Effect of Paid Paternity Leave on Paternal Involvement and Labor Market Outcomes*

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Abstract

While many countries have implemented paid paternity leave (PPL), little is known about how these labor laws affect intra-household dynamics and labor market outcomes in low and middle–income countries. I leverage Ecuador's 2009 PPL reform to study the effect of this policy on paternal involvement and labor market outcomes. I employ a difference-in-differences design that compares fathers of children born after 2009, to fathers of children born before 2009, who are employed in the formal sector (treated), versus informal sector (not treated). I find that fathers exposed to PPL increase time childrearing by 20 percent from an average of 2 hours per week. This effect is driven by the first-born child, is higher for fathers of girls, and is only present for educated and high-income fathers. Fathers who, pre-treatment, spend the least amount of time childrearing exhibit the largest gain. PPL does not lead to changes in formal employment, number of hours worked, or participation in housework. The results are robust to changes in the specification and the inclusion of individual fixed effects.

Keywords: paternity leave, father involvement, labor-market outcomes, development
JEL Codes: J13, J22, O17

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1 Introduction

Many countries have implemented paid paternity leave (PPL) with the goal of increasing paternal involvement in childrearing, advancing gender equality, and augmenting life satisfaction for fathers.[1] However, little is known about how this labor law affects intra-household dynamics and labor market outcomes. In part, this is because there is limited information on how fathers spend the leave time and whether it has long lasting effects on their domestic behavior.

PPL reforms are motivated by the idea that active fathering not only benefits child development (Fan & Chen, 2001; Tamis-LeMonda & Cabrera, 2002; Jeynes, 2005; Lamb, 2010; El Nokali et al., 2010) but offers additional benefits related to health and well-being (Cools, Fiva, & Kirkebøen, 2015) and longer-term effects on gender norms (Ray, Gornick, & Schmitt, 2009). Furthermore, PPL has effects on labor market outcomes in the long-run (Rege & Solli, 2013).

In this paper, I analyze the effect that PPL implementation has on the involvement in childrearing and labor market outcomes of fathers in Ecuador, a middle-income county in South America. The existent literature in family policies indicates that the generosity of paternity leave policies is correlated with the amount of time fathers spend childrearing (Boll, Leppin, & Reich, 2014; Fuwa & Cohen, 2007). However, this literature focuses on high-income countries and it is not clear that these findings apply to non high-income settings, for a variety of reasons.

First, parental leave policies in high-income countries are often of longer duration and complement a larger set of family policies, such as subsidized child-care and health care. However, in countries that lack a wide support system for families with young children, the marginal benefit of paid paternity leave may be more highly valued.

Second, the composition of families in low and middle-income countries often differs by containing multiple generations in a single household. If, in addition to the mother, the grandparents spend significant time caring for the children in the family, fathers may not be as responsive to paternity leave as families in developed countries where the alternative

[1] See figure 4 in the appendix for a visualization of current paternity leave regulations across countries.

source of care is often a paid childcare center.

Third, labor markets in low and middle-income countries present two distinct types of sectors; formal and informal. Formal workers enjoy the benefits of a social insurance package (pensions, health care, and other services) in exchange for contributions, normally made by the employer and employee. Informal jobs, on the other hand, refer to a variety of salaried and non-salaried jobs that do not comply with social insurance, regulations, and taxes (Bosch & Schady, 2019). In practice, only workers in the formal sector can access paternity leave. In Ecuador, formal workers are more educated and earn more than informal workers. Thus, PPL increases the gap in benefits between formal and informal sectors. On the contrary, for high-income countries where family policies reach almost everyone, paid leave favors low-income families the most.

My analysis addresses two broad questions. First, does the exposure to PPL lead to higher paternal involvement in childrearing and housework in the long run? Second, does PPL affect labor market outcomes for fathers? This paper explores these questions while conducting the first causal analysis of the effect of PPL on paternal involvement and labor market outcomes in a developing country.

Ecuador was one of the first Latin American countries that implemented PPL. In January 2009, Ecuador passed a law that provided paid paternity leave for workers in the public and private sector for 10 to 25 days. A father has the option to take the fully paid leave from the date of birth of his child. This is a use-it or lose-it benefit. According to the government announcement after passing the law, the goal of this policy is to strengthen the paternal link to the family and promote his integration to the family, based on a relationship of shared responsibility with the mother. PPL allows fathers to spend critical time in the hospital and at home with the mother and newborn. Even though the policy provides just a few days of leave, the special timing of these days could set a precedent for the family dynamics and task divisions in the household that otherwise would be determined by traditional gender roles. If fathers are present during the hospital stay and early days at home, it is possible they will begin domestic routines that will continue to influence child rearing well after paternal leave has expired.

Using data from the Ecuadorian National Employment Survey (2007-2013) I employ a

difference-in-differences (DID) design that compares fathers of children born after 2009, to fathers of children born before 2009, who are employed in the formal sector (treated), versus informal sector (not treated).

I estimate that fathers eligible for PPL increase time with their children by 24 minutes per week on average. This is an increase of 20 percent from an average of 2 hours per week before the implementation of PPL. The largest gain is seen among fathers who, pre-treatment, spend 1 hour per week child-rearing. When treated, the time spent with children increases by 2 hours per week. The increase in paternal involvement is driven by new fathers and public-sector employees, depends on the gender of the child, and is highly heterogeneous across education and income levels. This positive effect is higher for fathers of girls and is only present for educated and high-income fathers. Overall, this study provides novel evidence that PPL causes higher paternal involvement among educated and high-income fathers, suggesting that while fostering girls' advancement, PPL may increase existing inequalities in child-wellbeing. PPL does not lead to changes in formal employment, number of hours worked, or participation in housework. The results are robust to changes in the specification and the inclusion of individual fixed effects.

My results extend the literature on family policies in several ways. First, I provide a causal examination of the long-run effects of paternity leave on paternal involvement by looking at the time fathers spend with their children up to 4 years after taking the leave. This complements studies that focus on take-up determinants and short-term effects of parental leave (Bartel et al., 2018; Romero-Balsas, 2012; Haas, 1990; Haas & Hwang, 2008; Nepomnyaschy & Waldfogel, 2007; Tanaka & Waldfogel, 2007). Second, my research closely relates to Patnaik (2019), which studies the implementation of "daddy quotas"specifically in Quebec, Canada. However, I am able to analyze PPL implementation at the national level. Third, this is the first study that explores the effect of PPL in the setting of a non-OECD country.

The paper proceeds as follows: Section 2 provides background on the policy reform, and theoretical model. Section 3 describes the data, Section 4 details the empirical methods used. Section 5 presents results. Section 6 shows robustness checks, and section 7 concludes.

2 Background

2.1 Literature

Different theoretical frameworks have distinct predictions with respect to the effect of PPL on labor market outcomes and intra-household child-care divisions. The time-allocation theory, developed by economists under the human capital theory, predicts that a household decides the most efficient combination of time to allocate to paid work and non-market work, such as housework and childcare (Becker, 1965; Gronau, 1977; Juster & Stafford, 1991). According to this theory, the household will maximize their utility by having the wife take on more of the household work when the wife's income is less than the husband's, or the husband's work hours are greater than the wife's (Aldous, Mulligan & Bjarnason, 1998). The gender-ideology theory, more widely used in sociology and psychology, assumes that gender norms are a major determinant of the assignment of work (Aldous et al., 1998). This theory predicts that men with non-traditional gender role attitudes are more likely to care for there children (Deutsch, Lussier & Servis, 1993). Both theories would predict that PPL affects paternal labor market outcomes and later involvement by altering either fathers' skill at taking care of the child or fathers' sense of proper gender roles (O'Brien, 2003).

2.2 Policy

Ecuador is one of several Latin American countries that have implemented paid paternity leave. In January 2009 Ecuador passed a law that regulated paternity leave for workers in the public and private sector. This law created paid paternity leave for a total of 10 to 25 days. The father can take leave for 10 days if the birth is normal. In the case of a multiple birth or c-section the leave is extended to 15 days. If the birth is premature or if there is need for special care for the newborn due to sickness or incapacity the father is allowed to extend the leave to 23 days. If the child was born with a terminal or irreversible illness the father can take the leave for 25 days. In the case of maternity death, the father is allowed to take the remaining leave that would have corresponded to the mother. The law also provides 15 days of leave for both parents in the case of adoption from the day that the child is legally

located with the family. PPL is available for the father from the date of birth of his child and has to be taken continuously. The leave is fully paid by the employer. Additionally, Ecuador offers 12 weeks of paid maternity leave. This leave was not altered at the time that paternity leave was implemented in 2009.

3 Data

The household and individual level data used in this study come from Ecuador's National Employment Survey (ENEMDU) for the years 2007-2013. ENEMDU is a nationally representative household survey, conducted quarterly by the census bureau of Ecuador, INEC. This survey interviews every member of the household, and any given household is interviewed during several but not all quarters.[2]

Each individual is questioned about their labor market experience, demographic factors, and use of time. This survey collects data on employment status, hours worked, sector of employment (formal or informal), and household characteristics.[3]

Importantly, the survey includes a section about time-use on housework activities. It starts by asking whether the individual participates in housework, if the response is 'yes', then the individual is asked about the number of hours per week that they spend on different housework activities. This section also includes questions to assess paternal involvement in child rearing. Specifically the question is: "How many hours per week do you spend taking care of children, elderly and sick in your home?" These data are unique because they provide insight into how paternity leave affects future intra-household divisions of childrearing responsibilities in addition to standard labor market outcomes. [4]

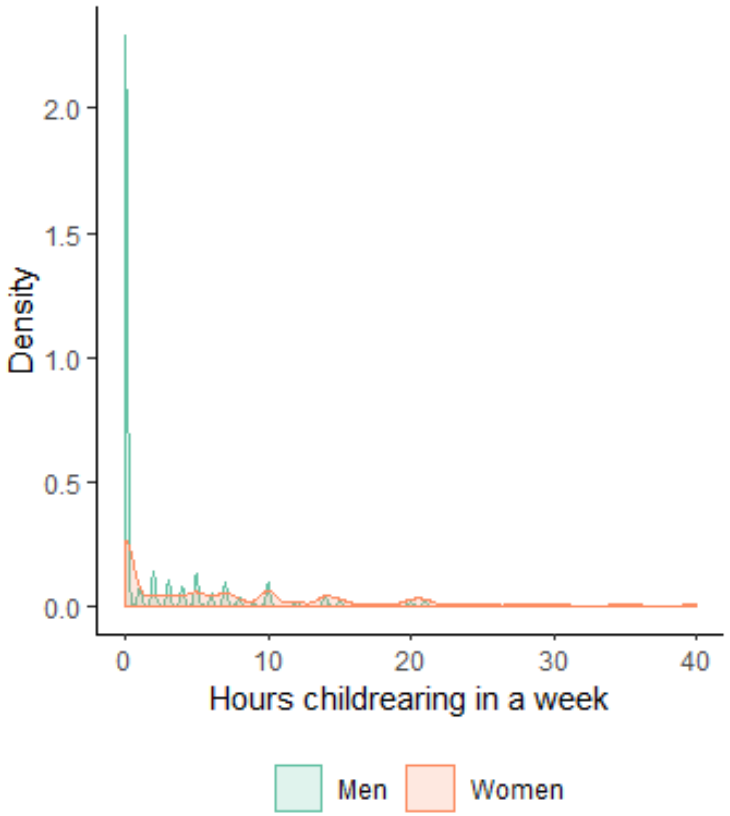
Figure 1 shows that 70 percent of men of 18 to 60 years old that live with a child do not participate in any childrearing activities, compared with 36 percent of women. This

[2]On average, the same household is interviewed during 3 or 4 quarters. This allows me to create a panel dataset and include individual fixed effects in the specification for robustness.

[3]The formal sector is defined as the group of employed individuals who work for companies of 10 or more employees and that are registered with the tax authority, the informal sector is formed by self-employed and employed individuals working for informal employers.

[4]If the individual responds that he does not participate in housework then a zero is imputed for hours childrearing and total housework. The number of hours dedicated to housework is self reported and does not necessarily equal the sum of the hours spent in each category of housework.

Figure 1
Density function of hours childrearing for men and women



Notes: Kernel density estimates of number of hours men and women spend childrearing per week. Sample includes men and women between 18 and 60 years old that have a child in the home. Source: INEC.

highlights the low levels of parental involvement among the population.

The outcomes of interest are: a) whether the father participates in housework, b) the number of hours per week spent childrearing, c) total number of hours per week dedicated to housework, and d) number of hours worked.

There are two primary limitations to using ENEMDU data. First, fathers can only be linked to children who live in the same household. Thus, the analysis excludes fathers who do not live with their children. Assuming that non-resident fathers are less involved with their children than resident fathers, my results will overstate the increase in paternal involvement as a result of PPL for the average father (including those not living with their infants). Second, the ENEMDU lacks precise information on child birth dates, only reporting the age of the child in years.

The sample that I use to conduct the analysis is constructed in the following way. First, I select employed fathers that have at least one child younger than 13 years old, and are ages 18-60. Second, using the age of the children living in the household I identify parents who have at least one child born after 2009. Third, I divide employed fathers according to their employment sector. Individuals employed in the formal sector are treated, and individuals employed in the informal sector serve as the control group in the DID design. The treated group is formed by fathers who have a child born after 2009 and work in the formal sector, and the control group is formed by fathers who work in the informal sector and fathers who work in the formal sector but do not have children born after 2009.

Table 1 shows the mean and standard deviation of the outcome variables and independent variables for treatment and control groups used in the DID design. The treatment and control groups are similar to each other before the implementation of PPL except in terms of education levels and marriage status. Fathers working in the informal sector are less educated and less likely to be married than those working in the informal sector. These differences have potentially important implications for the analysis because, all else equal, more educated and married fathers tend to spend more time childrearing. Hence, it is important to control for these differences and I also analyze these subgroups separately.

With respect to before and after trends, both formal and informal workers show an increase in time childrearing but a decrease in the likelihood of participating in housework, total hours of housework, and number of hours worked. For the independent variables the biggest differences are in the age of the youngest child and the number of children in the home. Fathers of a child born after the implementation of PPL have a younger child and more children on average. Given that these characteristics directly influence the time that parents spend childrearing I control for them.

4 Empirical Approach

I study the effect that exposure to PPL has on paternal involvement and labor market outcomes by leveraging the quasi-experiment provided by the implementation of PPL in Ecuador in 2009. I leverage the fact that fathers employed in the formal sector benefit from

Table 1
Summary Statistics - Fathers

	Child born before 2009:				Child born after 2009:			
	Mean		SD		Mean		SD	
Employed	0.893		0.309		0.911		0.285	
Formal	0.494				0.479			
Sample size	146995				39081			
	Formal		Informal		Formal		Informal	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Time-Use								
Hours worked	48.50	14.81	42.99	14.87	47.26	12.59	42.48	13.22
Participates in housework?	0.667	0.471	0.618	0.486	0.663	0.473	0.611	0.488
Hours Childrearing	1.856	5.715	1.653	8.718	3.194	5.043	2.706	8.776
Total hours of housework	15.28	25.46	16.11	28.06	9.833	14.37	9.009	15.424
Individual Characteristics								
Age of Youngest Child	5.862	3.505	5.883	3.521	1.060	1.103	1.007	1.111
Number of children	1.660	0.895	1.915	1.130	2.066	1.118	2.493	1.421
Married	0.552	0.497	0.427	0.495	0.489	0.500	0.404	0.491
Age	36.78	10.41	36.93	11.65	33.83	10.26	34.68	11.52
Ed: Primary	0.239	0.426	0.586	0.492	0.252	0.434	0.568	0.495
Ed: Secondary	0.456	0.498	0.362	0.481	0.489	0.500	0.385	0.487
Ed: Tertiary	0.305	0.460	0.0505	0.219	0.259	0.438	0.047	0.212
Elderly in the house	0.105	0.307	0.121	0.326	0.106	0.308	0.120	0.325
Sample size	64917		66312		17086		18516	

this labor law, while fathers employed in the informal sector do not have access to labor benefits. Hence, I employ a difference-in-difference design that compares fathers of children born after 2009, to fathers of children born before 2009, who are employed in the formal sector, versus informal sector. In this DID design the treated group is formed by fathers who have a child born after 2009 and work in the formal sector, and the control group is formed by fathers who work in the informal sector and fathers who work in the formal sector but do not have children born after 2009. This DID specification allows for differential trends on paternal involvement across sectors and by age of youngest child as long as the difference in the rate of change between fathers of children born after 2009 and fathers of children born before 2009 employed in the formal sector would have been the same as that of fathers

employed in the informal sector in the absence of PPL.

Under this assumption, I employ the following DID design to study the causal effect of PPL on outcome Y for fathers,

$$Y_{it} = \beta_1 After_{it} + \beta_2 Formal_{it} + \beta_3 After * Formal_{it} + \beta_4 X_{it} + \gamma_{ct} + \eta_{sy} + \epsilon_{it} \qquad (1)$$

where i is an individual and t represents a quarter-year. Y_{it} is the outcome of interest. I consider four main outcome variables: a) whether the father participates in housework, b) number of hours per week that a father spends childrearing, c) number of hours per week dedicated to all housework, and d) number of hours worked. $After_{it}$ is a dummy variable that takes the value of one if individual i lives with a child born during or after 2009, and takes the value of zero otherwise. $Formal_{it}$ is a dummy variables that take the value of one if the individual is employed in the formal sector at the time of the survey.[5]

The vector X_{it} includes a set of individual and household characteristics such as age (in five years bins), education (primary, secondary, and tertiary), marital status, ethnicity, age dummies for the youngest child in the household, and dummies for the number of children. City-time (quarter-year) and sector-year fixed effects are captured by γ_{ct} and η_{st} respectively. Standard errors are clustered at the city level (as a proxy for a labor market) to allow for correlation within cities and provide standard errors that are robust to heteroskedasticity and autocorrelation. The coefficient of interest is β_3, it captures the effect of PPL on the outcome variable among individuals employed in the formal sector. To interpret the DID coefficient as the causal effect of PPL on paternal involvement and labor market outcomes, the implementation of the policy must be uncorrelated with other time-varying determinants of time-use in the sample of employed fathers. I provide support for this assumption in section 6.

The main hypothesis of this analysis is that even though PPL offers few days of leave, the timing of these days is critical and thus facilitates routines at the intra-household level

[5]Because only age in years can be identified in the survey, a reported infant (younger than one year old) in the second quarter of 2009 may have been born as early as April 2008, assuming that births are approximately uniformly distributed throughout the year, only around 25% of surveyed infants would have been born after the implementation of the policy in that quarter, compared with 75% in the fourth quarter of 2009. Therefore, I treat 2009 quarter 4 as the first quarter of the policy.

that will remain well after the end of the leave. If these routines are sticky we should see a bigger effect of PPL for fathers that were able to access it during the birth of their first child. To test this hypothesis I employ a difference-in-difference-in-differences (DDD) design based on equation 1 where the third difference indicates that fathers can access PPL for their first child. In the following equation $First_{it}$ is a dummy variable that takes the value of one if the first child of the family was born after 2009. Given that fathers who had access to PPL for their first child are a subset of all treated fathers, the interactions $After * First$ and $After * Formal * First$ are collinear to $First$ and $Formal * First$. In the estimation I include the latter. I estimate the following specification:

$$\begin{aligned} Y_{it} =& \beta_1 Formal_{it} + \beta_2 After_{it} + \beta_3 First_{it} + \beta_4 Formal * After_{it} + \\ & \beta_5 Formal * First_{it} + \beta_6 X_{it} + \gamma_{ct} + \eta_{sy} + \epsilon_{it} \end{aligned} \tag{2}$$

where i is an individual and t represents a quarter-year. β_4 represents the effect that PPL has on fathers that receive this benefit for their second or later child, β_5 represents the additional effect of the policy for fathers that receive PPL for their first child. Thus, the effect of PPL on first time fathers is $\beta_4 + \beta_5$. X_{it} and fixed effects are the same as described for equation 1.

Since both, the DID and DDD methods (equation 1 and 2) leverage variation in the exposure to PPL rather than actual participation, I estimate *intent-to-treat* (ITT) which is preferable to estimates of *treatment on the treated* (TOT) for several reasons.[6] First, TOT estimates could be subject to the same bias from selection into treatment that previous cross-sectional studies have been criticized for. Second, from a policy-making perspective ITT effects may be more relevant as they allow for feedback effects, whereby the PPL could have changed expectations and norms beyond the effects of actually using the leave option. The implementation of PPL sent a strong public message about the importance of paternal involvement in housework which may have incentivized fathers who were exposed to PPL but not treated to nevertheless be more involved in the home. However, it is safe to assume

[6]ITT refers to the average effect of the policy on everyone expose to it regardless of whether they where treated, whereas OTT refers to the average effect of the policy for those that where actually treated by it. This this case OTT would represent the effect of PPL for those fathers that took the lave.

that feedback effects on parents who were exposed but not treated are smaller than the first-order-effects on parents who took the leave, such that the ITT results presented here underestimate the true causal effect of paternity leave on those who take it.

5 Results

Table 2 presents the results from estimating equation 1 of the effect of PPL on paternal involvement and hours worked. Column 1 shows that PPL has a small but positive effect on the likelihood that a father participates in housework. Column 2 indicates that the time fathers spend childrearing increases by 25 minutes. This estimate is statistically and economically significant, representing an increase of 20 percent from an average of 2 hours for formal workers before the implementation of PPL. Column 3 shows a small yet statistically significant increase in the total time dedicated to housework that mostly corresponds to the increase in time childrearing. Column 4 indicates that there is no effect of PPL on hours worked. The increase in father involvement as a result of exposure to PPL does not produce a decline in hours worked, indicating that fathers are not substituting away from labor, but are probably substituting away from leisure activities.

Table 3 presents the estimation of equation 2. This table supports one possible mechanism through which PPL affects paternal involvement. Namely, the routines established during the initial parenting experience are "sticky" and can have lasting effects on paternal behavior. In fact, column 2 shows that the increase in paternal involvement seen in table 2 is driven by new fathers. On average fathers that have access to PPL for their first child, increase their time childrearing by 37 minutes (equivalent to adding the two marginal effects β_4 and β_5), which is a 30 percent increase from a 2 hours pre-treatment mean. This increase is significantly larger than the effect of PPL for fathers who were exposed to PPL for their second or later child, who increase time childrearing by 16 minutes. These results support the hypothesis that intra household task-divisions are produced early on and that they are persistent over time.

Next, I examine heterogeneity in the effect of PPL on paternal involvement according to father characteristics. Each column in table 4 represents a different regression where the

Table 2
Effect of PPL on time use of fathers

	Dependent variable:			
	Participates on housework	Hours childrearing	Total hours of housework	Hours worked
	(1)	(2)	(3)	(4)
Formal	-0.023^{***}	0.100	-0.565^{***}	3.950^{***}
	(0.008)	(0.072)	(0.169)	(0.335)
After	-0.003	-0.249^{***}	-0.341^{**}	-0.082
	(0.007)	(0.055)	(0.159)	(0.210)
After_Formal	0.014^{*}	0.418^{***}	0.503^{***}	0.098
	(0.008)	(0.063)	(0.166)	(0.258)
Pre-t. Mean	0.677	2.051	20.85	49.58
Observations	166,831	166,825	166,827	166,831
R^2	0.168	0.080	0.835	0.147
Adjusted R^2	0.123	0.076	0.826	0.101
Residual Std. Error	0.449	4.143	10.180	14.916

Notes: OLS estimates from difference-in-differences regressions based on Equation 1. Participates on housework is an indicator equal to one if the respondent sends at least one hour doing any type of housework and zero otherwise. Hours childrearing, total hours of housework and hours worked are the self-reported number of hours in a week used for each activity. Housework includes childrearing, cleaning, shooping, doing laundry, cooking, and educating. Regressions include individual controls, time-city and sector-year fixed effects. Standard errors (in parentheses) allow for clustering at the city level. ***, **, and * denote statistical signifficance at the 1, 5, and 10 percent levels.

dependent variable is the time, in hours, that a father spends childrearing, and the sample varies according to father characteristics. Column 1 only includes fathers that participate in housework. Among these fathers the effect of PPL is slightly larger in absolute terms compared with the average effect when fathers that do not participate in housework are included. Columns 2 and 3 include fathers whose youngest child is a boy or a girl respectively. The effect of PPL on childrearing depends on the gender of the child. Even tough both groups have similar pre-treatment means the effect of PPL on time childrearing is higher for fathers whose younger child is a girl. Suggesting that PPL can play a role in fostering girl advancement.

Columns 4 and 5 in table 4 condition on being employed in the public or private sector.

Table 3
Effect of PPL on fathers behavior - First child

	Dependent variable:			
	Participates in housework	Hours childrearing	Total hours of housework	Hours worked
	(1)	(2)	(3)	(4)
Formal	−0.014	−0.202***	−0.583***	3.974***
	(0.018)	(0.064)	(0.167)	(0.342)
After	−0.003	−0.259***	−0.245	−0.173
	(0.008)	(0.091)	(0.165)	(0.201)
First	0.004	0.082	−0.325**	0.281
	(0.008)	(0.081)	(0.165)	(0.260)
Formal_After	0.009	0.275***	0.394**	0.279
	(0.008)	(0.079)	(0.178)	(0.265)
Formal_First	0.013	0.340***	0.337	−0.521
	(0.009)	(0.113)	(0.207)	(0.331)
Pre-t. Mean	0.677	2.051	20.85	49.58
Observations	166,831	166,825	166,827	166,831
R^2	0.168	0.154	0.835	0.147
Adjusted R^2	0.123	0.109	0.826	0.101
Residual Std. Error	0.449	4.068	10.180	14.916

Notes: OLS estimates from difference-in-differences regressions based on Equation 2. Participates on housework is an indicator equal to one if the respondent sends at least one hour doing any type of housework and zero otherwise. Hours childrearing, total hours of housework and hours worked are the self-reported number of hours in a week used for each activity. Housework includes childrearing, cleaning, shopping, doing laundry, cooking, and educating. Regressions include individual controls, time-city and sector-year fixed effects. Standard errors (in parentheses) allow for clustering at the city level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels.

The effect is significantly larger for public employees. This is probably a result of larger take-up among public sector employees. When a law is passed, public jobs are rapid to communicate, implement the changes and provide employees with benefits whereas the private sector has may take longer to be informed and comply with new regulations, specially in context with lax enforcement. Columns 6-8 include fathers who have obtained some primary, secondary, or tertiary education. The effect of PPL is only statistically significant for those

parents that have some level of secondary education. PPL has no effect on individuals with the lowest and highest levels of education.

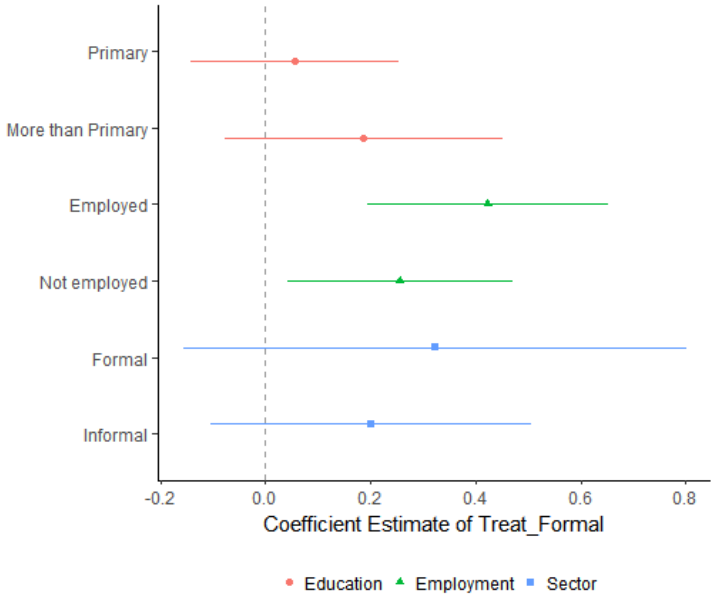
Columns 9 and 10 divide fathers according to their income into the lowest and highest half of the distribution. Only high income fathers present a positive and significant effect of the policy on their time childrearing. Overall, this table provides evidence that PPL causes higher paternal involvement among educated and high-income fathers, suggesting that PPL may increase existing inequalities in child-wellbeing. This result differs from studies in developed countries where the implementation of paid leave benefits low-income families the most (Bartel et al, 2018; Nepomnyaschy & Waldfogel ,2007). This could reflect differences in policy enforcement. It also could reflect larger stigma associated to paternity leave among low-educated workers in developing countries.

Table 4
Heterogeneity of PPL effect on time spend childrearing

	HW	Gender		Public		Education			Income	
	Yes	Boy	Girl	Yes	No	Primary	Secondary	Tertiary	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Formal	−0.136	−0.028	−0.088	0.414***	−0.074	−0.308**	−0.072	−0.150	−0.144	−0.239*
	(0.118)	(0.121)	(0.092)	(0.148)	(0.069)	(0.121)	(0.104)	(0.294)	(0.096)	(0.130)
After	−0.291**	−0.201*	−0.351***	−0.103	−0.210**	−0.102	−0.151	−0.088	−0.163*	−0.435***
	(0.121)	(0.113)	(0.108)	(0.084)	(0.088)	(0.093)	(0.127)	(0.366)	(0.087)	(0.138)
After_Formal	0.452***	0.286***	0.507***	0.534***	0.350***	0.061	0.238**	−0.009	0.117	0.537***
	(0.084)	(0.102)	(0.100)	(0.151)	(0.067)	(0.104)	(0.110)	(0.297)	(0.097)	(0.090)
Pre-t. Mean	3.027	2.093	2.001	2.161	2.025	1.533	1.931	2.591	1.906	2.130
Ind. Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	106,912	85,752	81,073	100,005	151,643	69,203	69,173	28,449	82,661	82,642
R^2	0.222	0.198	0.203	0.180	0.155	0.208	0.209	0.251	0.194	0.196
Adjusted R^2	0.158	0.116	0.117	0.106	0.106	0.105	0.117	0.131	0.107	0.126
Res. Std. Error	4.641	4.095	4.005	4.064	4.037	3.772	4.026	4.667	4.035	4.054

Notes: OLS estimates from difference-in-differences regressions based on Equation 1 where the dependent variable is the number of hours per week, that an individual spends taking care of children, and the sample varies according to father characteristics. Column 1 includes fathers that participate in housework, columns 2 and 3 include fathers whose youngest child is a boy or a girl respectively, columns 4 and 5 condition on whether the individual had a public job. Columns 6-8 include fathers who have obtained some primary, secondary, or tertiary education and columns 9 and 10 divide fathers according to their income into low and high brackets. Regressions include individual controls, time-city and sector-year fixed effects. Standard errors (in parentheses) allow for clustering at the city level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels.

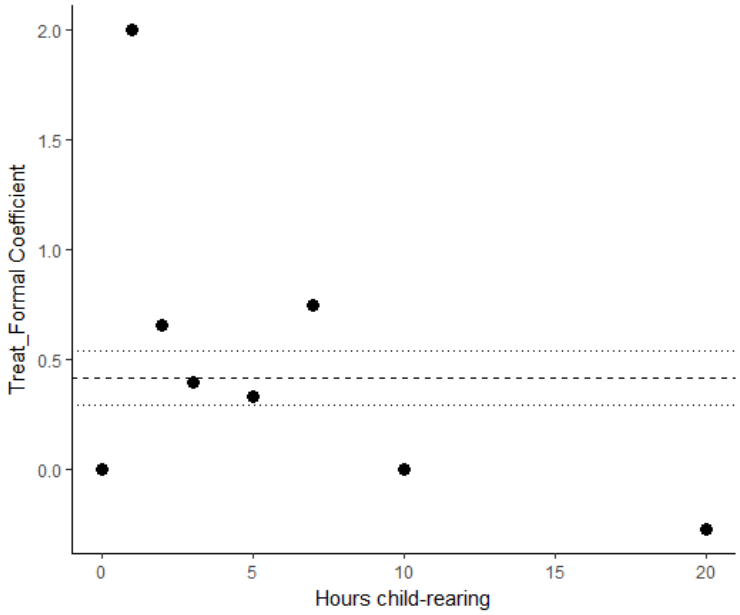
Figure 2
Heterogeneity of PPL effect on paternal involvement - mother characteristics



Several studies suggest that paternal involvement also depends on maternal characteristics such as education and employment. To address possible heterogeneous effects of exposure to PPL according to maternal characteristics I estimate equation 1 restricting the sample according to mothers' level of education, employment status, and sector. Figure 1 plots the DID estimate $Formal\_After$ for each regression. Education does not seem to be an important determinant for PPL, however whether the mother has a job does play an important role in PPL effect. Paternal involvement increases by 25 minutes per week as a result of PPL in households where the mother is employed, compared with 15 minutes in household with a non-working mother. Both effects are significantly different from zero but they are not statistically different from each other. For those fathers whose partner or wife is employed, whether the job is formal or informal does not seem to make a difference in the effect of PPL on paternal involvement.

One question that may arise is, where in the distribution of paternal involvement is the effect of PPL coming from? One possibility is that fathers who were already involved in the care of their children might increase their time by several hours from an already high pre-treatment mean. Another possible case is that the policy has a small but important

Figure 3
PPL effect on time childrearing - Quantile regression



effect on the majority of fathers and not only on those already involved. Especially those that did not participate in childrearing before the implementation of the policy. To shed light on this question figure 2 presents the effect of PPL as seen in equation 1) but using a quantile regression analysis.

Figure 2 suggests that the increase in paternal involvement is driven by fathers at the lower end of the distribution of time. The largest gain from PPL is seen among fathers who, pre-treatment, spend 1 hour per week childrearing. When treated, the time they spend with children increases by 2 hours per week, a 200 percent increase. Fathers that do not spend any time childrearing do not benefit from the policy and fathers in the top percentile of the distribution (that already spend more than 10 hours childrearing) experience a small decrease. The dotted line marks the average treatment effect presented in table 2.

6 Robustness

An important limitation of a DID analysis is that one must rely on an assumption that outcomes in treatment and control groups would have followed parallel trends in the absence of the policy reform. I perform a variety of robustness tests that lend credibility to the

identifying assumption.

This assumption would be violated if the PPL reform induced selection into the sample through impacts on fathers' employment status, sector, or fertility patterns. Moreover, since I can only observe fathers who reside with their children in the data, I face a threat to the identification assumption if the policy influences father–child cohabitation rates or if it is correlated with differential changes into or out of the formal sector. To evaluate the plausibility of these concerns, table 5 presents results from regressions that estimate the DID model (equation 1) using observable paternal characteristics as dependent variables (and omitting that specific variable in X_{it}).

The results in columns 1 and 2 of table 5 show that having a child after 2009 does not significantly affect the probability of being employed or the sector of employment, i.e. there is no selection into the formal sector. Given the short duration of the leave (10 to 15 days), these findings are not surprising. Columns 3 and 5 show that PPL has a significant negative effect on the number of children and the age of the father. This is consistent with the treatment group being younger than the control group as also shown in Table 1. The age of the father and the number of children in the home are positively correlated with time spent childrearing. Hence, if there is bias it will be biased toward zero.[7] Column 4 and 6 show that PPL has no effect on the age of the youngest child of the family, or marriage status. Overall, it is unlikely that differential demographic trends among treated fathers drive the results shown in section 5.

Table 5 provides some evidence that fathers main observable characteristics would have remained the same in the absence of PPL. However, even if this is true, I also need to assume that fathers do not sort themselves into treatment according to unobservable characteristics that affect paternal involvement and labor market outcomes, such as preferences for children, ability, or work ethic. Previous literature has addressed this concern by including individual fixed effects (Currie & Walker, 2011).

Table 6 shows that the findings are similar if we add individual fixed effects to equations (1) and (2). Individual fixed effects control for all observable and unobservable characteristics that do not change over time and that may affect the outcome of interest. The sample used

[7]The average age of the fathers in the treatment and control group is 33.8 and 36.6 years respectively.

Table 5
Correlation between PPL and paternal characteristics

	Dependent variable:					
	Employed	Formal	Children	Age Child	Age	Married
	(1)	(2)	(3)	(4)	(5)	(6)
After	0.007*	0.002	0.051*	−5.177***	0.341**	−0.004
	(0.003)	(0.005)	(0.027)	(0.037)	(0.152)	(0.006)
Formal			−0.023	−0.115***	−0.030	0.052***
			(0.020)	(0.043)	(0.247)	(0.007)
After_Formal			−0.204***	0.019	−0.602***	−0.009
			(0.021)	(0.036)	(0.152)	(0.007)
Pre-treatment Mean	0.908	0.513	1.777	4.844	35.967	0.564
Observations	186,076	166,831	166,831	166,831	166,831	166,831
R^2	0.209	0.320	0.303	0.506	0.261	0.328
Adjusted R^2	0.172	0.283	0.266	0.480	0.222	0.292
Residual Std. Error	0.277	0.423	0.952	2.688	9.781	0.420

Notes: Each column represents a different regression with a different dependent variable. The dependent variable in columns 1-6 are: Whether the father is employed at the time of the survey, whether he is employed in the formal sector, father's age, marriage status, number of children in the family, and age of the youngest child in the family. Column 1 includes all fathers in the sample, while columns 2-6 condition on employment at the time of the survey. All regressions include individual controls (except the dependent variable), and city-time and sector-year fixed effects. Standard errors (in parentheses) allow for clustering at the city level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels.

for these estimations includes men that I observe in the data more than once, and that at least in one of the observations had a child in their home. The identifying variation for this specification comes from changes over time in the number of children and exposure to PPL within fathers.

Columns 1 and 2 of table 6 show similar coefficients to the ones presented in tables 3 and 4. Column 1 shows an increase in time spent childrearing of 19 percent with respect to the pre-treatment mean. Column 2 shows an increase of the same magnitude as seen before with a loss in power given that fathers that receive PPL for their first child are younger than the rest of the fathers in the sample and thus I do not observe all of these fathers more than once. Hence, fewer treated fathers are included in this estimation than in the cross-sectional sample used for table 3. Columns 3, 4 and 5 show similar coefficients as table 2.

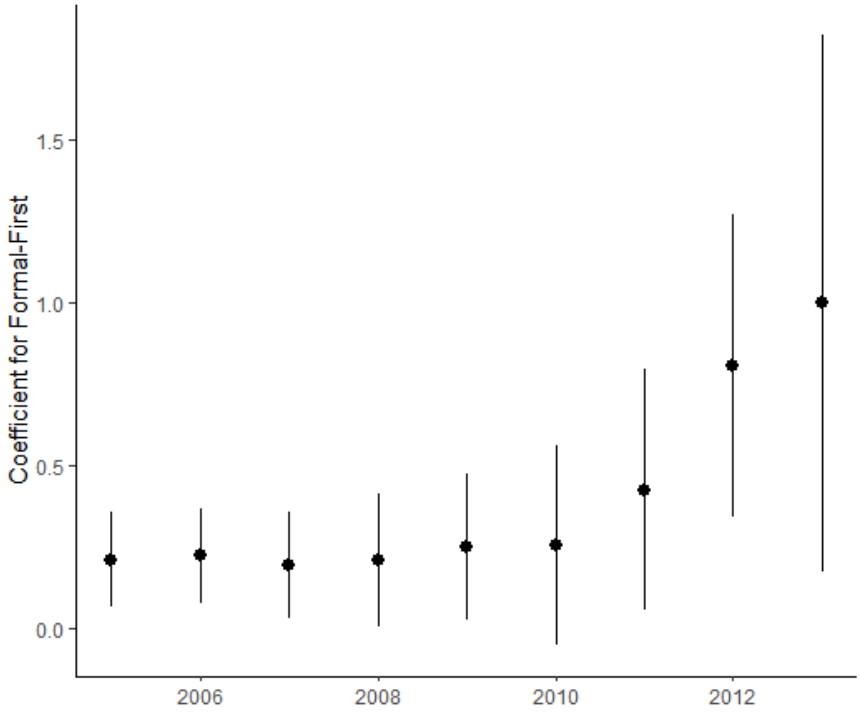
Table 6
Effect of PPL on fathers behavior - Individual FE

	Dependent variable:				
	Hours Childrearing		Participates in Housework	Total hours of housework	Hours worked
	(1)	(2)	(3)	(4)	(5)
Formal	−0.016	−0.016	−0.002	0.030	5.198***
	(0.122)	(0.122)	(0.014)	(0.334)	(0.528)
After	−0.136	−0.170	−0.007	−0.475	−0.516
	(0.136)	(0.129)	(0.015)	(0.316)	(0.460)
First	−0.079				
	(0.183)				
After_Formal	0.237*	0.334***	0.015	0.497*	0.391
	(0.133)	(0.120)	(0.013)	(0.281)	(0.417)
Formal_First	0.283				
	(0.202)				
Pre-treatment Mean	1.767	1.767	0.682	20.825	49.316
Observations	146,317	146,317	146,323	146,319	146,323
R^2	0.543	0.543	0.544	0.924	0.550
Adjusted R^2	0.262	0.262	0.263	0.878	0.273
Residual Std. Error	3.523	3.523	0.410	8.991	13.721

Notes: Regressions include individual controls, time-city, sector-year, and individual fixed effects. Standard errors (in parentheses) allow for clustering at the individual level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels.

To asses the evolution of the effect of PPL Figure 3 plots the coefficient estimate of *Formal_First* of equation (2) when I use the full sample period but I vary the time of the policy introduction from 2005 until 2012. This represents the additional effect of being exposed to PPL for the first-born child in the family. The plot indicates a break in the trend in 2009 with a sustained increase of the effect of the policy after that year. This increase in the effect can result from an increase in PPL take-up.

Figure 4
Evolution of PPL effect on paternal involvement



Throughout the paper I have used time spent childrearing as the main outcome of interest concerning paternal involvement. However, the ENEMDU data also include questions about other categories of housework. Table 7 presents the estimation of equation 1 when I use the remaining categories of housework as dependent variable. Exposure to PPL does not have a significant effect on the time that fathers spend shopping, fixing or washing clothes, or cooking. Column 2 and 6 shows an small but significant effect of PPL on time cleaning and educating. Importantly, exposure to PPL has a negative effect on the time that father spend helping children with school work. Even though this is a smaller decrease than the increase in time childrearing it could indicate some substitution away from older children to

time with younger children in the home.

Table 7
Effect of PPL on Fathers behavior - All housework categories

	Dependent variable:						
	Participates in housework	Hours Cleaning	Hours Shopping	Hours Clothing	Hours Cooking	Hours Educating	Total Hours
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Formal	-0.023^{***}	-0.079^{**}	-0.080^{**}	-0.086^{***}	-0.198^{***}	0.071^{*}	-0.565^{***}
	(0.008)	(0.037)	(0.035)	(0.028)	(0.049)	(0.042)	(0.169)
After	-0.003	-0.066^{**}	-0.012	-0.058^{***}	-0.060	0.129^{***}	-0.341^{**}
	(0.007)	(0.030)	(0.023)	(0.022)	(0.041)	(0.035)	(0.159)
After_Formal	0.014^{*}	0.070^{**}	0.001	0.049^{*}	0.091^{*}	-0.137^{***}	0.503^{***}
	(0.008)	(0.032)	(0.024)	(0.026)	(0.048)	(0.036)	(0.166)
Observations	166,831	166,827	166,826	166,827	166,827	166,826	166,827
R^2	0.168	0.143	0.185	0.122	0.110	0.140	0.835
Adjusted R^2	0.123	0.097	0.142	0.075	0.062	0.094	0.826
Residual Std. Error	0.449	2.180	1.613	1.543	3.051	2.263	10.180

Notes: Regressions include individual controls, time-city, and sector-year fixed effects. Standard errors (in parentheses) allow for clustering at the city level. $***$, $**$, and $*$ denote statistical significance at the 1, 5, and 10 percent levels.

7 Conclusions

Many developing countries have implemented paid paternity leave (PPL) with the goal of increasing paternal involvement in child-rearing and advancing gender equality. However, little is known about how this labor law affects intra-household dynamics and labor market outcomes in developing countries. I leverage the quasi-experiment provided by the implementation of PPL in Ecuador in 2009 to identify the effect that it has on paternal involvement and labor market outcomes. This is the first paper to study the effect of PPL in a developing country. I use data from the Ecuadorian National Employment Survey (2007-2013) to employ a generalized difference-in-differences design that compares fathers of children born after 2009, to fathers of children born before 2009, who are employed in the formal sector (treated), versus informal sector (not treated).

I estimate that fathers eligible for PPL increase time with their children by 24 minutes per week on average. This is an increase of 20 percent from an average of almost 2 hours per week before the implementation of PPL. The largest gain is seen among fathers who, pre-treatment, spend 1 hour per week child-rearing. When treated, the time spent with children increases by 2 hours per week. The increase in paternal involvement is driven by new fathers and public-sector employees, depends on the gender of the child, and is highly heterogeneous across education and income levels. This positive effect is higher for fathers of girls and is only present for educated and high-income fathers.

Overall, this study provides novel evidence that exposure to PPL causes higher paternal involvement among educated and high-income fathers, suggesting that while fostering girls advancement, PPL may increase existing inequalities in child-wellbeing. Further research is needed to establish which aspect of the policy implementation can be improved to benefit low-income families and their children.

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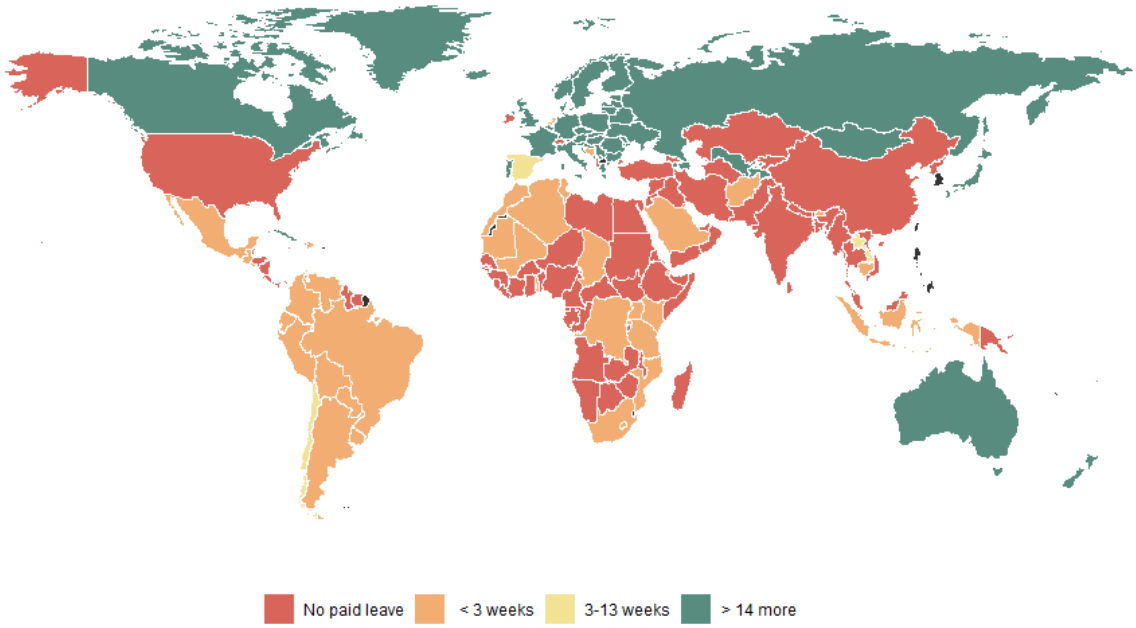
Appendix

Figure 5
Paternity leave regulations across countries



Note: Data from 2020 WORLD Policy Analysis Center