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The impact of paternity leave mandates on women's employment in the OECD countries

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Abstract

Women's Labour Force Participation Rates in the OECD countries are still much lower than men's. Literature attributes this persistent gap to the "motherhood penalty". Family leave policies tried to reduce this gap, but extended leaves seem to have backfired as they fueled a gender specialization between paid and unpaid work. Many countries introduced father-specific leave entitlements with the purpose of increasing their involvement in household labour and foster women employment. This paper studies the effect of paternity leave policies on female employment rates in 31 OECD countries. This analysis exploits the fact that each country introduced this policy in different years to estimate a difference-in-differences model. We find that paternity leave policies are associated with a 4.9% increase in female Labour Force Participation Rate. This result suggests that father-specific leave policies fulfilled the promise of fostering gender equality in the labour market.

Keywords: Paternity leave, Employment, Gender and labor markets

El impacto de políticas de licencia por paternidad en el empleo femenino

Resumen

La tasa de participación en la fuerza laboral de las mujeres aún es mucho menor a la de los hombres. La literatura suele atribuir la persistencia de esta brecha al llamado "castigo por maternidad". Los programas de licencia familiar intentaron revertir esta situación. Sin embargo, existe evidencia de que las licencias extendidas tienen el efecto contrario porque promueven la especialización de género en el mercado laboral versus el trabajo doméstico. Es por ello que muchos países introdujeron licencias para uso exclusivo de los padres con el propósito de aumentar su participación en las tareas domésticas y el cuidado de los hijos y así impulsar el empleo femenino. Este trabajo estudia el efecto de la introducción del beneficio de licencia por paternidad sobre la tasa de participación en la fuerza laboral de las mujeres para 31 países de la OECD. Este análisis explota la variabilidad temporal con la que cada país decidió introducir estas políticas para estimar un modelo de *difference-in-differences*. El resultado principal de este trabajo es que las políticas de licencia por paternidad se asocian a un aumento del 4.9% en la tasa de participación laboral de las mujeres. Este resultado sugiere que la introducción de la licencia por paternidad fue exitosa para promover la igualdad de género en el mercado laboral.

Palabras clave: Licencia por paternidad, Empleo, Igualdad de género

Códigos JEL: J16, J22, J32

1 Introduction

During the past decades, women have made significant progress in the labour market; there has been a convergence in human capital investment, employment opportunities, and wages relative to men. However, there is no evidence of fully closing gender gaps in neither of these outcomes (Olivetti & Petrongolo, 2016). In 2016, women's average employment rates for the OECD countries were still 13 percentage points lower than men's. Extensive literature has documented a persistent "motherhood penalty" that can explain the remaining gaps: even 15 years after childbirth, mothers earn lower wages, work fewer hours, are less likely to be employed and to hold management positions than fathers or childless women and men (Anderson, Binder & Krause, 2002; Angelov, Johansson & Lindahl, 2016; Hardoy, Schøne & Østbakken, 2017; Waldfogel, 1998).

Parental leave policies may help ameliorate some of the negative consequences of motherhood. These policies provide time off from work so that families can take care of their newborn or newly adopted children. In particular, by providing job-protected (sometimes paid) leave for new parents, these mandates may foster women's career continuity and improve future labour market prospects. Even though parental leave is typically available to both parents, most of the time-off is usually taken by mothers. As a result, lengthier leave entitlements might have the opposite effect because they can lead to sex specialization among heterosexual couples in household versus market labour (Becker, 1985; Hook, 2006, 2010). Then, parental leave policies can reduce female employment by two mechanisms. On the one hand, more women could decide to drop out of the labour market. On the other hand, employers may engage in statistical discrimination against women as they are more likely to take advantage of leave entitlements (Selmi, 2000).

In this context, men's participation in parental leave has attracted growing public attention, and several countries have included policies that earmark part of the leave for the exclusive use of fathers, usually referred to as paternity leave. Between 1994 and 2015, the number of countries with paternity leave provisions rose from 40 to 94 (ILO, 2017). Paternity leave mandates were enacted to foster gender equality. The hypothesis is that if mothers and fathers share a similar initial parenting experience, this can have a persistent effect on female employment by reducing gender specialization in paid and unpaid care work. In this case, women will be allowed to spend less time outside the labour force, and the rationale behind statistical discrimination against them will be eroded.

Nevertheless, evidence on the existence of these effects is inconclusive. While some studies found that fathers who were eligible for paternity leave showed greater involvement in household and childcare tasks (Bünning, 2015; Kotsadam & Finseraas, 2011; Rege & Solli, 2013), others could not find a statistically significant effect on the distribution of unpaid work (Ekberg, Eriksson & Friebel, 2013; Ugreninov, 2013). Regarding labour market outcomes, paternity leave

policies have been found to improve eligible mothers' earnings in Sweeden (Johansson, 2010) and Denmark (Andersen, 2018); they raised both earnings and hours spent on market jobs in Quebec, Canada (Patnaik, 2019); and raised employment rates in Spain (Farré & Gonzalez, 2018). However, Norwegian's "daddy's month" was found to have an adverse effect on mothers' labour market outcomes (Cools, Fiva & Kirkebøen, 2015). All results previously described are the effect of country-specific policies on families eligible to take paternity leave.

In this paper, we study the effect of paternity leave mandates on women's Labour Force Participation Rates (LFPR) in the OECD countries. To the best of our knowledge, this would be the first study to estimate this effect on a cross-country level. Other papers have taken a similar approach but for non-father specific leave policies (Blau & Kahn, 2013; Ruhm, 1998). This approach has the advantage of considering the general country-level effect of introducing these policies instead of the local effect on treated families. A country-level study can be especially relevant to capture the statistical discrimination effects that can potentially affect all women regardless of their fertility choices.

We have panel data for 31 OECD countries between 1991 and 2016. During this period, 19 out of 31 countries introduced paternity leave mandates that earmarked time-off from work for fathers' exclusive use and offered high wage replacement. Our analysis takes advantage of this variation in time and space to identify the causal effect of paternity leave policies on female employment using a difference-in-differences model.

This paper's main finding is that the introduction of paternity leave mandates is associated with a statistically significant increase in female Labour Force Participation Rates of about 2.2 percentage points, which represents a 4.9% raise. This finding's direction does not change with the addition of demographic controls or a change of database. We also find that most of this effect is driven by women aged 25 to 54 years who are directly affected by the policy.

The rest of the paper proceeds as follows: Section 2 reviews the literature and expands on the relationship between leave policies, and female employment, Section 3 describes the data and Section 4 presents the specification strategy. Finally, Section 5 concludes.

2 Previous Studies

2.1 Parental Leave

Parental leave policies provide time off from work so that families can take care of their newborn or newly adopted children. This entitlement usually follows maternity or pregnancy leave and can be taken by mothers, fathers, or both. New parents face competing job and family responsibilities, and these policies aim to address this double burden to improve family well-being and promote career continuity.

Even where parental leave is equally available to both parents, in heterosexual couples, most of the leave is taken almost exclusively by women. This reality can be explained by cultural norms, differences in earnings capacity, and the fact that the entitlements are usually restricted to mothers during the period immediately surrounding childbirth (Ruhm, 1998).

This difference in leave-taking implies that parental leave policies can have an ambiguous theoretical impact on women's employment (Klerman & Leibowitz, 1994). On the one hand, in most cases, the mother must be previously employed to qualify for leave entitlements. Besides, the possibility of taking job-protected leave may encourage job continuity immediately after the birth of a child. These effects suggest that parental leave policies would increase women's employment rates. On the other hand, these mandates may motivate women to take longer leave periods than they otherwise would while men suffer almost no interruption in their careers. Under these circumstances, women become available for household and childcare work, especially for time-inflexible tasks such as cooking, in a critical period of change in the division of household labour (Hook, 2010), thus reinforcing women's role as a caregiver (Hook, 2006). This difference in parenthood's initial experience can create a path dependence as the parent who carries out a higher share of housework at the beginning can develop a comparative advantage in these tasks in the long run (Becker, 1985). Following Becker (1985), "increasing returns from investments in specific human capital encourage a division of labor that reinforces differences in market and household productivity of men and women due to other forces" (pp. 35-36). Therefore, parental leave policies can *gender* the effect of children on household and market labour and increase the adherence to traditional gender ideologies (Hook, 2006).

According to these arguments, parental leave policies can reduce women's LFPR by two mechanisms. On the supply side, women who would have otherwise remained in the labour force decide to drop out. This effect is more common within highly educated women and can be driven by a desire to spend more time with her family. On the demand side, employers may engage in statistical discrimination against women, which means that "employers often will treat women differently from men because, on average, women are more likely to leave the workforce to have and to raise children, and these potential exits can be costly for employers" (Selmi, 2000, p. 744). This behaviour can potentially affect all women regardless of their fertility choices.

Empirical evidence suggests that the sign of the effect of these policies depends on the length of the paid leave. Following Rossin-Slater (2017), "leave entitlements less than one year in length can improve job continuity for women and increase their employment rates several years after childbirth. However, longer leaves can have negative effects on women's earnings, employment, and career advancement" (p. 4).

Most of the studies of short-duration leaves focus on the Family and Medical Leave Act (FMLA) that was passed in 1993 in the United States and still applies to these days. The

FMLA guarantees 12 weeks of unpaid leave for eligible mothers. While there is evidence that the legislation increased the probability that eligible mothers return to their pre-childbirth jobs (Baum, 2003), other studies could not find significant effects on women's employment or wages in the following years (Han, Ruhm & Waldfogel, 2009; Waldfogel, 1999). More recently, California and New Jersey passed laws to provide partial wage replacement and up to 6 weeks of leave.[1] Byker (2016) found a positive causal effect of these two policies in labour-force attachment in the months surrounding a birth, especially for less-educated women. There is also evidence that the California Program increased the number of weekly work hours and wages of mothers of little children (Rossin-Slater, Ruhm & Waldfogel, 2013).

European countries typically offer more extended parental leave entitlements. A study from Austria shows that a leave extension from one to two years reduced mothers' earnings and return to work in the short-term but had no long-term impacts (Lalive & Zweimüller, 2009). Similarly, a study from Germany finds that several expansions in maternity leave entitlements induced women to delay their return to work and had an adverse impact on their wages even eight years later (Schönberg & Ludsteck, 2007). In Norway, a study does not find a significant impact on either women's short and long-term wages or employment rates (Dahl, Løken, Mogstad & Salvanes, 2016).

Given the international variation in family policies, some papers proposed a country-level approach. This approach aims to capture the impacts of policies on labour market outcomes based on between and within-country variation in the intervention time. In a prominent early study, Ruhm (1998) uses a panel of nine European countries during 1969-1993. The analysis finds that the introduction of paid leave legislation leads to a 3 to 4 percent rise in female employment rates. However, lengthier leaves show a negligible additional impact on employment but are associated with a substantial reduction in relative wages. Olivetti & Petrongolo (2017) rely on a similar approach and use a panel of 30 OECD countries up to 2010. Their findings also suggest that moderate leave mandates are associated with higher female employment (mostly concentrated in less educated women), while longer entitlements may be detrimental.

Blau & Kahn (2013) study the existence of work-family policies (including parental leave) as a possible explanation of the lower LFPR of the United States relative to other 16 OECD countries. They estimate a model with country and year fixed effects for the 1990-2010 period and find that family policies have a joint positive effect on women LFPR while parental leave alone has a positive though no significant effect. However, they suggest that more generous leave policies may be the reason behind a reduced women's representation in high-level jobs in OECD countries outside the United States. They argue that "there may be a trade-off between some policies that make it easier for women to combine work and family and women's advancement

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[1] California's Paid Family Leave went into effect in July 2004 while the New Jersey Family Leave Insurance took effect in 2009.

at work" (Blau & Kahn, 2013, p. 255).

Overall, cross-country evidence reports a negative association between more extended parental leave entitlements and female employment. This paper complements existing cross-country evidence by studying a specific family policy: the right to paid paternity leave, which is thought to ease these adverse effects.

2.2 Paternity Leave

With the previously described concerns in mind, some countries introduced paternity leave entitlements because of a generalized belief that parental leave systems should support families and also foster gender equality in the labour market. Paternity leave refers to the portion of parental leave that can be used exclusively by fathers, cannot be transferred to the mother, and typically offers high wage replacement.

The paternity leave hypothesis is that when mothers and fathers share a similar initial parenting experience, it can have a persistent effect in reducing gender specialization. When fathers stay at home with their newborn or newly adopted child, they get the space needed to develop the skills and sense of responsibility of household and childcare labour. Following Rehel (2014), this allows fathers to develop a co-parent rather than a helper attitude. As a result, women are able to spend less time outside formal work, which leads to less loss of this specific human capital and can foster their careers. Therefore, if paternity leave leads couples to achieve a more balanced distribution of time and effort between paid and unpaid work, this can break the specialization described by Becker (1985) and have a persistent positive effect on women labour market outcomes.

Father-specific leave entitlements can improve female employment by tackling both supply and demand-side mechanisms. On the supply side, women can spend less time off from work and develop less housework specialization, which reduces their incentives to drop out of the labour force. On the demand side, if women are no longer socially perceived as the main responsible for childcare and household labour, there will no longer be grounds for statistical discrimination against them.

Several causal studies leverage the introduction of country-specific paternity leave policies to measure its impact on various outcomes. Most of them use a variation of a regression discontinuity design to identify the policy's impact on families that were just entitled to paternity leave compared to families that were just not eligible. Their key identifying assumption is that families could not change the birth date to alter their eligibility.

Several studies focused on the effect of paternity leave mandates on household and childcare labour distribution, which is argued to affect female employment. Kotsadam & Finseraas (2011) examine the introduction of the "daddy-quota" in Norway and find that treated fathers are 50 percent more likely to share equally the task of doing laundry in the long run. In a study

of the same policy, Rege & Solli (2013) find a long-term causal decrease in fathers' earnings, which they interpret as a result of a reduction of working hours and greater involvement in childcare. In addition, Bünning (2015) studies Germany policy using a fixed-effects regression and find that fathers increased their involvement in childcare even after short leaves but only the ones that took longer leaves, or took it while their partner was at work, showed an increase in housework participation.

Conversely, there is extensive evidence that shows no effect on the distribution of unpaid work. Ugreninov (2013) cannot find a significant effect of Norwegian's "daddy-quota" on mothers' sick leave absence, which they consider an indicator of mothers' burnout due to a combination of employment and family obligations. On the same line, Ekberg et al. (2013) study the Swedish "daddy-month"; although they find strong causal effects on fathers' leave uptake, this did not alter the long-run household division of labour as measured by the share of leave taken for care of sick children. Avdic & Karimi (2018) argue that these results may be due to "strong social norms regarding typical male and female behavior" that may have led to role conflicts and can explain their results that the Swedish policy increased the probability of separation. On the contrary, Olafsson & Steingrimsdottir (2015) study a similar reform in Iceland and find that parents eligible for paternity leave have a lower probability of having a divorce during the first ten years of their child's life. These ambiguous effects on intra-household division of labour and conflict reflect that even in the countries with the most generous paternity leave policies, it is still hard to break traditional gender roles in household and market labour.

Few articles directly analyze the impact of paid paternity leave on female labour outcomes. Johansson (2010) study the Swedish policy using a difference-in-differences approach on an intra-couple level and find that longer leave-taking by fathers is associated with higher mothers' earnings. A similar result was reported by Patnaik (2019) for Quebec's policy: exposed mothers show an increase in earnings and hours spent on market jobs whereas exposed fathers spend less time in paid work outside the household. She concludes that "increased paternity leave had a large and persistent impact on gender dynamics within households, moving them towards a dual-earner dual-caregiver model wherein fathers contribute more to home production and mothers contribute more to market production" (Patnaik, 2019, p. 4). In this same line, Farré & Gonzalez (2018) examine the introduction of paternity leave mandates in Spain using a regression discontinuity design. They report a negative effect on subsequent fertility that they argue happened due to two channels: higher employment rates among mothers and higher involvement in childcare among fathers, leading to them having lower desired fertility. On a novel approach, Andersen (2018) work for Denmark's policy focus on studying paternity leave relative to mothers' leave and finds that fathers' leave reduces the within household gender gap through increasing mothers' wages. Finally, Amin, Islam & Sakhonchik (2016) looked at paternity leave policies in developing countries using a cross-section of firm-level data and suggest that the

proportion of women for a typical firm is higher in countries that mandate paternity leave. Despite this evidence, Cools, Fiva & Kirkebøen (2015) use a regression discontinuity difference-in-differences approach and find an adverse effect of Norwegian's "daddy's month" on mother's labour market outcomes.

To the best of our knowledge, there are no studies that evaluate the impact of paternity leave mandates on female employment on a cross-country level. The purpose of this paper is to study if these country and individual-specific effects remain present when looking at the aggregated level. Although the identification of the causal impact can be more complicated at such an aggregated level, this approach has the advantage of considering the general country-level effect of the policies rather than the impact on the eligible individuals, which is less likely to capture effects such as the mitigation of statistical discrimination against women regardless of their family choices.

3   Data

The data is a panel of yearly observations of 31 OECD countries over the period 1991-2016. The dependent variable in our analysis is the female Labour Force Participation Rate (LFPR), defined as the proportion of a country's working-age population that is employed.[2] This variable was retrieved from the DataBank World Development Indicators (World Bank, 2020) to be used to estimate the main results. The summary of female LFPR by country is presented in Table 1. We also used a second database obtained from OECD (2020a) to extend our analysis to LFPR for different age groups.

Table 2 reports average female LFPR before and after the implementation of paternity leave mandates. In most countries where this policy was implemented, the average female LFPR increased. This means that, on average, a higher proportion of working-age women were employed in the period after the introduction of the policy. These statistics suggest that it could be of interest to study the effect of paternity leave policies on female LFPR.

The information on the introduction of paternity leave mandates was obtained from OECD (2020b). Although these policies' implementation details may differ across countries, this database provides a standardized definition that we will be following in this work. The reported variable is the *length of paid father-specific leave* and refers to "the number of paid weeks reserved for the exclusive use of fathers, including entitlements to paid paternity leave, 'father quotas' or periods of paid parental leave that can be used only by the father and cannot be transferred to the mother, and any weeks of paid shareable leave that must be taken by the father in order for the family to qualify for 'bonus' weeks of parental leave" (OECD, 2020b). Therefore, when we refer to paternity leave policies, we will be referring to those policies that offer paid and

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[2]The working-age population refers to people aged 15 or older.

Table 1: Female Labour Force Participation Rates on the OECD countries

	Average	Std. Dev.	Min	Max
Australia	52.40	3.29	46.58	56.03
Austria	48.04	2.88	42.24	51.96
Belgium	39.89	3.52	33.90	44.29
Canada	55.29	2.63	50.97	58.51
Chile	37.67	5.26	31.71	46.72
Czech Republic	47.44	1.77	45.07	51.07
Denmark	55.75	1.71	52.70	58.77
Finland	50.39	2.42	45.91	54.82
France	43.83	2.33	40.46	46.77
Germany	46.64	3.26	42.90	52.66
Greece	33.58	2.53	29.68	37.87
Hungary	39.70	2.32	35.63	45.51
Iceland	68.12	2.03	65.13	71.80
Ireland	45.97	6.79	32.53	54.08
Italy	32.09	2.70	28.16	35.18
Japan	47.50	1.18	46.10	49.65
Korea, Rep.	47.90	1.46	44.59	50.37
Luxembourg	41.66	5.10	33.74	49.62
Mexico	38.43	3.04	32.67	42.30
Netherlands	50.35	5.07	39.48	55.30
New Zealand	54.98	3.63	48.20	60.42
Norway	57.86	2.93	52.01	61.75
Poland	42.60	2.41	38.10	46.67
Portugal	48.34	2.11	45.25	51.13
Slovak Republic	44.77	2.70	42.21	53.56
Spain	34.90	6.76	24.82	43.38
Sweden	55.35	1.53	53.01	60.63
Switzerland	56.73	1.75	53.58	59.75
Turkey	25.47	3.01	20.70	31.52
United Kingdom	51.02	1.90	47.84	54.28
United States	54.28	1.50	52.11	56.60
All	**46.74**	**9.38**	**20.70**	**71.80**

non-transferable leave to the fathers. In this paper, the treatment variable is a dummy that takes the value of 1 if the country's *length of paid father-specific leave* is equal or longer than a week, and zero otherwise. Table 3 describes the introduction of paternity leave mandates between 1991 and 2016. Over the analyzed period, 19 of 31 OECD countries in this study have passed such policies in different moments, and 3 of them already had them. This variation in time and space is used to identify the effect on female employment.

Finally, control variables include GDP per capita in current USD, birth rates (per 1000 people), female unemployment rate, and the proportion of the female working-age population employed in service or agricultural jobs (manufacturing is the excluded reference category). These were also retrieved from World Bank (2020).

Table 2: Before and After Comparisons of Female LFPR

Countries with paternity leave	Pre-Treatment period	Post-Treatment period
Australia	51.83	55.54
Austria	44.56	49.09
Belgium	35.21	41.61
Chile	33.72	43.04
France	41.31	45.67
Germany	44.35	50.31
Hungary	38.74	40.41
Iceland	66.06	68.89
Japan	47.55	47.38
Korea, Rep.	47.35	48.92
Luxembourg	35.58	44.36
Mexico	37.57	42.02
Netherlands	48.52	54.48
Norway	52.13	58.34
Poland	42.06	44.04
Portugal	46.93	49.09
Spain	31.10	40.97
Turkey	25.37	28.06
United Kingdom	49.39	52.42
All	**44.39**	**50.48**

4 Paternity leave mandates and female employment

4.1 Empirical Strategy

The purpose of this study is to identify the average effect of paternity leave policies on the proportion of women employed in the countries that implemented such policies (i.e., the average treatment effect on the treated). The empirical strategy consists of comparing the female LFPR of countries that introduced paternity leave to countries that did not. In the absence of an experimental design, a major concern is that the countries that offer father-specific leave could be different from the countries that do not offer it and that these differences may be correlated with female employment. It could be the case that in some countries, women's employment is already high due to a cultural mandate to be more career-oriented, and therefore they are in a better position to demand policies with the potential of equalizing labour market conditions. In this case, the correlation between paternity leave entitlements and unobservable factors that influence female employment may lead to biased estimates. In principle, most variables that may confound identification vary across countries but are fixed over time (at least during the period under study). In order to control for time-invariant unobserved heterogeneity, we use panel data and estimate a difference-in-differences model. This model compares the evolution of outcomes in treated countries before and after the intervention to the evolution in control

	Year
Australia	2013
Austria	1997
Belgium	1998
Chile	2006
Denmark	Before 1991
Finland	Before 1991
France	2002
Germany	2007
Hungary	2002
Iceland	1998
Japan	2010
Korea, Rep.	2008
Luxembourg	1999
Mexico	2012
Netherlands	2009
Norway	1993
Poland	2010
Portugal	2000
Spain	2007
Sweden	Before 1991
Turkey	2016
United Kingdom	2003

Note: These are the countries with paternity leave mandates that fulfill the criteria described above.

group outcomes. The change in the non-treated countries provides an estimate of the true counterfactual, that is, what would have happened to the treatment group if there had been no intervention.

The difference-in-differences estimator includes year fixed effects that control for any common shocks for all countries and country fixed effects that control for time-invariant characteristics. Formally, the model can be represented by the following equation:

$$FemaleEmployment_{it} = \alpha PaternityLeave_{it} + \beta X_{it} + \lambda_i + \mu_t + \epsilon_{it} \qquad (1)$$

where $FemaleEmployment_{it}$ is the female Labour Force Participation Rate in country i in year t; $PaternityLeave_{it}$ is a dummy variable that takes the value of one if the country i provides paternity leave entitlements in year t and zero otherwise; X_{it} is a vector of control variables that vary both across countries and time; λ_i is a fixed effect unique to country i and μ_t is a fixed effect common to all countries in period t.

The vector X_{it} includes different sets of control variables that are likely to capture a portion of the impact of the country's time-varying factors that influence female employment. The first set includes birth rates, female unemployment, and the fraction of female employment in ser-

vices and agriculture jobs. These are the same variables included by Ruhm (1998) in his seminal paper on parental leave. Nevertheless, some of these controls can be considered bad controls according to Angrist & Pischke (2008) as they could themselves be outcome variables. To begin with, Ruhm (1998) acknowledges that the birth rate could be endogenous. Moreover, the literature finds that leave mandates can influence women's fertility choices (Farré & Gonzalez (2018), for example). Second, female unemployment can be influenced by paternity leave mandates. Employers' statistical discrimination against women may lead to higher unemployment; consequently, if paternity leave mandates successfully reduce statistical discrimination, this can also lead to lower female unemployment. Third, the sector distribution of female employment within agriculture and services could also be affected by paternity leave policies, although it would be more unlikely. These are a result of countries' economic structure and cultural factors, and changing this distribution would imply the migration from the country to the city (or vice versa) and the specialization in radically different activities. While the distribution varies over the period under study, it would be unlikely that paternity leave policies could influence such structural country characteristics in the short or medium-term.

Our proposed controls aim at capturing some of this time and space variability without the need for such strong assumptions to justify that the policy does not impact them. For this purpose, we include GDP per capita as a control variable, which acts as a proxy for macroeconomic conditions and the country's wealth. These can influence both women's LFPR and the introduction of father-specific leave. However, such an aggregated variable is very unlikely to be significantly impacted by a specific policy such as paternity leave, at least during the short period under study. GDP may be positively correlated with the implementation of paternity leave policies because wealthier countries tend to have better institutions, and hence they are able to pass more progressive policies and finance leave entitlements. Besides, these policies are likely to be introduced in years with good macroeconomic conditions, when the government can guarantee their funding. Furthermore, GDP can be related to female employment. During a recession, GDP decreases and there can be massive dismissals, which are reflected in lower female LFPR; the opposite is also true during periods of economic growth.

We propose two new specifications: one with GDP per capita as the only control and another one that also includes the fractions of female employment in services and agriculture jobs as in Ruhm (1998). These two variables account for changes in the sector composition of employment and can be correlated to female LFPR.[3] Following Olivetti & Petrongolo (2016), "the expansion of the service sector may create jobs whose characteristics better match female preferences and household roles, and at the same time may increase the relative demand for female work as long as women have a comparative advantage in the production of services" (pp. 2-3). In

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[3]The omitted category is the fraction of female employment in industry jobs. Results remained unchanged regardless of the combination of these variables included in the models.

addition, women in different sectors might have different preferences for leave policies; thus, changes in the sector composition of employment might affect the likelihood of passing paternity leave policies. Despite our previous arguments on why these variables are good controls, this assumption should still be taken cautiously.

In summary, we include three sets of controls: first, the ones included by Ruhm (1998); second, GDP per capita only; third, we include GDP and we add the fractions of female employment in services and agriculture jobs.

The error ϵ_{it} is a country time-varying error which is assumed to be independent across time and space. However, as this study uses panel data, the errors could be correlated across years in the same country. Therefore, standard errors are clustered at the country level to avoid potential biases in their estimation. This methodology allows for an arbitrary covariance structure within countries over time. As we have a small number of clusters, the cluster-robust estimator produces estimates of standard errors that are biased downwards and can lead to over-rejection of the null hypothesis. Following Cameron & Miller (2015), we calculate standard errors using a bootstrap cluster-robust estimator that has been shown to perform well with less than 50 clusters. We also report non-clustered robust standard errors.

In this model, α is the difference-in-differences estimate of the (average) effect of paternity leave policies on female LFPR. The key identifying assumption of this model is that the evolution in female employment in non-treated countries is an unbiased estimate of the counterfactual. This assumption cannot be tested directly, but it is possible to test whether the time trends in the control and treatment countries were the same in the pre-intervention years. To do this pre-treatment trend test we followed de Chaisemartin y D'Haultfoeuille (2019a) and de Chaisemartin, D'Haultfoeuille y Guyonvarch (2019b); the estimation results can be seen in Figure 1. We cannot statistically reject the null hypothesis that the pre-intervention outcome is the same for the eventually treated and the control countries in 14 out of 15 years, which gives validity to the difference-in-differences approach.

4.2   Main Results

We present equation (1) estimation results in Table 4. Column 1 shows the results for a model that includes only the paternity leave dummy, country fixed effects, and year dummies. We find that the introduction of paternity leave mandates is associated with a statistically significant increase in female LFPR of about 2.2 percentage points, which amounts to a 4.9% increase of the baseline rate. This result could be anticipated by the difference in treated and non-treated groups after the treatment shown in Figure 1.

One concern is that there might be country characteristics that vary across time and space and are correlated with both female employment and the implementation of paternity leave policies. Therefore, we directly control for observed time-varying variables in columns 2 to 4 of
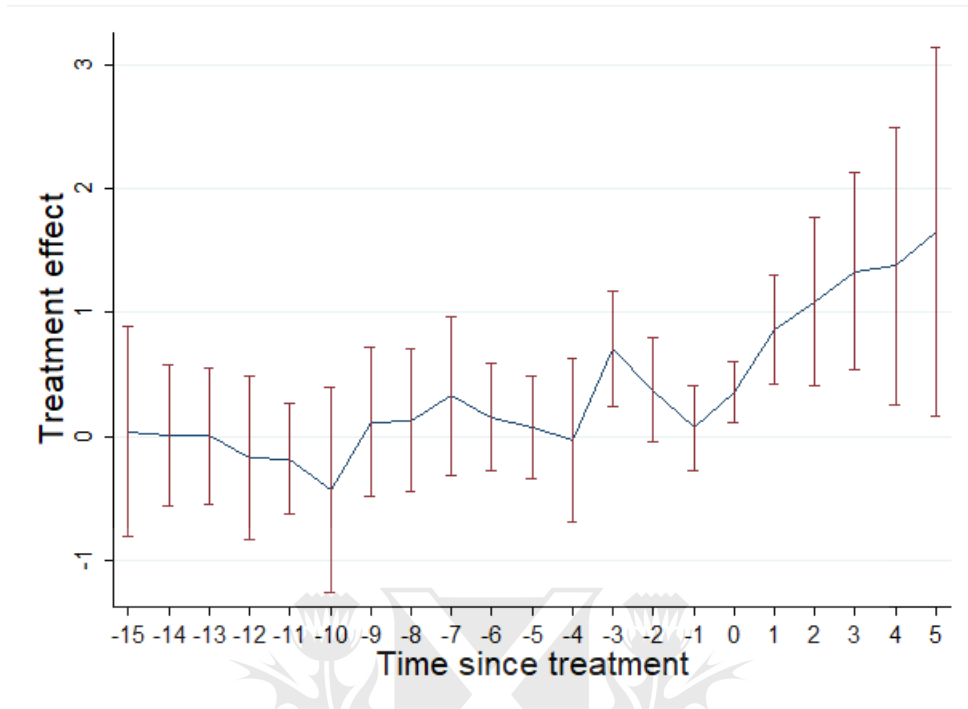
FIGURE 1: PRE-TREATMENT TRENDS TEST

Table 4. As anticipated in the previous section, we include different sets of controls. The second column reports the results for the model that includes the same covariates as Ruhm (1998). The coefficient is slightly lower but very similar to the one without controls. However, we have argued that some of these are bad controls that might be capturing part of the policy's effect (Angrist & Pischke, 2008). Therefore, in column 3, we estimated a model with GDP per capita as the only control. It could be that countries that introduced paternity leave policies were also experiencing idiosyncratic macroeconomic changes that might confound the effect. Again, the estimated impact of the policy remains very similar to the one reported in column 1 and is also statistically significant. Among the specifications that include control variables, this is our preferred one. Finally, column 4 includes GDP and the fraction of female employment in services and agriculture jobs. Again, little change in the policy's effect is observed. It is worth noting that the population is not included as a control variable since all variables are expressed as a proportion of the population(total or female) or a per capita level.

Overall, these results suggest that the introduction of paid paternity leave mandates is associated with a significant increase in female Labour Force Participation Rates of about 4.9% regardless of the choice of controls. These results are in line with Blau & Kahn (2013) that find that other family policies have a jointly positive effect on female LFPR for 16 OECD countries.

Table 4: Impact of paternity leave mandates on Female LFPR

	Main Results				Other Results		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Total	Total	Total	Total	Total	Age 25-54	Age 55-64
Paternity Leave (=1)	2.198	1.865	2.513	2.354	1.981	2.938	1.869
	(.809)**	(.762)**	(.766)***	(.748)***	(.720)**	(1.064)**	(1.914)
	[.849]***	[.796]**	[.798]***	[.758]***	[.722]***	[1.004]***	[1.940]
GDP per capita			.00013	.00008	.00013	.00010	.00017
			(.00004)***	(.00004)*	(.00004)***	(.00006)	(.00008)*
			[.00004]***	[.00005]	[.00004]***	[.00006]*	[.00009]
Female services employment		-.387		-.415			
		(.189)**		(.217)*			
		[.227]*		[.243]*			
Female agricultural employment		-.143		-.146			
		(.131)		(.157)			
		[.286]		[.274]			
Birth rate		.102					
		(.342)					
		[.346]					
Female unemployment		-.491					
		(.0943)***					
		[.102]***					
First year average	44.54	44.54	44.54	44.54	45.59	62.09	32.44
R^2	.389	.623	.464	.508	.537	.606	.675
Observations	806	806	806	806	675	675	675
Number of countries	31	31	31	31	27	27	27
Number of years	26	26	26	26	25	25	25

Note: models include year and country fixed effects. Robust standard errors are in parenthesis. Cluster-robust bootstrapped standard errors are in brackets (200 repetitions). The first-year average corresponds to 1991 for columns 1-4 and 1992 for columns 5-7.

* Significant at the 10 percent level.

** Significant at the 5 percent level.

*** Significant at the 1 percent level.

4.3   Other Results

Family leave policies are expected to have a more substantial effect on younger women that are close to childbearing age, as they will be the ones immediately affected by the mandates (Ruhm, 1998). To explore these different effects by age, we leverage a second database retrieved from OECD (2020b). Estimation results of equation (1) using this new database are reported in columns 5 to 7 of Table 4.[4]

Column 5 shows the results for total female LFPR using this second database. This dependent variable is comparable to the one used in the main results. The estimated impact is statistically significant and positive and accounts for a 4.34% increase of the baseline level. This estimation shows that our main results are robust to a change of database.

We then study if there is a differential effect of paternity leave mandates on women employment according to their ages. In this database, women closer to childbearing age are represented by ages 25 and 54, while women that have passed childbearing age are included in the ages 55 to 64. The estimated effect of paternity leave mandates on younger women's employment is statistically significant and positive. It represents an increase of 2.9 percentage points, which is 50% higher than the estimated effect for total women and accounts for a 4.73% raise of the baseline level. On the contrary, the estimated effect for older women is not statistically significant. We see that the effect found on total women employment is mostly driven by the impact on younger women, which are the most likely to leverage paternity leave mandates immediately after these are implemented.

It is worth noting that paternity leave mandates are expected to influence employment possibilities for women of all ages in the long run. If younger women can remain at work after childbirth and statistical discrimination is mitigated, then there will be a higher female employment rate once these women grow old. Nevertheless, we did not expect to find these long-run effects in our database because we would have needed a more extended period since the policies were implemented.

5   Discussion

Despite the great convergence seen in recent decades, there is still a persistent gender gap in employment rates and salaries in almost every OECD country. Family leave policies were supposed to improve women's labour market prospects, but more generous leaves ended up promoting a sex specialization between paid and unpaid work. This specialization can reduce

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[4]We ran pre-treatment tests for each of these specifications using the same methodology described in subsection 4.1. In any of the models were we able to reject the null hypothesis that the pre-intervention outcome is the same for the eventually treated and the control countries. In addition, we estimated all the models with the same sets of controls used for the main results, and both the coefficients and the significance showed little variation.

women's employment as it may influence them to drop out of the labour force, and employers may engage in statistical discrimination against them.

In this context, many countries introduced paternity leave mandates to foster gender equality in the household and labour market. The hypothesis is that when fathers stay at home too, neither of the parents will specialize in household nor market work. This allows women to spend less time outside the labour force and erodes the rationale behind employers' statistical discrimination.

This paper shows that the introduction of paternity leave policies in the OECD countries has indeed improved women's employment. We found that countries that implemented father-specific leave policies experienced, on average, a 4.9% increase in women's labour force participation rates. This effect is robust to the inclusion of different sets of control variables and a change of database.

Previous literature has studied the causal effect of paternity leave mandates on eligible families in specific countries and found contradictory evidence. While proving causality is more straightforward in these studies, such micro-level analyses are less likely to capture the effect on statistical discrimination that potentially affects all women regarding their family choices (Patnaik, 2019; Rehel, 2014; Selmi, 2000). Our results suggest that paternity leave policies in the OECD countries were able to break the grounds of the "motherhood penalty" and left them in a better position to achieve more equality in the labour market.

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