservable differences in labor market productivity between mothers and childless women remained stable. The results for

mothers of three or more children were similar to those for mothers of two children. The gross penalty for three or more children declined from 35.9% in 1986 to 1995 to 31.1% in 2006 to 2014, although this change was not statistically significant. When comparing women with the same level of education and experience, mothers with three or more children saw a stable wage penalty over time.

Figure 3: Wage Penalties for One, Two, and Three or More Children Compared with No Children

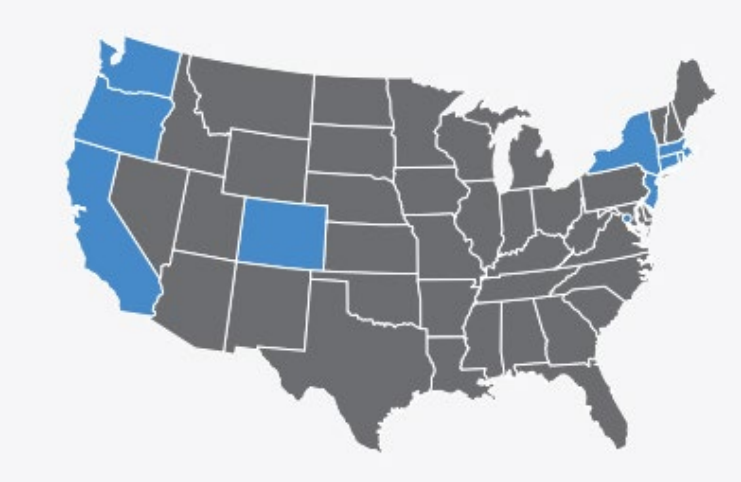


Note. Figure presents wage penalties for mothers as a percentage of childless women's wages. Penalties were derived from the coefficients in Table 2 using the following formula: $penalty = e^{coefficient} - 1$.

Source: Motherhood Penalties in the U.S., 1986–2014

Figure 4 shows that only nine states, New York, New Jersey, Rhode Island, Washington D.C, Washington, California, Colorado, Connecticut, Massachusetts and Oregon enacted family and medical paid leave laws. This is important because studies show that paid family leave helps keep women linked to the labor market, which in turn can negate motherhood wage penalty because women would not be completely removed from paid work. The introduction of paid family leave in California and New Jersey was found to increase mothers' labor force attachment in the year of birth and up to five years afterward. For mothers with college degrees, the effects lasted closer to eight years. Moreover, paid maternity leave is also associated with higher pay among mothers. Wages of mothers who were working prior to the birth of their first child and received pay during their maternity leave are 9% higher than those of other mothers.

Figure 4: States who Have Paid Family Leave



Source: Economic Engagement of Mothers: Entrepreneurship, Employment, and The Motherhood Wage Penalty

3.0 LITERATURE REVIEW

The motherhood penalty is used to describe the economic effect on a woman when she has a child. According to Jee et al. (2019) previous studies found that mother earn less than childless women. Two studies found that employed mothers in the United States suffer a per-child wage penalty of approximately 5%, on average, after controlling for the usual human capital and occupational factors that affect wages Budig and England 2001; Anderson et al. (2003). Kahn et al. (2015) provides argument for this effect stating that having and raising children interferes with the accumulation of human capital, which translates to levels of productivity and in turn lower wages. Research indicates that Women who, as a result of having or planning to have children, either cut short their education, drop out of the labor force for an extended period, cut back to part-time employment, choose occupations that are more family friendly, devote less effort on the job, or pass up promotions because of time or locational constraints, end up achieving less than childless women who stay on track with full-time employment and take advantage of opportunities for training and career advancement. Prior research, such as Budig and England (2001), showed a 7% per-child penalty using data from the National Longitudinal Survey of Youth (NLSY). They argued that only one third of this penalty can be attributed to lost experience yet using data from the PSID, Lundberg and Rose (2000) suggested that experience plays a key role, arguing that mothers only face penalties when they interrupt their employment due to care responsibilities. In terms of productivity, William (2001) found that mothers were offered salaries 7.9% less than childless women, whereas actual prospective employers called mothers back for interviews half as often as they did childless women, which was research based on both a laboratory experiment and a real-world audit study with actual employers Correll et al.

(2007). This research suggests that employers' perceptions of mothers as less committed to work may help account for the motherhood penalty, even when there do not appear to be warranted reasons to discriminate against mothers Jee et al. (2019).

Therefore, another explanation for the Motherhood penalty is mothers may face workplace discrimination because some employers believe that mothers are less competent or committed to their jobs than childless women, however this discrimination is hard to measure Kahn et all. (2015). Using residual wage differences that remain after controlling for human capital and other relevant characteristics Correll et al. (2007) is an alternate and effective way to capture such discrimination.

Studies also showed the evaluation of the motherhood penalty through education level. For example, Anderson et al. (2003) compared the motherhood wage penalty for mothers in different educational groups and found that mothers who were high school graduates experienced the largest wage penalty. They interpret the relationship between level of education and the magnitude of the wage penalty as evidence contradicting productivity explanations of the motherhood wage penalty. However, the authors lack direct measures of productivity, limiting their ability to rule out productivity explanations Correll et al. (2007). Moreover, Anderson et al. (2002) research found that the motherhood wage penalty for white mothers varies considerably by education level. In a cross section, mothers who did not complete high school do not earn less than their childless counterparts, while high-school and college graduates earn about 10 percent less per child. Anderson et al. (2002) research concluded that the least skilled do not suffer lower wages for becoming mothers, there is a 15-percent penalty for college-educated mothers of two

or more children, which can be entirely explained by years out of the workforce for whites, and that women who are high school graduates and black college graduates appear to occupy a middle position: years out of the workforce contribute only modestly to explaining the motherhood wage penalty experienced by individual women.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

The study uses annual panel data from 2019. Data was obtained from the Integrated Public Use Microdata Series (IPUMS). Publicly available. Summary statistics for the data are provided in Table 1.

Table 1 Summary Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Incwage	1,402,150	56104.47	68118.78	0	717000
nchild	1,402,150	.8019049	1.114506	0	9
age	1,402,150	42.1215	13.33417	16	65
white	1,402,150	.779172	.4148049	0	1
black	1,402,150	.0837692	.2770415	0	1
asian	1,402,150	.0643982	.2454611	0	1
mwspouse	1,402,150	.544961	.4979746	0	1
separated	1,402,150	.0163385	.1267736	0	1
divorced	1,402,150	.104665	.3061214	0	1
widowed	1,402,150	.0134572	.115222	0	1
single	1,402,150	.0162282	.2303629	0	1
noschooling	1,402,150	.0150526	.1217622	0	1
highschool	1,402,150	.3550162	.4785184	0	1
college	1,402,150	.6205035	.4852619	0	1

4.2 Empirical Model

Following Anderson, Binder Krouse (2009) this study adapted and modified Motherhood Penalties in the U.S., 1964-2014 Jee et al. (2019). The model $+\varepsilon_{it}$ could be written as follow:

$$INCwage = \beta_0 + \beta_1 nchild + \beta_2 age + \beta_3 race + \beta_4 marst + \beta_5 educ + \beta_6 state$$

Incwage is the annual amount of total income for the individual. It represents total pre-tax wage and salary income, that is, money received as an employee, for the previous year.

Independent variables consist of five variables obtained all from IPUMS. Appendix A provide data source and descriptions, for using the variables. First, nchild is a dummy variable and represents the presence of a child in the household. Second, Age is the age of the induvial. All the research done in this study used individuals 65 or under. Third, race is a dummy variable and was categorized into White, Black, and Asian. Fourth, marst is a dummy variable signifying the individual's marital status and categorized into married, separated, divorced, single, and widowed. Fifth, educ is a dummy variable measured by the highest year of school or degree completed and categorized into college, high school, or no education. Lastly, state identifies the state in which the housing unit was located of the individual.

5.0 EMPIRICAL RESULTS

The empirical estimation results are presented in Table 2. The empirical estimation showed that nchild had a relatively strong and significantly positive effect at the 1% level on Incwage for both women and men. Fixed effect with state shows parallel results; had a relatively strong and

significantly positive effect at the 1% level on Incwage for both women and men. Results were only gathered on individuals under the age of 65 and who were currently employed. Interpreting these results, it is evident that women with children make more then women without children and men with children make more then men without children. This does not align with current literature, however because of limitations in the study including only accounting for the year 2019 and not measuring the impact of income before and after a child, could be reason why. Most glaringly in the results was the fatherhood bonus, men with children made over four thousand more than women with children. This is consistent with the results of Hodges and Budwig (2010) who further suggested the gender wage gap should be more accurately discussed as the motherhood penalty. For further analysis, Tables 3, 4 and 5 looks at the effects of race, education, and marital status on a mother's income comparatively to that of fathers. Table 3 results, finding that white fathers earn roughly $34,854 thousand more than white mothers; Black fathers earn roughly $13,550 thousand more than Black mothers and Asian fathers earn roughly $34,986 more than Asian mothers, is consistent with Loose and Desai (2020) study that concluded the motherhood wage penalty is larger among white women, and children have smaller effects on the wages of Black women. Moreover, results measuring the effects of marital status on a mothers' income verse that of fathers, as seen in Table 4, show that married fathers earn roughly $33,025 more then married mothers; divorced fathers earn roughly $18,544 more then divorced mothers; and single fathers earn roughly $8,469 more than single mothers. Lastly, Table 5 measures the effect of education on the income of mothers compared to that of fathers and show that fathers with a college degree or higher earn $44,657 more then mothers with a college degree or higher; Fathers who highest educational attainment was a high school diploma

earn roughly $19,969 more then mothers with the same status; Fathers without any education making $11,198 more than mothers without an education.

Table 2: Regression results for the Motherhood Penalty and Fatherhood Bonus

	Dependent Variable = Income			
	I Women with Children	II Women with Children	III Men with Children	IV Men with Children
CONSTANT	-9352.545*** (733.0255)	-915.817 (913.5573)	-28512.01 (909.4048)	-13000.91 (91214.837)
age	550.7929*** (5.464708)	524.2984*** (5.433801)	834.5962 *** (7.896936)	810.0572*** (7.864337)
nchild	468.089 *** (59.31744)	391.2826*** (58.88842)	4362.622*** (85.04443)	4276.861*** (84.61492)
mwspouse	6788.22 *** (172.6349)	8097.097*** (171.9128)	21517.19*** (254.1749)	22649.19*** (253.3576)
college	32503.29*** (682.3376)	32638.73*** (676.8575)	51295.91*** (833.6765)	51589.43*** (828.6697)
white	3135.659*** (238.6553)	5630.667*** (241.6314)	9509.974*** (334.4778)	12707.33*** (339.3611)
black	139.946 (299.4371)	2170.236*** (305.749)	-6315.142*** (450.6245)	-4584.831*** (457.8487)
asian	14997.92*** (326.4184)	13216.77*** (325.6813)	17559.33*** (471.1528)	15565.91*** (470.2301)
gradeschool	-2696.092*** (884.9168)	-3216.676*** (877.6781)	-2955.895*** (1034.179)	-3073.222*** (1027.515)
highschool	7126.245*** (686.5422)	8264.477*** (681.106)	13386.35*** (837.1667)	15168.97*** (832.3346)
seperated	-1532.495*** (448.6541)	-764.6447 (445.2603)	6109.099*** (777.4857)	6630.813*** (772.7505)
divorced	3363.983*** (229.9568)	4866.048*** (228.7199)	5239.785*** (363.8649)	7005.373*** (362.3072)
mwospouse	2338.254*** (459.325)	2586.568*** (455.6392)	10401.2*** (652.3191)	10323.82*** (648.2036)
widowed	-4396.738*** (452.7115)	-2705.147*** (449.3731)	1128.585 (1070.829)	2894.594*** (1064.187)
R^2	0.0970	0.1121	0.1443	0.1556
F-statistics	5580.01***	1353.27***	9426.21***	2125.05***
Number of obs.	675,414	675,414	726,736	726,736
Fixed effect with State	NO	YES	NO	YES

Note: *** , **, and * denotes significance at the 1%, 5%, and 10% respectively. Standard errors in parentheses

Table 3: Summary Statistics Measuring the Effect of Race on Income

Variable	Observation	Mean	Std Dev	Min	Max
White Mothers	227,560	48906.94	54863.37	0	717000
White Fathers	240,171	83761.14	91774.69	0	717000
Black Mothers	30,319	41291.74	42879.95	0	714000
Black Fathers	19,186	54842.24	55695.62	0	665000
Asian Mothers	22,009	64351.55	72425.83	0	717000
Asian Fathers	22,154	99337.82	105141.4	0	717000

Table 4: Summary Statistics Measuring the Effect of Marital Status on Income

Variable	Observation	Mean	Std Dev	Min	Max
Married Mothers	206,641	52534.89	59193.03	0	717000
Married Fathers	258,971	85559.16	93024.23	0	717000
Divorced Mothers	38,792	47017.59	47134.17	0	717000
Divorced Fathers	18,427	65561.2	70421.3	0	717000
Single Mothers	39,029	32315.48	34324.43	0	717000
Single Fathers	20,357	40784.11	39350.03	0	717000

Table 5: Summary Statistics Measuring the Effect of Education on Income

Variable	Observation	Mean	Std Dev	Min	Max
College educated Mothers	205,371	57667.17	60894.93	0	717000
College educated Fathers	183,968	102324.8	104218.7	0	717000
High School Educated Mothers	89,644	29306.61	30114.88	0	665000
High School Educated Fathers	108,233	49274.14	43936.52	0	717000
Non-educated Mothers	3,160	24850.9	32014.38	0	544000
Non-educated Fathers	4,279	36048.74	37335.38	0	626000

5.0 CONCLUSION

In summary, the estimates obtained by the study demonstrates that the impact of a child on a man is positively related with a significantly higher income comparatively to that on a woman, which can help explain a proportion of the gender wage gap. The results in this paper imply that race, education, and marital status contribute significantly to the income discrepancies between mothers and fathers. Policy implications, such as paid leave, high quality childcare, and flexible schedules are a vital component in decreasing the motherhood penalty. To create a smaller and potentially non-existent gap the United States should attempt offering paid leave that only fathers are eligible to take. In addition, it is of equal importance to recognize that with the extremely high costs of childcare, it would be beneficial to increase the availability and reduce the of out-of-pocket cost for public early care and education. Economically, this can increase labor force participation rate, especially mothers which in turn can reduce the gap. Lastly, this study

contributes to extant literature by empirically analyzing the fatherhood bonus as it relates to the motherhood penalty.

Appendix A: Variable Description and Data Source

Acronym	Description	Data source
Incwage	Reports each respondent's total pre-tax wage and salary income - that is, money received as an employee - for the previous year.	Integrated Public Use Microdata Series (IPUMS)
nchild	Counts the number of own children (of any age or marital status) residing with each individual. NCHILD includes step-children and adopted children as well as biological children.	Integrated Public Use Microdata Series (IPUMS)
age	Reports the person's age in years as of the last birthday.	Integrated Public Use Microdata Series (IPUMS)
race	The race of the individual.	Integrated Public Use Microdata Series (IPUMS)
marst	Each person's current marital status.	Integrated Public Use Microdata Series (IPUMS)
educ	Indicates respondents' educational attainment, as measured by the highest year of school or degree completed.	Integrated Public Use Microdata Series (IPUMS)
state	Identifies the state in which the housing unit was located, using the coding scheme developed by the Inter-University Consortium for Political and Social Research (ICPSR).	Integrated Public Use Microdata Series (IPUMS)

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