LABOUR MARKET CONSEQUENCES OF PARENTAL LEAVE POLICIES IN OECD COUNTRIES

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Abstract: This paper sheds light on the consequences that entitlements to extended paid leave after the birth of children have had on labour market outcomes and gender differences in outcomes over recent decades. We first point out the variety of leave policies that have proliferated in OECD countries from the mid-1990s especially with the adoption of leave entitlements for both parents to supplement basic maternity leave rights. These entitlements are granted for various periods of time and paid at rates reflecting the various reasons for prolonging or shortening periods of leave to care for children to meet objectives of child well-being, labour market outcomes, gender equity or budget constraints. Leave periods are usually specified because parental care is seen as positive for children, and is a cheap solution for a government to provide care instead of formal services, but there are concerns about the consequences of prolonged periods of leave on labour market outcomes and gender equity. These concerns are addressed here by looking at the long-run consequences that the extension of paid leave has had on female, male, and gender differences in employment rates, average working hours, and earnings in 30 OECD countries from 1970 to 2010. We find no evidence for a detrimental influence of an extension of paid leave on female employment rates and the gender ratio of employment. On the contrary, the incidence is rather positive, though the overall effect is small. The influence of the duration of paid leave on the average number of hours worked by women relative to men is also found to be positive, but up to a certain limit in the total duration of leave. After a certain threshold, which cannot be estimated precisely, a longer period of paid leave towards is associated with a decline in female average working hours and the female-to-male ratio. The provision of paid leave is also found to have a negative effect on the gender gap in earnings of full-time employees, whatever its duration.

TABLE OF CONTENTS

Boxes

Figures

Introduction

Parental leave policies give employees time to care for their young children without dissolving their commitment to work and protect their job placement while on leave. However, such policies have developed across countries in various ways because they are at the intersection of several dimensions: the economic, since they affect labour force participation and labour market regulation; the social, with concerns about the health of working mothers and their children, and the physical and emotional development of children; and the demographic, since fertility decisions are also affected by leave policies. Leave policies raise the issue of gender equality, since mothers remain the main users of leave rights, although fathers are also entitled to take father-specific or parental leave days.

This mix of issues generates a situation where various priorities can be set among the objectives which have to be balanced when leave entitlements are designed. In particular, concerns about the well-being of children need to be adjusted to the potential consequences of leave mandates on parents' labour market outcomes and gender equity (Galtry and Callister, 2005; Ray et al., 2010; OECD, 2011). The provision of some period of paid leave is likely to have positive consequences on parental labour market outcomes since it facilitates mothers' return to work after the birth of a child. Mothers may hold their jobs more continuously if they are entitled to leave work for a certain period of time. The return to work benefits employers who invest in employees' skills and human capital, as well as employees who are not dismissed. Paid leave entitlements also benefit the most disadvantaged families, whose income is secured when one parent is on leave and for whom the possibilities of finding alternative affordable and good quality childcare solutions are more limited. This combination of positive outcomes may depend on the length of time parents are entitled to leave work, however. If the time at home after childbirth is too short, the mother and child's well-being is at risk in cases where a child requires a prolonged period of maternal care. But if the period of time spent out of the labour market is too long, female career prospects and gender equity may suffer, and parents may be deterred from taking long periods of leave. Finally, a more balanced use of leave entitlements by the two parents after childbirth may also limit the adverse consequences of leave rights on labour market outcomes and gender inequalities.

Other considerations also enter into the design of leave entitlements, such as the norms regarding the role of mothers and fathers in childcare and the education of children. These norms vary across countries, but they also change within nations over time (Cameron and Moss, 2007). Employers' attitudes also shape the design and condition the success of parental leave policies, since there is a cost for employers in the short run to replace employees on leave and they also contribute to the payment of workers on leave. Yet, conversely, parental leave mandates also increase the chances that employees will resume work after an interruption, and this gives employers more chances of reaping the benefits of their investments in human capital in the long run.

Against this background, rights for parents to leave work after childbirth have greatly expanded over the last decades in most OECD countries. Basic rights for mothers to leave work for a few weeks around childbirth were introduced first. All countries nowadays grant such periods of "maternity leave", which is usually covered by statutory payment. Additional entitlements for the two parents have been often set to complement these maternity rights. Parents are consequently entitled to leave their jobs for a prolonged period with conditions of length, payment and transferability between parents that vary widely across countries, however.

These differences in the design of leave mandates influence the extent to which parent use and share their rights. The payment rate is a key parameter in the decision to leave work and for how long since such a period out of work is only affordable for most families if the income of the parent on leave is partly replaced. Assuming that fathers are often the main earners in families, the economic argument

makes it profitable for parents to divide work and care. For this reason, women are likely to take most of the period available for leave, whereas the father's fraction is still limited. Against this trend, some countries have attempted to achieve a more gender-balanced use of leave entitlements by increasing payment rates and/or fixing individual rights that limit the possibilities for parents to transfer their own rights to their partners. While non-negligible, success here is limited in the sense that gender differences in practice are still large. This results in consequences on labour market outcomes that are still highly differentiated by gender.

The incidence of leave entitlements on labour market outcomes is not a straightforward matter. Some arguments suggest a positive influence on female labour market outcomes. It is highly likely that the provision of leave entitlements after childbirth, or the extension of existing rights, will increase the labour supply of women before and after childbirth. Being employed before a birth becomes more attractive for women if they work for a sufficiently long period to meet the eligibility conditions for parental leave. Extended rights to leave may also encourage mothers who would have left the labour market in the absence of leave entitlement to stay connected to the labour market and return to work after a certain period of time. But these positive outcomes may be reduced if mothers stay out of work so long as to depreciate their skills and create difficulties in resuming the same job[1]. Moreover, the extent to which leave mandates create positive outcomes for women also depends on how employers respond to leave mandates and to their extensions. Statutory entitlements are likely to foster employer-employee loyalty, which in turn may be positive for female employment outcomes. Employers may nonetheless be reluctant to hire women who are most at risk of taking leave, if there are substitutes of same "quality" available in the labour force. They may also be encouraged to keep women in jobs where interruptions have limited consequences for the production process or for which it is relatively easy to replace the workforce.

For this reason, the effect of leave mandates on female labour market outcomes remains at the end quite uncertain, especially at the "macro" country-level, which reflects the combination of individual behaviours and market forces. Similarly, the effects on male outcomes are also uncertain, though men's behaviours are less likely to be directly affected by leave entitlements.

This paper assesses how the extensions of leave entitlements in OECD countries since the early 1970s have influenced gender differences in labour market outcomes. Three types of outcomes are scrutinised: employment rates, average working hours and the weekly earnings of full-time employees. The empirical procedure builds on the framework proposed by Ruhm (1998) who analysed the incidence that leave mandates have had in 19 European countries up to the early 1990s. The analysis is extended here to all OECD countries and to cover the prolific years for leave policies that followed in the aftermath of the 1990s. We also address estimation issues that were left out of Ruhm's seminal paper such as the potential cross-country heterogeneity in relationships between leave duration and labour market outcomes and non-stationarity. For this purpose, we use an unbalanced panel of 30 OECD countries for which we assess the effect of an extension in the duration of paid leave to which parents are entitled after a childbirth on three different labour market outcomes: employment rates, working hours and earnings. The paper is structured as follows. We first present milestones regarding the cross-national differences in leave policies. Then, the literature on the incidence of leave on labour market outcomes is succinctly reviewed. The third section sets out the empirical strategy before the presentation of results for each kind of outcomes.

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[1] This might occur because whilst the possibility of returning to work for the same employer is protected during the complete period on leave, there is often no strict guarantee that leavers can go back to the same job.

I. Parental leave policies in OECD countries

Legislated rights to leave work to care for a newborn child have a long history in the OECD area. Basic rights were first granted for working mothers to leave work a few weeks before and after the birth of a child so as to protect the health of working mothers and their newborn children. The right to leave work after childbirth has since been progressively extended with entitlements granted to both parents without distinction, or to mothers and fathers separately. The development of these additional rights has been especially rapid since the late 1980s, and driven by motivations that go beyond health-related concerns. The potential benefits of maternal care for children at a young age are among the main arguments put forward to justify a prolonged period of leave. The evidence that a return to work by mothers within the six months after childbirth is harmful to children is, however, limited (OECD, 2011; Huerta et al., 2011).

Another motivation for governments to extend the period of leave lies in the fact that subsidising parents to be on leave and care for children often costs the public budget much less than the expenditure that would be required to expand childcare capacities. A longer leave can also be a means to deter the parents of a very young child (and especially mothers) from supplying labour in periods of high unemployment (Kamerman and Moss, 2009; Martin, 2011).

Mothers are usually the main users of leave rights, and this is why specific entitlements for fathers have been introduced in many countries, in an attempt to promote a more balanced division of care work between parents. There are therefore many concerns that come into play when countries decide to grant leave entitlements or to extend existing rights. Leave policies vary accordingly, as can be seen in the large variations in the design of leave entitlements across the OECD. A first main difference lies in the extent to which maternity (or pregnancy), paternity or parental-leave entitlements are combined in order to grant employment protection to parents who are absent from work while they provide personal care to their very young children (Box 1). In some countries, parental leave is supplemented by a further period of leave (home-care leave/child-care leave) that parents can take to care for a young child, often up to age 3. This web of entitlements leads to substantial differences in the total length of time that either the mother or the father can spend out of work to care for a child.

Countries have also introduced leave entitlements with different timings. In general, countries which first introduced parental leave entitlements in the early 1970s made it possible for parents to leave work for comparatively long periods of time after childbirth. These entitlements have been subject to reforms in many countries, but as will be shown below, most of the initial differences have been either maintained or increased over time by these reforms.

In addition, the period of leave is often covered by public income support, which can be topped-up by employers. Still, there are still large differences in the amounts of money that parents receive to replace their earnings, and the total expenditure made by governments to support parents on leave around childbirth.

Box 1. Definition of the different types of leave entitlements

Maternity leave (or pregnancy leave): Employment-protected leave of absence for employed women at around the time of childbirth, or adoption in some countries. Almost all OECD countries have ratified the International Labour Organisation (ILO) recommended minimum period of 14 weeks of paid leave, but many countries have fixed maternity leave entitlements above this minimum (ILO, 2010). In most countries, beneficiaries may combine pre- with post-birth leave; in some countries a short period of pre-birth leave is compulsory as is a six- to ten-week leave period following birth. Almost all OECD countries provide for specific public income support payments that are tied to the maternity leave period.

Paternity leave: Employment-protected leave of absence for employed fathers at the time of childbirth. Periods of paternity leave are much shorter than for maternity leave, and are two weeks at maximum. Because of the short period of absence, workers on paternity leave often continue to receive full wage payments.

Parental leave: Employment-protected leave of absence for employed parents, which is often supplementary to specific maternity and paternity-leave periods (as above), and usually, but not in all countries, follows the period of maternity leave. Entitlement to the parental leave period is individual, while entitlement to public income support is often family-based, so that only one parent claims such support at any one time.

Home-care leave: Leave to care for children until they are about three years old. This can be a variation or an extension of parental leave, and payments are not restricted to parents with a prior work attachment. In Finland relevant income support payments are contingent on not using public day-care facilities, while in Norway payment rates vary with the number of hours that public day-care is used.

In addition to parental-leave entitlements, working parents can make use of a range of additional leave entitlements, *e.g.* holidays, sick-day entitlements to help them cope with family care needs, which often arise at short notice (OECD, 2011a, indicator PF2.3; see appendix A1).
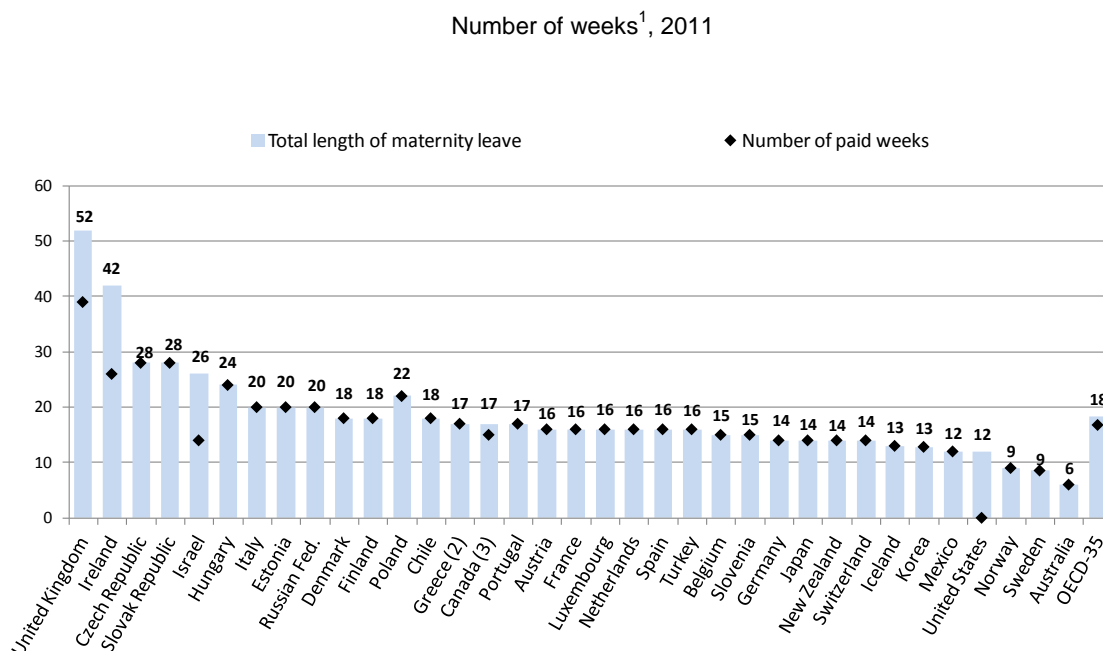
I.1 Maternity leave entitlements

Maternity (or pregnancy) leave entitlements were first introduced to protect the health of working mothers and their newborn children. Therefore, they are often part of social insurance systems, alongside health insurance and paid sick leave. They provide women with a period of rest around childbirth and guarantee a return to the previous job within a limited number of weeks after childbirth. Maternity or pregnancy leave is generally available to mothers only, but in some countries (Belgium, Finland, Germany, Israel, Italy, Portugal, Poland, Slovenia and Spain) part of the leave can be transferred to fathers under certain circumstances. A minimum period out of work around childbirth is mandatory, but the exact timing of leave varies across countries, and in any case, can be adjusted for medical reasons or by employer-employee agreement.

Across the OECD, the average duration of maternity leave was around 19 weeks in 2011 (Figure 1). Women are entitled to the longest period (52 weeks) in the United Kingdom, but that country has no parental-leave scheme. By contrast the period was shortest in Australia where within the 52 weeks parental leave entitlement only 6 weeks can be taken by mothers prior to the birth of a child[2]. In the

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[2]   In fact, there is no statutory entitlement to Maternity leave as such in Australia. However, entitlements to paid and unpaid Parental leave have been granted since January 2011, which provides for up to 12 months of postnatal leave for women, up to six weeks of which may be taken prior to the expected birth of the child. For births after 1 January 2011, eligible mothers may receive payment for up to 18 weeks of this leave under the Government's new Paid Parental Leave scheme.

United States, the only country without federal or central government legislation on paid maternity leave, programmes in some individual States provide income support during leave through either sick-leave insurance or maternity-leave programmes (Kamerman and Waldfogel, 2010)[3].

Figure 1. Maternity leave duration in OECD countries

Number of weeks[1], 2011

1. Total length of maternity leave refers to the sum of paid and unpaid entitled weeks: the numbers above the bars refer to the total length of employment-protected maternity/parental leave in 2011. In Australia, Norway and Sweden, there are no separate rights to maternity leave. The numbers shown for these countries refer to the weeks of parental leave strictly reserved to mothers.

2. In Greece, there is a basic leave of 17 weeks plus six months, granted after Basic Maternity leave and before the beginning of the use of flexible working.

3. For Canada, the 17 weeks refer to the situation in most provinces and territories, but, for example, the provinces of Québec and Saskatchewan provide 18 weeks.

I.2 Parental leave entitlements

Parental leave entitlements offer parents additional opportunities to temporarily stop working and care for a newborn child. These periods of parental leave are usually taken just after maternity leave, though in some countries they can be taken much later during childhood (usually before the child reaches age 8). In a few countries, there is no separate legal frame for maternity/paternity or parental leave, though some period of leave can be reserved for the specific use of each parent.

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[3]Payment during leave is most often obtained through sick leave insurance in the US (Kamerman and Waldfogel, 2010). Five states (California, Hawaii, New Jersey, New York, Rhode Island) and Puerto Rico have Temporary Disability Insurance (TDI) programmes or cash sick leave benefits. A few others have enacted family paid leave (California, Washington, New Jersey). Minnesota, Montana and New Mexico also have active At-Home Infant Care policies providing low-income working parents who choose to have one parent stay home for the first year of a newborn or adopted child's life, with a cash benefit offsetting some portion of the wages forgone.

The legal basis of these entitlements varies widely across countries, the variations in motives for granting rights above and over the basic maternity entitlements being one reason for these differences. Parental leave entitlements were often introduced as supplementary rights for mothers only, but they have been extended to fathers in most countries, with leave being alternatively available as: i) a *family right* that parents can divide between themselves as they choose; ii) an *individual right* which can be transferred to the other parent; and iii) a *non-transferable individual right* (*e.g.* both parents have an entitlement to a specified amount of leave). The latter, often called "mommy and daddy quotas", have to be taken by fathers and mothers on a "use it or lose it" basis.

Figure 2 shows cross-country variations in the number of weeks for which mothers can be on leave after the weeks of maternity leave. This statistic includes all the post-natal weeks available through home care or childcare leave periods on top of the weeks of maternity leave. Countries are ranked by year of introduction of these entitlements which are distributed by calendar year. Strikingly, the figure shows a quite clear divide between forerunner countries which first introduced parental leave entitlements in the late 1960s or early 1970s and those which granted such rights from the 1980s onwards. Parents are entitled to leave work for a period lasting between two and three years in countries which first introduced these supplementary entitlements, while the period granted as parental leave is much shorter (1 year maximum) in countries which introduced such entitlements later. Moreover, cross-national differences have tended to increase over time, with a large expansion of the length of leave occurring especially in Austria, Czech Republic and Poland since their introduction. By contrast, the period of leave was shortened in only few countries such as Sweden, or more recently Germany where the standard period of the basic payment were significantly reduced. More details about the actual variations in the total weeks of paid leave over the four decades are illustrated in Figure A1 of the Appendix.

Figure 2: Parental leave entitlements[1]
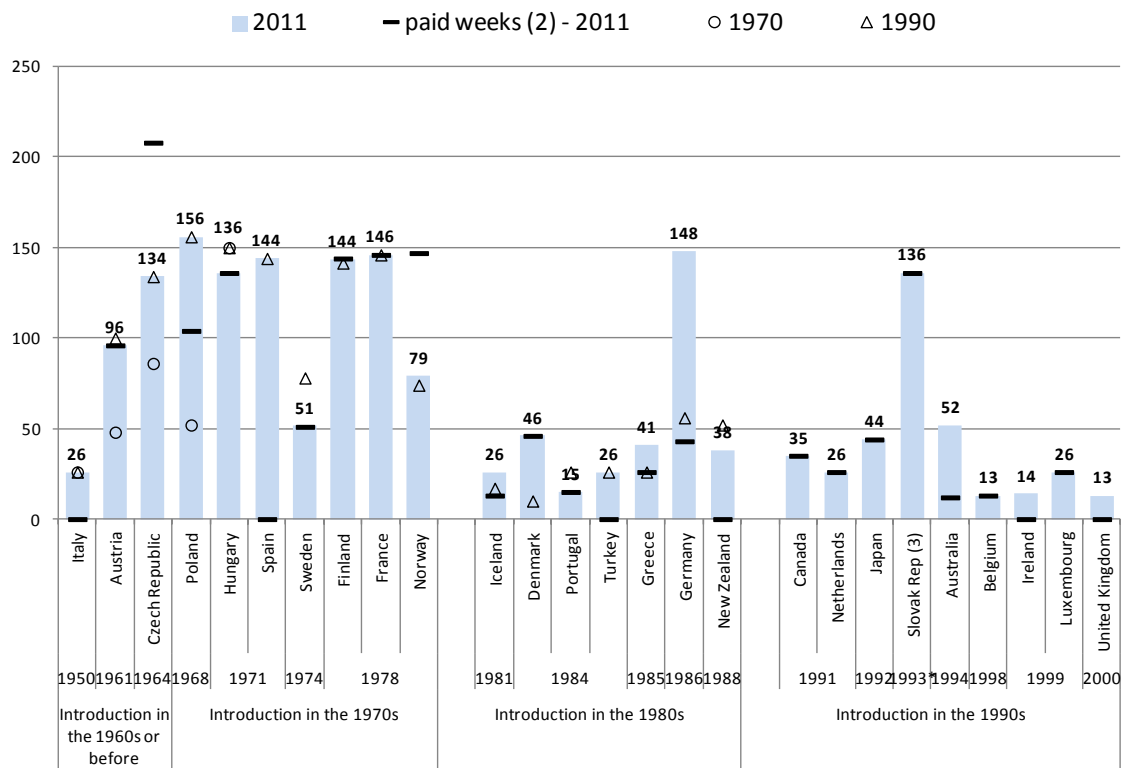
1. Both paid and unpaid weeks of leave are shown, except for the estimates on paid leave in 2011. These totals refer to parental leave and subsequent prolonged periods of paid and unpaid leave women can take after maternity leave to care for young children (sometimes under a different name as for example, "childcare leave" or "home-care leave".

2. In some countries, different options of payment exist, which imply different periods for which a benefit is received. The option with the longest period of benefits is taken into account here. In *Australia*, after the first 12-month period of leave, a parent can request to take up to another 12 months (of their own or their partner's unused leave period). In *Canada*, the federal Employment Insurance programme provides for 35 weeks of paid parental leave; unpaid leave periods can be longer. For example, the province of Québec provides for up to 52 weeks of unpaid leave, during which period eligible clients can claim benefits under the Québec Parental Insurance Plan. In the *Czech Republic*, a parental benefit can be received until the child is 48 months old, while the job-protected period of leave stops at month 36. In *Germany*, there is a family entitlement to leave up to 3 years, but the period of payment is limited: an income-related 'parental benefit' (*Elterngeld*) is paid for a period of 12 months (+2 months bonus if the father takes at least 2 months). Instead of 12 (+2) months the parental benefit may be spread over 24 (+4) months. In the *Netherlands*, payment is not made by a benefit but through a tax credit. In *Norway*, there is 36 weeks of paid parental leave which can be taken by the mother plus 52 weeks of unpaid job-protected leave. However, a cash-for-care payment can be received until the child reaches their third birthday. In *Sweden*, a municipal child-raising allowance (*vårdnadsbidrag*) has been reinstituted since 2008 on top of the statutory period of leave granted. Starting in 2009, municipalities may choose whether or not to provide a benefit for parents with a child aged one to three years who do not use publicly-funded childcare services and for whose child 250 days of Parental leave have already been used. In *Poland*, the basic payment is for 24 months, but the period can be extended to 36 months where there is more than one child.

3. Slovakia was governed by leave legislation applying in Czech Republic, and implemented its own legislation from 1993 onwards.

Source: Moss (2011); Missoc tables: Social Protection in EU Member States; and information provided by national authorities in non-EU countries; OECD Family database.

The period of "parental" leave is unpaid in Ireland, Italy, New Zealand, Spain, Turkey and the United Kingdom, and paid for at least a portion of the period in all other countries, though payment rates vary widely. 12 countries supply benefits covering the complete period of leave; and 14 countries only

make payments during part of the period of employment-protected leave. In the Czech Republic and Norway, the period of payment in 2011 exceeds that covered by the employment protection, which can create difficulties in re-entering the labour market for those parents receiving the benefits for the complete period. France is also the only country where the period for which a benefit is received varies with birth parity.

More generally, labour market outcomes are likely to depend on the total period for which each parent can be on leave. Figure 3 shows the total number of weeks obtained by the addition of the *paid* weeks granted to women giving birth as a maternity and/or parental leave period. This total varies greatly across countries from a few weeks of employment-protected but *unpaid* leave in Australia and the United States to 3 years of paid leave (Austria, Czech Republic, Finland, France from the second child birth, Hungary and Slovakia). Overall, there has been an increase on average in the total period available for leave in OECD countries, but with large differences across countries (see detailed figures by country, Fig. A1 in the Appendix).

Figure 3: Total paid weeks of paid leave granted to mothers[1]

in 1980, 1995 and 2011
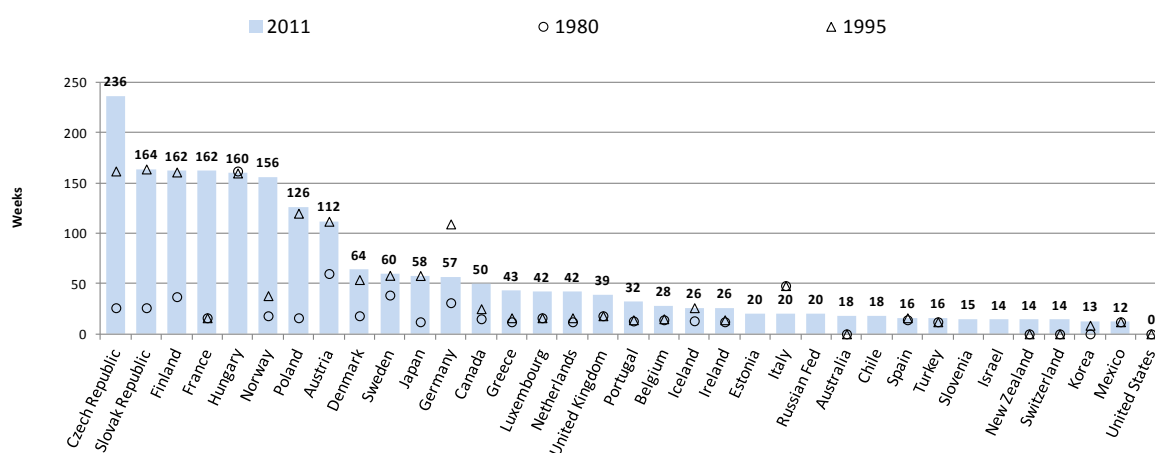
Countries are ranked by number of paid weeks available in 1980

1) Weeks of maternity and of parental leave that women can take after maternity leave is added. Weeks of "childcare or home-care leave" are also added where relevant.

Source: OECD Family database.

I.3 Father-specific leave entitlements

Many countries have also introduced father-specific rights in leave schemes. For instance, about half of OECD countries have separate paternity-leave entitlements which allow fathers to be off work during the first 5-15 days immediately following childbirth. In addition, some fraction of the parental leave period can be reserved to the exclusive use of each parent, with no possibility of transferring it to the partner. Reforms that introduced "quotas" to be used by each parent have proved to be efficient in encouraging fathers to take some period of leave. Nordic countries (except Denmark) and Slovenia have the longest leave periods reserved for fathers, with Iceland and Slovenia granting up to 13 weeks to each parent with their earnings replaced 80% and 100% in Slovenia below a certain threshold (Figure 4). However, the period taken by fathers is unlikely to last more than the minimum set by legislation. Despite the various devices set to encourage fathers to actually use their rights, the overall period of father-specific leave remains quite short with fathers taking no more than around 20% to 25% of the days of leave taken by parents (Moss, 2010) –

Figure 4: Weeks of leave entitlement for fathers[1], 2008
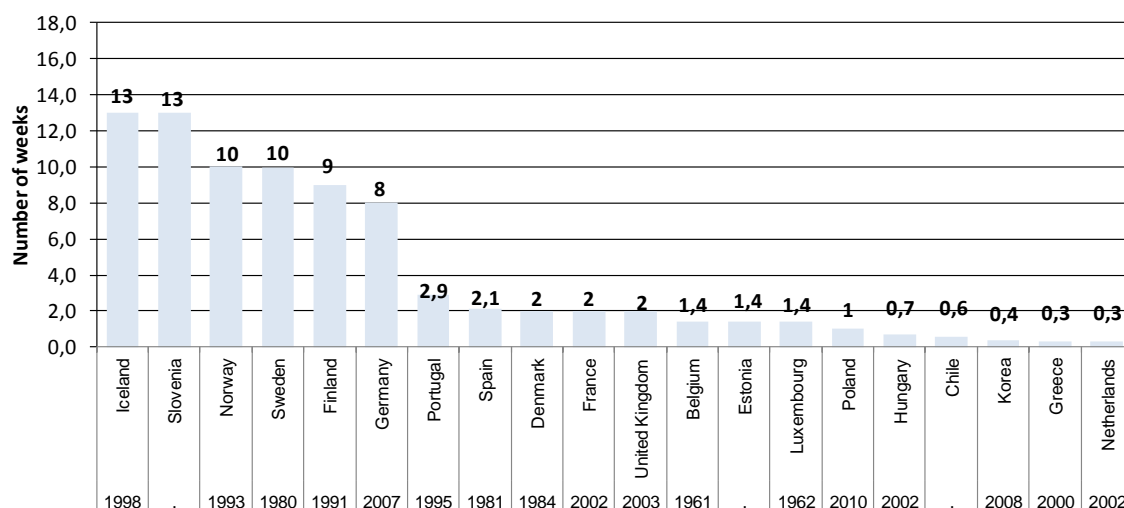
1. Estimates of the weeks of entitlement include paternity leave and father-specific "quotas" in parental leave entitlements.

## I.4 Government spending on leave

Another key cross-country difference lies in the expenditure by governments to support the income of families with one parent on leave. This expenditure depends on several parameters, including the number of leave takers, payment rates and the duration for which leave are usually taken. All these parameters vary across countries but in general, maternity or paternity entitlements are insurance-based and salaries are replaced during the few weeks of leave in most countries. Cross-national differences are larger regarding payment rules for parental leave. Long leave periods are very often associated with flat-rate family-based payment, so that only one parent – in practice the mother – claims payment while on leave. By contrast, shorter periods of parental leave are often associated with earnings-related (individual) payments that guarantee a higher wage replacement rate, up to a ceiling (see OECD 2011, Indicator PF2.4 for details). With such schemes, high earners and men are more likely to claim part of the entitlements. However, as leave payments do not fully replace the leave-taker's wage, and since women often earn less than their partners, they are more likely than men to take all or most of the leave entitlement.

All these differences in payment conditions lead to substantial variations in the amounts spent on leave by governments. Figure 5 shows the differences in the public expenditure per childbirth, when all types of leave and "birth grants" are considered. Spending can be quite high because leave covers more children than those born in the current year. In 2007, spending ratios were comparatively much higher in countries where parental leave was granted for a relatively long period (Czech Republic, Finland, Norway) and/or well-paid (Iceland, Luxembourg, Norway, Sweden). Only in Austria did expenditure per newborn child decrease in 2007 compared with 1995.

Figure 5: Spending on child-related leave and birth grants per childbirth

In US$ PPP
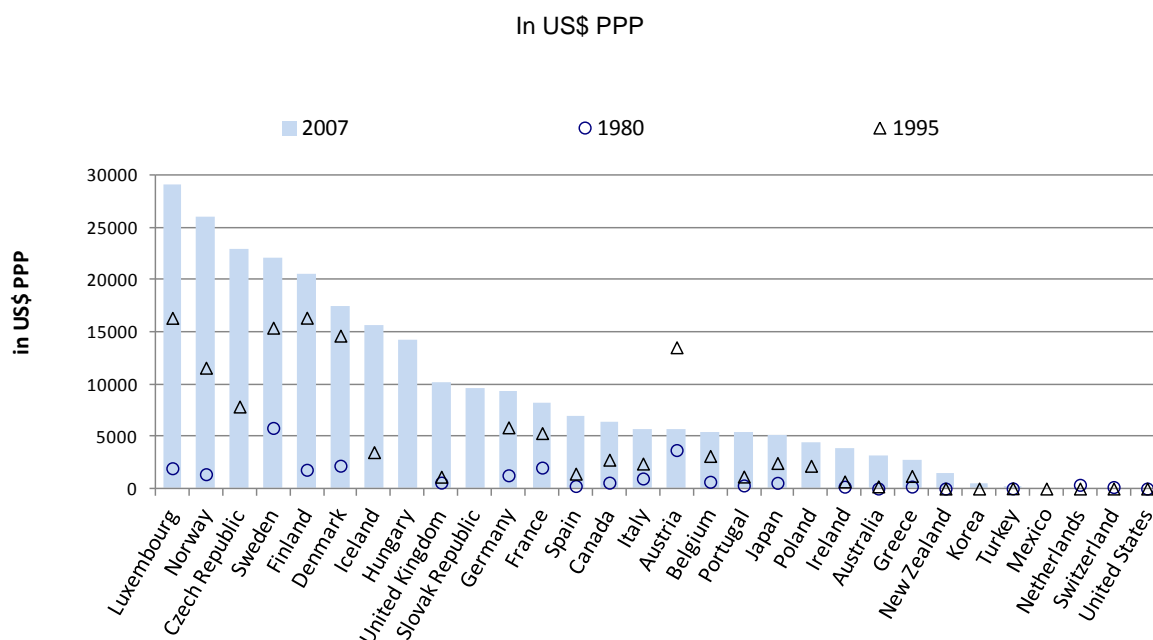
2006 for Italy

Source: Authors' calculation based on OECD Social Expenditures database.

II. Theoretical background and previous findings

How parental leave mandates influence labour costs and in turn the supply and demand of labour is key to figuring out the consequences of leave policies on male and female labour market outcomes. Gender-asymmetric consequences can be expected due to the wide differences between women and men regarding leave take-up. As a result, leave entitlement is likely to shift upwards the labour supply curve of the group of workers who are most likely to use it all – e.g. women –, relative to those groups who are less likely to take leave – e.g. men. Labour demand might not adjust completely to this increase in supply, however, because the provision of leave will raise the non-wage cost of labour if employers need to change the production process, or to hire and potentially train temporary staff. Employers may even be tempted to reduce their labour demand for female workers in such case. But leave mandates give employers a greater guarantee that their employees will return to work after a childbirth, and that they will gain the returns on the investment in human capital made before childbirth and the associated period of leave (Klerman and Leibovitz, 1994). This is, of course, more likely to happen for trained and/or qualified workers from whom employers can expect higher returns on their investment in human capital. Public payment contributions to share the cost of leave are in contrast much more obviously required for low-skilled workers for whom employers can expect much lower returns from their continuity in employment. The downward demand response of employers may overall be small compared with the shift in female labour supply since leave benefits in most OECD countries are primarily paid by public transfers. Statutory entitlements to leave work after a childbirth are thus a device to foster employer/employee loyalty: leave entitlements raise employees' attachment to the labour market and encourage employees to return to the same employer after a period of work interruption. They also contribute to securing the benefits employers can get back from their investment in human capital. One can thus expect a positive influence of leave mandates on the employment rates of women, and a larger impact for women relative to men. This may take some time to appear because women are first encouraged to make a break in their career by being on leave in the short run, and they would disappear from the employment statistics if workers on parental leave were not counted among active adults (see data issues below). The positive incidence of leave entitlements on employment statistics is then likely to become visible when women return to work after a few weeks on leave – or even years on leave in some countries. Many women may nonetheless switch to part-time or reduce their working hours once they resume work if they want to spend time with their children or face childcare constraints. Hence, we can expect the average working hours of women to decrease relative to those of men after the introduction or extension of childbirth-related leave.

Leave policies can also have longer-term consequences on the total employment rates of all women because the norms and attitudes regarding female employment change accordingly. If leave entitlements (or their extension) create more continuous female participation in the labour market, then their participation will become increasingly rewarded and accepted by families as well as by employers. Social interactions may then increase the effect the provision of leave entitlements had initially, with spill-over effects since more women would be encouraged to enter the labour market and invest more in their career before having children, potentially adapt the timing of maternity, then go on leave and return to work afterwards (Bernhardt, 1993; Gustafsson and Kenjoh 2007). Maurin and Moschion (2011) also show that neighbourhood is an important vector for the transmission of social norms regarding mothers' labour force participation. In this context, not only those women who are actually eligible to paid leave, but also those who are not yet in a position to claim it would overall benefit from the provision of paid leave. This change is also likely to increase over time since there is some evidence that each generation of women has been influenced by its predecessors shifting the identity of women from a family-centred world to a more career-oriented one (Goldin and Katz, 2002;

13

Goldin, 2006). In this case, the right to leave and return to work after childbirth may work as a "social multiplier" of female labour force participation.

The potential consequences on relative earnings are less straightforward. On the one hand, the absence from work is damaging for female earnings if this absence is long enough to deteriorate accumulated skills and because it lowers the chances of being promoted. Moreover, the shift in female labour supply relative to male tends also towards a decrease in their relative wages in the new equilibrium. However, this tendency may be limited by the presence of binding equal pay legislation that prohibits unequal treatment between men and women. In addition, employers may be encouraged to invest more in firm-specific human capital, on the other hand, because they know that qualified women will resume work after leave. Both labour productivity and the relative earnings of women will be positively affected, balancing the initial assumption. The provision of paid leave may not be completely neutral for men either, even if they do not make much use of it. For instance, if employers' aversion to the risk of having female employees on leave were high, they would be deterred from hiring women and may instead recruit more men. Moreover, the number of leave days taken by fathers is increasing but remains low, which suggests that demand response by employers to this limited change in fathers' behaviour is likely to be small. In all, a nil or positive influence on male labour market outcomes can be expected from leave mandates because of labour market forces. These effects, if they exist, are surely small in comparison with those on female outcomes. For this reason, the net effect of leave rights on gender differences is expected to be positive for women relative to men regarding employment rates, but negative regarding earnings.

The duration for which employees can be on leave may make a large difference in outcomes, however. The longer the period, the higher the costs borne by employers will probably be if they need to replace employees for a prolonged absence from work, and also because employees on long leave may more probably suffer from a depreciation of their skills. Moreover, entitlements to longer leave might affect first those employees with lower salaries, lower marginal utility of work, and lower probability to return to work. The influence of leave may thus follow an inverted U-shape, positive up to a certain duration, and negative afterwards – as found, for instance, by Ruhm (1998).

This ambivalence of the influence of leave mandates on labour market outcomes has been demonstrated by empirical research, for various countries. Several papers have, first, established the positive incidence of leave mandates on mothers' return to work. This positive association is found in countries where leave is entitled for a rather short period of time, as in the United States where there is a federal entitlement for 12 weeks of unpaid leave after a childbirth – some states supplementing this federal entitlement with payments. For instance, Berger and Waldfogel (2004) found that mothers employed in jobs covered by leave entitlements return to work more quickly after the 12 weeks of leave than those not covered by leave mandates. Similarly, Han et al. (2009) found that the introduction of leave mandates for family or health reasons in a few States has been associated with a significant 4.7 point increase in the probability of working 9 months after a childbirth. Women using paid and job-protected leave were also found to remain employed more frequently after a couple of years, e.g. when the child reaches their 4th birthday[4]. Baker and Milligan (2008) obtained similar

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[4] The effects are more pronounced for women with college graduation or above than for those with lower qualifications. Higher educated parents and married women are indeed more likely to take up leave because they are more frequently eligible for it and can also afford it more frequently. Espinola-Arredondo and Mondal (2009) add that the impact of FMLA on female employment rates has been positive and significant for some states when they complement the benefits and eligibility criteria of FMLA. They also stress the interplay of leave entitlements with other insurance scheme: the impact of FMLA in those states which did not previously enact Temporary Disability Insurance is significantly more positive on female employment than in states which already had TDI; and the impact is higher in states which expanded the benefits and eligibility criteria.

findings for Canada, where the proportion of women quitting their jobs has decreased since the introduction of 17-18 weeks of mandated leave, while the proportion of those returning to their pre-birth employers has increased. A further extension of job-protected leave, up to 70 weeks in some provinces, was found to significantly increase leave take-up and the total time spent at home after childbirth. The probability of returning to the pre-birth employer is also increased after such extensions in leave duration.

Results regarding the influence of long periods of paid leave on later labour market outcomes are mixed, however. As mentioned in the former section, a few countries (for instance Austria, France, Germany, Norway) have indeed introduced long leave that can last several years. The influence of such long-period leave varies over time. In the short run, the introduction of cash payments covering a few years of leave has increased the amount of time women spend off work. For example, a "cash-for-care" allowance was introduced in Norway in 1998 to pay women leaving the labour market to care for a newborn child for up to 3 years. Partial payments are made if women decide to work part-time instead of completely leaving the labour market. A few months after introduction, the main effect found was a shift from full-time to part-time work for women with a 1- to 2-year-old child (Ronsen, 2009). Some years later, women with children of same age were more likely to completely leave work and receive the full-rate benefit than to decide to work part-time. In all, Schone (2004) found that "cash-for-care" payment induced a 4% decrease on average in the labour force participation of women with children below age 3– with a lower probability of taking up the benefit among households with higher earnings and higher educational background (Aassve and Lappegard, 2009).

Cash-for-care payment was also introduced for three years in France in 1985 for women giving birth to a third child, and then extended to households with a second child in 1994. The incidence was found to be similar to that already mentioned for Norway by Piketty (2005) who calculated that the 1994 extension of parental care allowance induced a minimum of 11% decrease in employment rates of mothers with a second child below age 3. The longer-term effect on female employment rates is not so clear, since it appears that employment rates of women with two children increased a few years after the reform. This increase has nonetheless been delayed for mothers of two children in comparison with the trends observed for the other categories of mothers, probably as a result of the 1994 reform (Thévenon, 2009). Hence, the progression of employment rates of women with two children has probably been slowed down by the provision of cash-for-care payment, but the increase due to better opportunities for combining work and family has not stopped.[5]

The evidence for Germany and Austria also suggests that entitlements for a long period of leave significantly increases the total time women spend out of work. There is no evidence, however, that the extension of the time available for leave has had a significant impact on female labour supply. The period covered by leave benefits in Germany was extended a number of times over the decades before the most recent 2007 reform. The first increases in the duration of paid leave were found to have had greater effects on employment rates than the more recent. Schönberg and Ludsteck (2006) found in particular, that the return to work was most delayed when the job-protected and paid leave was increased from 2 to 6 months, and least delayed by the increase from 18 to 36 months in 1992[6].

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[5] However, all recipients of the home-care allowance are not necessarily covered by a job-guarantee since the regulations for benefits and leave are separated. In this situation, a long break with home-care allowance is also associated with greater difficulties in returning to employment and a higher risk of getting a temporary or subsidised contract after the expiration of the benefit payment (Ananian, 2010).

[6] The reaction to these extensions of the period of leave varied with educational attainment, however. Highly educated women showed the greatest labour supply response for the increase from 2 to 6 months but the least for the increase from 18 to 36 months. By contrast, low-educated women were more likely to postpone their return to work when leave was extended above 18 months.

However, there is little evidence that the successive extensions of leave duration had a significant positive or negative long-term impact on German mothers' labour supply – e.g. 5 years after childbirth (Schönberg and Ludsteck, 2007)[7].

Austria also made several changes to leave legislation with large variations in the duration of paid leave over the last decades. In particular, two major reforms took place on in 1990 and 1996: on 1 July 1990, the maximum duration of parental leave was increased by 1 year, from the child's first to their second birthday: in 1996 this period was reduced from 24 to 18 months. Lalive and Zweimüller (2005) concluded that the increase of leave duration by one year in 1990 led to a significant increase in effective time spent out of work – by an amount of around 0.4 to 0.5 months per additional entitlement of one month – and a strong delay of the return to work[8]. The depressing effect on employment rates seems to have persisted after the period covered by leave entitlements, with a probability of being back at work 36 months after the birth 11 percentage points lower after the reform. The same authors also pointed out the more negative consequences of time spent out of work when the return to employment is made after the period covered by job protection. No adverse effect of leave extension on re-entry wages and other job characteristics was identified when the return to work was made within the job-protected period; in contrast, women who delay their return to employment after the expiration of leave rights were found to have less favourable labour market outcomes (Lalive and Zweimüller, 2009). Also for Austria, Lalive et al. (2011) have tried to disentangle the effect of the job protection guarantee from that of the payment schemes. To do this, they looked at the effects of a variation in the period covered by a parental leave benefit for a constant period of job-protection[9]. The period of benefit reception is actually identified as the main determinant of the timing of the return to work, but the authors also find a strong interaction between the two dimensions. An extended period of benefit reception is found to delay mothers' return to work, but this effect combines with the influence of the job guarantee which seems to affect the labour supply response of high- but not low-earnings groups[10].

This interaction between the job protection guarantee and the provision of payment is also seen in cross-national comparison. Pronzato (2009), in particular, interprets European differences in the timing of return to work after childbirth observed for mothers between 1994 and 2001 as a consequence of the variation in leave entitlements. She suggests especially that the job guarantee has

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[7] In particular, Schönberg and Lusteck (2007) note that the rise in job-protected leave from 2 to 6 months in 1979, and from 6 to 10 months in 1986 had no significant impact on the probability of working 5 years after childbirth. These expansions fail therefore to increase the employment continuity of mothers after childbirth, while the share of women working 5 years after childbirth was decreased at most by respectively 1.28 and 0.3 percentage points. By contrast, the expansion from 18 to 36 months increased the share of women working three years after childbirth by about 1.5 percentage points. The effect is small but consistent with the conclusion that the expansion in leave coverage did not overall lower mothers' long-run labour market participation rates.

[8] Lalive et al. (2011) get an estimated effect of higher magnitude with an average delay of 7.8 months of return to work after the 1990 extension of parental leave entitlements.

[9] In 1996, the maximum duration of job protection was left unchanged, but a sharing rule between parents was introduced so that cash benefits could only be drawn for the maximum duration if one parent took a leave of at least 6 months. In practice, take-up of parental leave by fathers was extremely low and the reform can be seen as a limitation of cash benefit to 6 months.

[10] More precisely, the introduction of a time limit in the protection of their job clearly speeds up high earning mothers' return to work , whereas an extension of such a job-protected period has no effect on their timing of return. By contrast, any extension or reduction of the period covered by a job-guarantee seemed to have no effect on the labour market behaviour of the low wage earners. Two effects combine for workers in the intermediate position. The compensation payment increases the reservation wage which leads mothers to be more selective with regard to job offers and thus to delay their return to work. And the existence of a time limit in the job guarantee affects the timing of the return to work.

no significant effect during the first year after childbirth, but is important in deciding when within the 2nd or 3rd year the return to work will take place. By contrast, leave benefits appear to delay the timing of return to work within the first year after childbirth, while no significant impact is found thereafter. Mothers' labour supply responses vary largely with their educational attainment, however.

A few studies also looked at the incidence of leave mandates on earnings in the short and long run. Most of them find a negative impact from a period passed on leave on wages at return to work. Women who make full use of the maternity or parental leave legislation and return to work when leave expires receive on average lower wages in the years after childbirth than those who advance their return. A possible explanation for this is that firms find it costly to keep the same job available the longer a woman stays away from work, and assign her to a job that is comparable to the one held before childbirth.

By contrast, the evidence on the persistence of these inequalities is more mixed. Several studies point out the existence of persistent penalties on the progression of earnings due to the time passed out of employment. For example in Germany, each year of work interruption is estimated to depress the wage received on return to work and within the few years after by 6% to 20%, variations being due to differences in empirical specifications (Ondrich et al., 2002; Kunze and Ejrnaes, 2004; Beblo et al., 2006); and Schönberg and Ludsteck (2007) found that differences can be observed even 8 years after childbirth.

Similar results were found in France when entitlements to a 3-year period of paid leave were extended to families with 2 children in 1994. Lequien (2012) found that wage growth over six years following the birth of a second child is lower for those women who gave birth after the reform compared to those who had a child just before. Each year of work interruption is estimated to lower later wages by 7% to 17% depending on the specification, up to 10 years after the reform.

These results, however, are challenged by other studies, which do not find any adverse effect on mothers' labour market outcomes in the medium or long run. For example, Lalive et al (2011) did not find any detrimental effect on wages of the aforementioned reforms in Austria, despite the significant delays in return to work among mothers eligible for the more generous leave regimes. This suggests the guarantee of returning to the same or comparable job works quite well as a protection of earnings. This argument is also made by Zhang (2010) who estimates that Canadian mothers returning to work seem to regain the lost earnings in about seven years after their return to work. The recovery is strongest for mothers going back to work with their original employer, despite substantial income losses incurred in the first two years after childbirth.

The relationship between the expansion of leave entitlements, labour market outcomes and gender differences has also been but only rarely scrutinised at the macro-level. One notable exception is the research carried out by Ruhm (1998) where he analysed the influence of paid leave duration on employment trends in 9 European countries[11] from 1969 to 1993. The impact of leave is basically assessed by looking at the differential impact that extensions of paid leave have on outcome trends for women compared to men. He basically found that expansions of paid leave have been associated with increases in women's employment, but with (small) reductions in their relative wage at extended durations. He also identified modest but negative impacts of leave duration on the female-to-male ratio in weekly working hours.

Our present analysis builds on this approach with three main extensions:

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[11] Denmark, Finland, France, Germany, Greece, Ireland, Italy, Norway, and Sweden.

(i) The geographical coverage is enlarged to include 30 OECD countries, with much more diverse parental leave policies than the 9 pioneer countries considered by Ruhm (1998).

(ii) The period covered is extended until 2010. As argued in the former section, this extension makes it possible to consider the main developments of parental leave policies which took place in the aftermath of the 1990s.

(iii) We analyse not only the influence of the duration of paid leave on labour market outcomes, but also the sensitivity of these latter to government spending. We expect higher spending per birth to increase leave take-up and potentially have a negative (income) impact on female labour force participation and gender differences.

Finally, we address the concerns drawn by potential non-stationarity and heterogeneity of our panel and the inconsistencies of estimates that these two issues can generate.

III. Data and methodology

III.1 Data issues

This analysis uses aggregate data covering the 1970- 2010 period for 30 OECD countries. Information on changes in parental leave legislation since the early 1970s was collected by questionnaire and reported by Baldi and Chapple (2010). This information was coded to monitor the changes in the total duration of paid leave a woman is authorised to take just before and after childbirth. The total adds rights attached to maternity and parental leave entitlements[12], from which the entitlements for exclusive use by the father are subtracted.

Figure A1 in the Appendix shows changes in our main explanatory variable, e.g. the duration of paid leave[13]. The changes are not very frequent and of small magnitude in general, except in Austria, Czech Republic, Finland, France, Germany, Poland, and Slovakia where big shifts up or down in the duration of paid leave can be observed. But changes in leave duration have occurred in almost all countries covered here except in two countries[14].

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[12] The total length of paid leave available for mothers is obtained by the sum of paid leave available as parental and/or childcare leave not for exclusive use by the father plus the weeks of maternity leave except those taken after the birth of a child if there is an overlap with parental leave entitlements. We consequently assume women take most of the transferable part of leave entitlements, which proves to be the case even in countries which are most advanced in promoting gender equality. Furthermore, we take into account the period for which a family can receive a home-care allowance to calculate the total duration of paid leave, although the payment of this allowance can be disconnected from the right to leave work and thejob-protection stipulation. Countries concerned by parental allowance are Austria, Czech Republic, Estonia, France, Finland, Germany, Norway, Poland and Spain. We consider the entitlements attached to the birth of a second or subsequent child in France where payments are granted for a longer period than after a first birth.

[13] One key difference between the leave variable considered here and the variable used by Ruhm (1998) is that he considered the existence of parental leave only, disregarding the provision of basic maternity leave entitlements. Here we consider the combination of the two types of entitlements because the distinction between the two is not possible in countries where there is only one legislative framework for parental leave, and the total period a mother can leave work is probably a more accurate proxy for analysing the influence of leave policies on labour market outcomes.

[14] Australia and the US where there is a right to unpaid leave for a few weeks after a childbirth.

The information on legal entitlements does not necessarily coincide completely with the variations of the actual use of leave made by parents, for which there is no information available on a time-series basis. However, changes in the legal duration of leave are likely to shadow the most important changes in behaviour. Nevertheless, a change in employment outcomes can be associated with a change in leave duration reflecting the changes in legislation but which is larger than the effective change in the period on leave; the coefficient measuring the effect of leave will be underestimated in such a case.

The inclusion of government spending on leave and other benefits paid at childbirth which depend on take-up rates may partly correct this error. This information comes from the OECD database on social expenditures, but is available only from 1980 onwards. We estimate the annual purchasing power parity (PPP) amounts paid per live birth, disregarding the actual labour market status of parents.

The dependent variables are natural logs of sex-specific employment-to-population ratios, average working hours and hourly wage rates. Data on employment rates are taken from the OECD Labour Force Statistics providing time series on employment ratios by age category. The analysis is focused on women compared to men aged 25 to 54 to limit the comparison to those adults who are the most likely to have children and be covered by leave entitlements. Very young adults and seniors are consequently excluded because they face specific employment issues and are less likely to be affected by leave legislation. Nevertheless, this age group is large enough to consider the effect that leave entitlements can have on the outcomes of population categories which are the immediate users of leave, given the above-mentioned market responses or the possible diffusion of behaviours beyond leave takers. Figure A2 in the Appendix shows a continuous increase in employment rates for women in this age group over the years in almost all countries. These trends contrast with those for men, which have been, rather stable or have declined slightly over the period. Measurement errors may affect the comparison of employment rates, however, since there are differences in the way employees on leave are reported in employment statistics – despite international conventions[15].

Data on working hours refer to the weekly average per employee calculated, for each sex, on the basis of the hours worked in the main job. These data are available for 27 countries and for a time span that varies across countries. The data regarding weekly earnings (in US$ PPP) cover full-time workers only and are taken from the OECD Earnings database. These data are available for 10 countries only, and time series are often limited to few years (Figure A4). Only countries with at least 9 years of observation have been included in the model. However, all these countries show either a stable or an increasing ratio of the female-to-male earnings, which indicates actually a decrease in the gender gap of earnings of full-time employees.

This rapid description of data shows that there are large variations in the N and T sizes of the panels by types of outcomes we consider. This may affect the efficiency of the estimation procedures used to measure how these outcomes are affected by the extension of paid leave. The next section presents the empirical strategy.

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[15] For European countries for instance, EU-guidelines stipulate counting parents on parental leave as employees absent for other reasons: they must be counted as employed if the period of absence is less than 3 months or if they continue to receive a significant portion of previous earnings (at least 50%). However, national treatment of long or unpaid parental leave varies widely. For example, many parents on parental leave in France (up to 3 years for parents with 2 children or more) are counted as inactive, while leave is technically unpaid (there is an income support benefit for all parents with a child not yet 30 months old (see OECD Family Database Indicator PF2.1). By contrast, many parents in Austria or Finland on home-care leave (which is often taken when the child is 1 to 3 years of age) are included in the employment statistics.

III.2 Empirical Setting

The rest of the paper assesses the influence of an extension of the period of paid leave on different labour market outcomes, e.g. employment rates, average working hours and earnings. This influence is measured by female-to-male differences in labour market outcomes. Fixed-effect models are used to estimate the impact of within-country changes in leave duration on employment situations of men and women separately. Then the effect of leave extension on the gender gaps in outcomes is estimated.

Formally, the labour market outcomes Y_{ijt} – measured in natural logs–, for each sex i (where f indicates female and m males) in country j at year t is assumed to be determined by:

$$Y_{ijt} = \beta_i L_{jt} + \alpha_{ij} C_j + \theta_{ijt} X_{ijt} + \delta_{jt} X'_{jt} + \square_{it} T_t + e_{ij} t + \varepsilon_{ijt} \tag{1}$$

Where i = f, m; j denotes the country and t the year, L_{jt} is the duration of paid leave (L_{jt}) in weeks; C_j denotes country-fixed factors; X_{ijt} are other time-varying, sex and country-specific factors that drive the evolution of labour market outcomes, while X'_{jt} are those factors which affects the outcomes of both sexes identically. T_t are year dummies which capture the impact of the time-specific circumstances that all countries have faced over the 1970-2010 period, and $e_{ij}.t$ denotes exogenous trends in outcomes, which assumed here to be linear and both country- and sex-specific.

The fixed-effect estimations measure the average response of labour market outcomes to changes in leave duration over time, for each sex separately before applying the model to the gender differences in outcomes. The presence of country-fixed factors (C_j) also eliminates the incidental disturbance of time-constant country characteristics.

β_i provides an unbiased estimate of leave effect if ε_{ijt} and L_{jt} are uncorrelated. However, bias is introduced if time-varying country effects are correlated with changes in parental leave entitlements (if, for example, the political process leads countries to increase entitlements when employment is rising). To overcome this issue, one option is to estimate the influence of leave extension on the female-to-male difference in labour market outcomes:

$$Y_{fjt} - Y_{mjt} = (\beta_f - \beta_m).L_{jt} + (\alpha_{fj} - \alpha_{mj})C_j + (\theta_{fjt} - \theta_{mjt})(X_{fjt} - X_{mjt}) + (\square_{ft} - \square_{mt})T_t \\ + (e_{fj} - e_{mj})T + (\varepsilon_{fjt} - \varepsilon_{mjt})$$
$$\tag{2}$$

Or equivalently

$$\Delta Y_{jt} = \beta L_{jt} + \propto C_j + \theta \Delta X_{jt} + \square_{jt} T_t + e_j T + \varepsilon_{jt} \tag{3}$$

As stated earlier by Ruhm (1998), this equation can be interpreted as a "difference-in-difference-in-difference" estimate where β measures how growth in the gender gap in labour market outcomes varies as a function of the duration of paid leave.

Since women use almost all days of parental leave, it may be the case that β_m is equal to zero; β will provide an unbiased estimate of β_f in this case. However, since men are increasingly taking days of leave, β_m can also be nonzero but is likely to have the same sign as β_f, but with a lower magnitude since the use by parental leave by fathers is very low even in countries with the most advanced parental leave legislation. Using the proxy β to estimate β_f will give an overestimation in this case. By contrast, β_f and β_m may have opposite signs if employers or households respond to longer leave

by substituting employment away from females and toward males, or vice versa[16]. This is not likely to be the case, however, since such discriminatory practices are usually prohibited by the law. If laws are effective, β_m is much more likely to be nil or have the same sign than β_f with a smaller magnitude, given the low prevalence of fathers taking parental leave.

The effect of the duration of the parental paid leave is also not necessarily linear. The potential non-linearities are tested first by the inclusion of quadratic values of leave duration in the equation, so we can check whether the incidence of leave extension changes when duration increases. We may expect, for example, a short period of leave to have a positive influence on employment rates whereas a negative or less strong effect may arise if leave entitlements induce a long period out of employment. Moreover, continuous values of duration may poorly capture the effects of the parental leave mandates if threshold effects exist. For instance, if women strongly wish to stay at home for a brief time following a childbirth, but return rapidly to work thereafter because of a steep decrease in the marginal utility of being at home. In this case, entitlements to short absences from work may have a substantial impact on labour supply, while further extensions of the periods of leave may have little additional influence. To permit this type of "step-effects", models are also re-estimated with the following dummy covariates: a variable "any leave", which equals one if the country has enacted a paid leave mandate and zero otherwise, and a variable more than 26 weeks to take into account threshold effects of longer leaves. These step-effects can be tested on employment rates and working hours, but not on earnings because of the limited time series.

Lastly, the effect of parental leave legislation can be modulated if both the amount paid is low or if the take-up of parental leave (for any reason) is relatively low. One way of controlling for such an effect is to introduce an indicator of real use and level of parental leave amounts. The influence of governmental spending paid at childbirth along with leave or as birth grants is a good one. Of course, this indicator might be endogenous, but we are interested here in its joint effect with our variable of interest. To what extend does adding such a control to government expenditure affect the parental leave legislation effect observed up to now? The spending per childbirth is then included as a control regressor in a second set of regressions covering a restricted number of countries and a shorter period for which this information is available.

The low frequency of changes in leave duration also requires that we properly distinguish their effect from other potential shocks or changes that happened at the same time in each country. In other words, one must make sure that other country- and time-specific confounding factors among the X'$_{jt}$ which can be correlated with changes in leave duration are controlled for. The yearly variations in the relative increase in GDP per capita are used in this perspective to proxy country–and-time specific shocks that might be correlated with changes in leave entitlements.[17]. Time trends are systematically included in the regression to account for the exogenous trends in labour market outcomes (see below).

The estimation of equations (1) and (3) is not straightforward, however, for several reasons. Material challenges due to (i) the by-step nature of changes in leave duration per country; (ii) the non-

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[16] Using the proxy β to estimate will give a underestimation in this case.

[17] Control with other country-specific and time-varying variables influencing changes in labour market outcomes, including average number of years of education, fertility rate, total unemployment rates, GDP per capita and proportion of employees working in the service sector. However, these results are not presented because of their potential endogeneity with respect to leave policies. Moreover, some of these variables are only available for a limited period of time which considerably reduces the number of observations and thereby the efficiency of the estimation. However, coefficient values and the conclusions are not dramatically changed when these controls are added.

stationarity nature of the data; (iii) the potential delay between policy implementation and behaviour changes; (iv) the heterogeneity in relationships between countries and over time and (v) the potential cross-section dependence between unobserved characteristics have to be sorted out to obtain consistent estimates.

A first challenge comes from the specific "by-step" nature of changes in our variable of interest, i.e. the number of paid weeks of parental leave. Although the number of changes in leave duration is quite large (a total of 110 changes are counted over our 40-year period), the number of changes by country is often small (3.6 changes per country on average), and the duration of leave remains at a given level for quite a long period in between those changes. This implies a relatively flat profile of leave duration during some periods with some shifts (which are often of limited size), unless they are due to a complete change of "paradigm" as in a very few cases (Moss and Kamerman, 2009). In turn, leave durations exhibit a high persistence with a non-stationary profile that has to be taken into account in the estimation.

Similarly, the trends in labour market outcomes also show a non-stationary profile due to the multiple factors driving their increase for each country and sex specifically, over and above leave policies. In order to remove these trends, one option is to include country- and sex-specific (linear) time trends $(e_{ij}.t)$ in the set of regressors with the advantage that they are exogenous variables and fit the changes in (the log) of labour market outcomes reported in Figures A1 to A4 in the Appendix. Nevertheless, these time trends may not be sufficient for the consistency of the estimations, which requires the variables be cointegrated. This condition is tested by an Im-Pesaran-Shin (2003) unit root test applied to the residuals obtained from the estimations of equations (1) and (3). We run this test because, among other reasons, it is adapted for unbalanced panels and allows panel units to be heterogeneous. This test assumes independence across the cross-sections, an assumption which is also tested by the test of cross-dependence designed by Pesaran (2004).

Another issue arises from the period of time which may be needed before getting the labour market behaviours affected by a change in leave legislation. As a result, current labour market outcomes may be the consequence of both current and past changes in leave rights. This argues for including lagged values of the leave variable in the estimation. However, none of the four-year lagged values of leave we have tested exhibit a better explanatory power on labour market outcomes than the influence of the contemporary value of leave duration[18].

However, another possible issue is that changes in leave entitlements may not be independent of employment trends, for example, if periods of leave are extended when tensions occur in the labour market. The causation between employment outcomes and leave duration may be reversed in such cases, with the consequence that the estimated coefficient would be biased. A classical strategy for overcoming this endogeneity problem consists in using instrumental variables to approximate the effect of leave on labour market outcomes. However, there is no obvious candidate to instrument leave durations because the time series variables available here are all correlated with both probability of taking leave and labour market outcomes. The use of lagged values of endogenous variables has become popular in such circumstances in macro panel analysis, but here this is clearly a sub-optimal strategy since lagged values of leave are weakly correlated to their current value when there is a policy change, while they remain correlated with labour market outcomes after a few years for the above mentioned reason of possible time lag in outcome responses. However, IV-regressions with two-stage least squares with time-lagged observations of leave duration are tested to check the robustness of our results.

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[18] Results will present one-year lag effects but other results are available on request.

Another issue from the potential existence of heterogeneity in economic relations is also often discussed in cross-country work, leading to warnings against using pooled estimation results to inform country-specific policy. "Pooled" estimators, such as those given by fixed (country) effects assume homogeneous slope parameters to identify the effect of leave extension on labour market outcomes. Such typical panel estimators incorporating fixed effects and/or instrumental variables, however, will be inconsistent under slope heterogeneity (Lee et al., 1997). For moderately large panels in both dimensions N and T, a useful approach is the Mean Group estimator (MG) of Pesaran and Smith (1995), which allows for country idiosyncratic adjustment by running the country-specific regressions and then averaging the coefficients across the panel. Although this approach is consistent under a wide range of conditions, it may be inefficient in small samples. For instance, Mark and Sul (2003) warn against the small sample fragility of single equation estimators, arguing in favour of aggregate pooled panel approaches. These concerns are relevant here as the number of countries is limited (N=30) and because the effective time span for which the outcomes variables are available vary across country from few to 40 years, meaning that cross-section averages may be vulnerable to outliers. As a consequence, rather than choosing an estimation procedure a priori, the empirical approach will be to compare results from a range of panel estimators that assume different restrictions (to be tested) regarding homogeneity.

A further challenge is the possible existence of correlation between units in cross-section, which would violate the classical regression assumption of unit independence. Time dummies are often used to address this issue, but this may be not sufficient if, for instance, countries are affected by a common shock but react differently. Changes in leave policies can be connected with such country-specific adjustment, in which case it is relevant to further control by the variation in the relative increase of the GDP used to address such effects. An alternative is the Common Correlated Effects (CCE) by Pesaran (2006) that might be relevant if the remaining error term still contains a country-specific component. For the mean group estimators, this involves augmenting the model specification with (weighted) averages of the dependent and independent variables and is consistent under both heterogeneity and cross-sectional dependence. These MG and CCE estimation procedures require quite large panels to be efficient, and therefore are applied to the model on employment rates which provide the longest time series. The deceptive results we obtained, however, deterred us from running these procedures on the other two labour market outcomes for which panel sizes are much smaller[19].

IV. Results

IV.1 The impact of paid leave duration on employment trends

Table 1 reports a first set of estimates from the regressions of employment rates as described in equations (1) and (3). Female and male employment rates are expressed as a function of the maximum number of paid weeks of leave (divided by 100 for ease of parameter interpretation) as set by the

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[19] A final concern is that investigating long-run equilibrium relations in a static model without any lagged variables may oversimplify the dynamic adjustment of the system, and may mistake short-run deviations for long-run effects. Error-correction models can overcome this problem with the simultaneous estimation of long-run relations and short-run deviations. Moreover, the pooled mean group estimator suggested by Pesaran et al. (1997) makes it possible to take into account the country heterogeneity in the adjustment process which affects the consistency of the estimates (Pesaran and Smith, 1995). One assumes in this case that countries converge to the same equilibrium while the speed of adjustment is country-specific. This procedure was applied here to measure the effect of leave extension on employment rates, but none of the estimates obtained were significant. For this reason, we do not present the related results.

legislation. Results are first presented for each sex separately, and the last rows of Table 1 report the estimations for the gender gap (female less male) in employment rates.

The first three estimations reported in Table 1 (Models 1 to 3) include country-fixed effects so that the coefficients capture the effect of within-country changes in leave duration on employment rates. All the models also include time dummies and country-specific (linear) time trends to eliminate the incidence of exogenous factors driving the evolution of labour market outcomes. They also include the yearly variations in the relative increase in log GDP to further control for any periodic and country-specific events that may have occurred at the same time as a change in leave legislation.

The estimates obtained with this basic specification show a positive and statistically significant impact of the extension in paid leave duration on the female employment rate, while the estimated impact on male employment rates is not significantly different from zero. Moreover, the Im-Pesaran-Shin unit root test applied to the residuals of this model, with a p-value below 0.05, suggests that the assumption of no cointegration between data series is rejected and that residuals are stationary. Time trends thus seem to efficiently eliminate the trends of the non-stationary employment rates. The hypothesis of cross-sectional independence between panels is strongly rejected, however, which indicates that time dummies and variations of GDP are inefficient controls for unobserved common factors. The estimates we get with the fixed effects may consequently be biased, even though we cannot say whether this bias is downward or upward.

Specifications which allow a delay in the response of employment rates to parental leave change are reported in the next columns. Lagged values of leave are never found with a significant influence on female or male employment rates, as is shown by the results with one-year lag in columns (2) and (3) and by those of the regressions with higher-order lags which were tested but are not reported here (results available on request). This is not surprising because the average duration of paid leave in the sample is much shorter than one year – 39 weeks on average –, and the responses of employment rates are likely to start within the same year.

More sophisticated specifications are then performed. IV estimations (column 4) show that coefficients of women's employment rate are hardly affected but become less significant once the possible endogeneity of leave duration is taken into account. The estimates we get from the Mean Group (column 5) and the Common Correlated Effects (column 6) are not statistically significant, which can be explained by the large cross-country differences in single equation estimates due to the difference in the time span covered by the data on employment rates available for each country.

Table 1: Influence of paid leave on employment rates

	(1)	(2)	(3)	(4)	(5)	(6)
	Country fixed effects			IV-2SLS	MG	CCE
Dependent variable: Natural log of <u>female</u> employment rates (25-54 years old)						
Leave duration	0.014** (0.007)	-	0.021* (0.011)	0.010 (0.008)	-0.053 (0.081)	0.080 (0.105)
Leave duration $_{t-1}$		0.008 (0.007)	-0.009 (1.012)	-	-	-
Im-Pesaran-Shin cointegration test (p-value of $\widetilde{Z}$)	0.028	0.038		0.032	0.000	0.000
Pesaran test of cross-section dependence (p-value)	0.001	0.001		0.001	0.000	0.123
R^2	*1.00*	*1.00*	*1.00*			
Dependent variable: Natural log of <u>male</u> employment rates (25-54 years old)						
Leave duration	0.007 (0.006)	-	0.018* (0.009)	0.000 (0.007)	-0.065 (0.051)	-0.002 (0.053)
Leave duration $_{t-1}$		0.000 (0.006)	-0.015 (0.010)	-	-	-
Im-Pesaran-Shin cointegration test (p-value of $\widetilde{Z}$)	0.038	0.048		0.048	0.000	0.000
Pesaran test of cross-section dependence (p-value)	0.008	0.006		0.006	0.000	0.299
R^2	*1.00*	*1.00*	*1.00*			
Dep. variable: <u>Female-to-male difference</u> in natural log of employment rates (25-54 years old)						
Leave duration	0.007* (0.004)	-	0.003 (0.006)	0.010* (0.005)	0.011 (0.073)	-0.044 (0.044)
Leave duration $_{t-1}$	-	0.00868* (0.00512)	0.00559 (0.00724)	-	-	-
Im-Pesaran-Shin cointegration test (p-value of $\widetilde{Z}$)	0.000	0.000		0.000	0.000	0.000
Pesaran test of cross-section dependence (p-value)	0.001	0.001		0.001	0.000	0.000
Number of observations	847	847	847	847	847	847

Robust standard errors in brackets. ***, ** and *: significant at the 1%, 5% and 10% levels, respectively. All models include time dummies, country-specific linear time trends, and year-to-year variations in the log of GDP. The dependent variables are the log of employment rates and their difference by gender in the last rows. Leave duration refers to the number of weeks of paid leave (irrespective of the wage replacement level) divided by 100.

The 'net' effect of the duration of paid leave on female-to-male difference in employment is reported in the last rows of Table 1. Almost all estimates indicate a positive influence of leave duration on the

female-to-male gap in employment rates. This association is estimated to be significantly different from zero by the standard country-fixed and IV estimations, which also do not reject the assumption that residuals are stationary. The assumption of cross-section dependence cannot be rejected, however. As for the female and male equations, the estimates given by the Mean Group and the Common Correlated Effects estimations are insignificant. It is also worth noting that the CCE model fails here to address the concerns for which they were developed, namely to account for all cross-section dependencies. In such circumstances, neither the MG nor the CCE estimates seem to perform better than the fixed-effect models. From now on, we will therefore prefer the country-fixed effect specifications. These models exhibit positive and significant coefficients for leave duration, which suggests that the extension of paid leave had overall contributed to increasing the female-to-male employment ratio, thereby reducing the gender gap in employment rates. The impact is nevertheless estimated to be small in any case, with a one-year paid leave inducing an increase of the relative employment ratio of less than 0.5 percentage[20] points compared with no paid leave entitlements.

A 3-year period of leave is thus estimated to increase the ratio of women working by between 1.1 (column 1) and 1.6 (column 4) percentage points. These numbers are overall small, but they support the argument that the extension of paid leave had a positive rather than negative impact on female labour force participation rates and thereby on the gender employment ratio.

The results reported in the Table 2 show results of alternative specifications of our variable of interest which aim at capturing potential non-linearities in the influence of leave on employment rates. This assumption of a decreasing and/or reversing incidence of leave duration is first tested by the addition of its square in the equation (column 1). None of the coefficient values obtained for the squared term of leave duration is significantly different from zero, so that there is no indication of a reversing incidence of leave with its duration.

The existence of "step effect" in the incidence of leave can be further tested with the inclusion of a dummy variable to indicate whether paid leave is granted or not, whatever its duration. This dummy variable captures the effect of leave mandates better than continuous regressors do if, for example, parents strongly wish to stay at home for a brief amount of time after childbirth, but prefer to return to work after a few days or weeks. Several thresholds were tested, but only the results for two specifications are reported in Table 2.

Column 2 includes a dummy variable equal to one if the country has enacted a leave mandate over the period under consideration and zero otherwise. Note that the rights to a minimum period of paid leave were introduced before 1970 in the vast majority of OECD countries, while they have been introduced since then in only 5 countries (Canada, Ireland, Korea, New Zealand and Switzerland). Despite this low number of cases, we found a significant incidence of this introduction of paid leave on employment rates. Interestingly, the results in column 2 also show a different influence of this introduction for men and women. Female employment rates do not seem to be significantly affected by the introduction of a short period of paid leave, as captured by the dummy variable, while they are positively affected by the extension of the period, as already suggested in Table 1. By contrast, male employment rates seem to benefit from the introduction of paid leave but do not react to its extension. A consequence of this asymmetric influence on female and male employment is that the introduction of paid leave tends to increase the gender gap (e.g. to lower the relative female-to-male employment

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[20] 0.36 for column 1. This value is calculated by applying the following formula $100 *(\exp(52/100)*)-1)$, where 52 is the number of weeks in one year, and is divided by 100 because the variable included in the regression was the number of weeks divided by 100; it is the coefficient of leave obtained by the regression on employment ratio reflecting equation (3).

ratio) because of its positive incidence on men's employment; this first negative influence is balanced, however, by a positive influence of the extension of paid leave on female employment rates.

Column 3 reports the results of another non-linear "threshold effect" but with a cut-off point at 26 weeks (half a year). It is worth noting that about 15 countries (half the countries in our sample) have extended the entitlements to paid leave by 26 weeks or more over the decades under consideration. Here we find that the extension of paid leave above 6 months has no additional effect on either female, male or gender gap outcomes and that the leave duration is not affected by a possible threshold effect of long paid parental leave. All these first three models confirm that the assumption that parental leave duration has a linear effect on employment rate cannot be rejected.

Finally, the final column in Table 2 analyses the robustness of this relationship when taking into account the yearly amounts spent by governments on leave and birth grants calculated by child. The regressions are run for a subset of countries and a restricted period of time since data on public spending are available for 20 countries from 1980 to 2007. For a given duration of paid leave, higher amounts spent per childbirth reflect the higher number of leave days actually taken by parents (mainly mothers) and/or the higher payment rates which can also go along with higher take-up rates. As expected, employment rates respond negatively to governmental spending on leave (column 4). The impact of higher spending on the total employment rates of women aged 25-54 is quite sizeable since an increase of spending by US$1,000 per year and per birth is estimated to decrease female employment rates by 1% on average – as given by the exponential of the coefficient on spending obtained in column 3 (0.00265). This result is highly consistent with the expectation that higher payment will first encourage more women to take longer leave periods and delay their return to work. By contrast, male employment rates are not affected by the spending on leave and birth grants made by governments in all specifications, which is consistent with the fact that few fathers actually take parental leave and/or take only a small portion of it. Overall, the female-to-male relative employment ratio appears to be negatively impacted by the expenditures made for leave after childbirth. The increase in leave takers, as reflected by the higher spending, exerts a depressing influence on the long-run development of female employment and thereby contributes to increasing the gender gap in employment rates.

But despite their statistical significance, the magnitude of the effects of leave duration is hardly affected. The parameters of leave duration for women and men are rather similar and the loss of significance of the parameter on the gender gap is likely to be due to the sample size reduction. In all, this finding makes it quite clear that the leave duration legislation effect is quite robust to different econometric specifications. As the duration of paid leave increases, labour markets converge towards a long-run equilibrium in which female employment rates get closer to those of men

Table 2: Influence of non-linear effects of the duration of paid leave on employment rates

	(7)	(8)	(9)	(10)
Dependent variable: Natural log of <u>female</u> employment rates (25-54 years old)				
Any paid leave > 0 weeks	-	0.007 (0.007)		
Any paid leave > 26 weeks	-	-	0.579** (0.233)	-
Leave duration	0.029 (0.023)	0.014** (0.007)	0.0228** (0.009)	0.015** (0.006)
Leave duration squared	-0.008 (0.012)	-	-	-
Gov. spending	-	-	-	-0.002* (0.001)
Dependent variable: Natural log of <u>male</u> employment rates (25-54 years old)				
Any paid leave > 0 weeks	-	0.039*** (0.008)		
Any leave > 26 paid weeks	-	-	0.218 (0.189)	-
Leave duration	0.013 (0.017)	0.007 (0.006)	0.008 (0.007)	0.009* (0.005)
Leave duration squared	-0.003 (0.009)	-	-	-
Gov. spending	-	-	-	-0.000 (0.001)
Dep. variable: <u>Female-to-male difference</u> in natural log of employment rates (25-54 years old)				
Any paid leave > 0 weeks		-0.032*** (0.008)		
Any leave > 26 paid weeks	-	-	0.360** (0.141)	
Leave duration	0.016 (0.016)	0.007* (0.004)	0.0143** (0.005)	0.006 (0.004)
Leave duration squared	-0.004 (0.007)	-	-	
Gov. spending	-	-	-	-0.001** (0.000)
Number of observations	847	847	847	490

All models include country-fixed and time dummies, as well as country-specific linear time trends, and year-to-year variations in the log of GDP. The dependent variables are the log of employment rates and their difference by gender in the last rows. Leave duration refers to the number of weeks of paid leave (irrespective of the wage replacement level) divided by 100.

Robust standard errors in brackets. . ***, ** and *: significant at the 1%, 5% and 10% levels, respectively. Countries whose government spending is included: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, United Kingdom, United States.

IV.2. The impact of leave entitlements on average working hours

The influence of leave entitlements on average working hours is summarised in Table 3. We see here also a positive association between leave duration and women's average working hours in all specifications. All estimates show a positive association between leave duration and female working hours, while no such association is found for men. This difference in the response of male and female working hours is confirmed by the positive association found between the extension of paid leave and the average female-to-male working hours ratio.

The influence of a marginal increase of leave duration declines, however, with the gradual extension of paid leave, as shown by the significant negative sign of the squared leave duration coefficient. For instance, the coefficients reported in column (2) suggest that paid leave of 20 weeks leads to an increase of 0.5 hours per week in the average female-to-male working hours ratio. The effect peaks (1.7 hours) at a period of leave that is slightly longer than 2 years (127 weeks) and then decreases. This finding is quite consistent with the intuition that women on leave for a couple of years are more likely to go back to work on a part-time basis or at reduced working time. However, we did not find evidence of any "step effect", such as those tested in columns (3) and (4), for instance, with the inclusion of a dummy variable equal to one if paid leave is granted for a period above 26 weeks and zero otherwise[21]. By contrast, the evidence suggests that the extension of paid leave has rather contributed to help women maintain or increase their working hours in the vast majority of countries where such extension happened, thereby contributing to reducing the gender gap in working hours.

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[21] Potential step-effects were also tested for longer values of leave, i.e. for thresholds set at either 52 or 120 weeks to proxy the maximum estimated by the duration squared term. None of them showed a significant coefficient that would suggest the existence of any significant step-effect, over and above the concave impact of leave duration tested in column (2).

Table 3: Influence of paid leave on weekly working hours

	(1)	(2)	(3)	(4)	(5)
		Country fixed effects			IV-2SLS

Dependent variable: Natural log of <u>female</u> average working hours (25-54 years old)

	(1)	(2)	(3)	(4)	(5)
Any paid leave > 26 weeks	-	-	0.006 (0.004)	0.003 (0.004)	-
Leave	0.014*** (0.004)	0.035*** (0.010)	0.010** (0.004)	0.028** (0.010)	0.021** (0.004)
Leave squared	-	-0.011** (0.005)	-	-0.008* (0.005)	-

Dependent variable: Natural log of <u>male</u> average working hours (25-54 years old)

	(1)	(2)	(3)	(4)	(5)
Any paid leave > 26 weeks	-	-	-0.000 (0.003)	-0.001 (0.004)	-
Leave	0.00694 (0.00555)	0.00856 (0.0111)	0.006 (0.006)	0.010 (0.013)	0.010 (0.006)
Leave squared	-	-0.00130 (0.0055)3	-	-0.001 (0.005)	-

Dep. variable: <u>Female-to-male difference</u> in natural log of average working hours (25-54 years old)

	(1)	(2)	(3)	(4)	(5)
Any paid leave > 26 weeks	-	-	0.007 (0.004)	0.004 (0.005)	-
Leave	0.00731* (0.00402)	0.0268** (0.0107)	0.003 (0.004)	0.017 (0.014)	0.010** (0.004)
Leave squared	-	-0.0105** (0.00503)	-	-0.006 (0.006)	-
Number of observations	595	594		594	594
R^2	0.998	0.998	0.998	0.998	

All models include country-fixed and time dummies, as well as country-specific linear time trends, and year-to-year variations in the log of GDP. The dependent variables are the log of the weekly average working hours and their ratio by gender in the last rows. Leave duration refers to the number of weeks of paid leave (irrespective of the wage replacement level) divided by 100.

Robust standard errors in brackets. . ***, ** and *: significant at the 1%, 5% and 10% levels, respectively.

IV.3 The impact of leave entitlements on the gender earnings gap

Table 4 shows the results obtained for the estimation of the impact of leave duration on the weekly earnings of full-time employees. This estimation is run on the basis of a much smaller sample of 10 countries only, for which data on average earnings by sex are available. For each country, data on earnings are available for only a limited period of time, however, which does not make it possible here to consistently test the presence of a step-effect. Nevertheless, the available data suggest that earnings are steadily increasing over time, while the earnings gap between genders is stable or decreasing. Furthermore, the regression of earnings trends on leave duration suggests a significant and positive

association between this latter and the average earnings of women and men taken separately. No significant association is evidenced between paid leave and the trends regarding the gender gap in earnings.

Table 4 Influence of paid leave on weekly earnings – country fixed-effect

	Country fixed effects		IV-2SLS
	Dependent variable: Natural log of female earnings (25-54 years old)		
Any leave > 26 weeks	-	-	-
Leave duration	0.041* (0.024)	-0.055 (0.084)	0.0513* (0.0310)
Leave duration squared	-	0.052 (0.041)	
	Dependent variable: Natural log of male earnings (25-54 years old)		
Any leave > 26 weeks	-	-	
Leave duration	0.041* (0.02)	-0.0112 (0.0798)	0.0557* (0.03066)
Leave duration squared	-	0.0288 (0.0386)	
	Dep. variable: Female-to-male difference in log of earnings (25-54 years old)		
Any leave > 26 weeks	-	-	-
Leave duration	0.000 (0.005)	0.000908 (0.00539)	0.00441 (0.00673)
Leave duration squared	-	-0.0237* (0.0130)	-
Number of observations	445	445	441
R^2	0.997	0.997	

Countries included are: Australia, Germany, Finland, France, Japan, Korea, Netherlands, Sweden, United Kingdom, and the United States. All models include country-fixed and time dummies, as well as country-specific linear time trends, and year-to-year variations in the log of GDP.

Robust standard errors in brackets. . ***, ** and *: significant at the 1%, 5% and 10% levels, respectively.

V. Conclusion

This study has shed light on policies regarding the entitlements for parents to leave their jobs temporarily on the birth of a child and the consequences for parental labour market outcomes. We first pointed out the increasing diversity of leave mandates across OECD countries, following the provision of entitlements to leave work for both parents on top of the basic "maternity" rights covering mothers around childbirth. This diversity reflects the different options taken by countries to meet various objectives regarding child education, labour market and gender equity concerns, or to meet budgetary constraints. We showed a persistent divide between countries which first promoted the rights to parental leave and where paid leave is still in 2011 granted for much longer periods and those which introduced such rights from the 1990s onwards – and where gender equity concerns are often prominent. Nevertheless, we identified around 110 changes in leave duration in the 30 OECD countries covered from 1970 to 2010, which makes it possible to estimate their influence on labour market outcomes, i.e. employment rates, average working hours and weekly earnings. The macro-level perspective adopted here has the advantage that we consider the potential influence of leave policies on all the working age population, who can be affected directly by workers who actually use leave entitlements, but also indirectly through labour market forces and the diffusion of labour market practices.

In all, we have found no evidence that leave mandates have had a detrimental influence on female employment rates and on the gender ratio of employment. On the contrary, our estimates rather suggest a positive incidence of leave duration, though the overall effect is very small. This finding is consistent with the earlier finding of Ruhm (1998) and also many micro-level studies which conclude that the extension of leave entitlement for a longer period tends to allow more women to keep their attachment to the labour market, and thus increase the number of women participating in the labour force at the end despite (or thanks to) a longer period of time spent at home in the short run.

Nevertheless, the results also showed the asymmetric incidence that the introduction of paid leave and its extension with parental leave entitlements have had on men's and women's employment rates. The introduction of leave entitlements for a few weeks only seems to create a shock to labour market demand which initially benefits men's employment more than women's (if the period of leave is not long enough to attract women into work). However, the extension of the period of paid leave seems to have a more positive incidence on the total employment rates of female workers. The mechanisms at work are not fully identified here, but it may be that longer paid leave makes it more attractive or easier for women to work before and/or after having children. The reaction of the labour demand side, if any, does not appear large enough to completely offset the upward shift in women's labour supply due to the entitlement to extended leave. Our results also suggest that, although the introduction of paid leave is initially damaging for gender equality in employment, its extension for prolonged periods seems to be less damaging, probably because leave becomes progressively more widely used and thereby more widely accepted by employers and other employees. It is safe to assume that the introduction of paid leave as well as its extension above the minimum standard of maternity leave did not hurt and has instead fostered the increase in female labour market participation, thereby contributing to reducing gender inequalities. The overall effect of the legal duration of paid leave on employment rates seems to be small, however, since we estimated that the extension by 41 weeks that occurred on average over the past four decades has probably contributed to increasing the female employment rate relative to that of men by no more than 0.5%. This result is also robust to the inclusion of government spending used to approximate the effective use of leave entitlements. It

shows that women's employment rates are most affected by the use of paid leave, while men's are not. It also reveals the relative importance of payment compensation over and above the extension of the legal maximum duration of leave in measuring the influence of leave policies on labour market outcomes and their gender asymmetries. The nature of the data did not afford more precise insights into the exact incidence of payment level, however.

Similarly, we found a positive association between leave duration and the average number of hours worked by women relative to men, but here up to a maximum of leave duration. Further extensions of paid leave above this point tend then to depress the female-to-male working hours ratio. One explanation may be that providing a longer leave may also incline women to work less hours when they return to work even if they still work full-time or because they are more likely to work part-time. Women may also be more frequently employed in jobs with less earning potential when they return to work after childbirth and a period on leave. This would explain our last result showing that the provision of paid leave – whatever its duration – may have contributed to widening the gender gap in earnings of full-time employees.

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Figure A1: Weeks of paid leave in OECD countries – 1970-2010

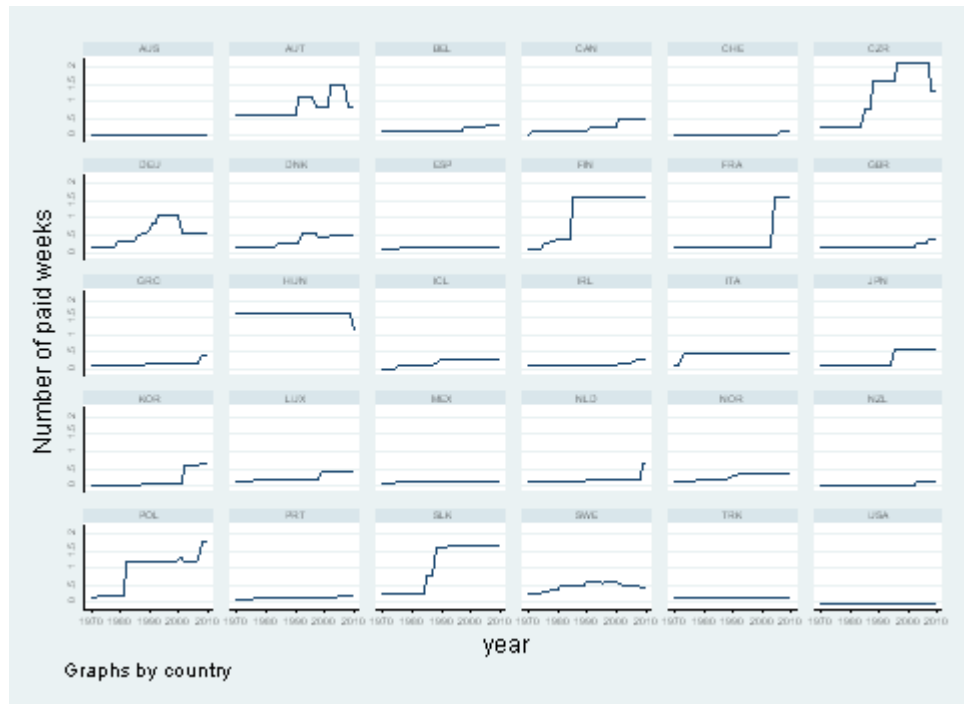Graphs by country

Figure A2: Employment rates in OECD countries – 1970-2010

Graphs by country
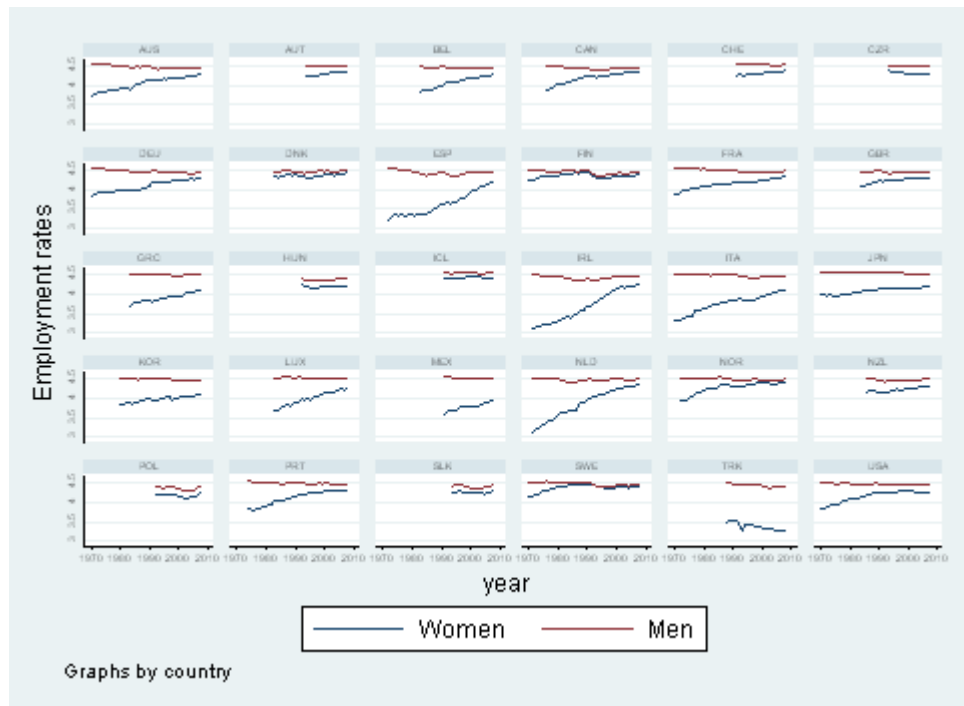
Figure A3: Average Working Hours – 1970-2010

Graphs by country
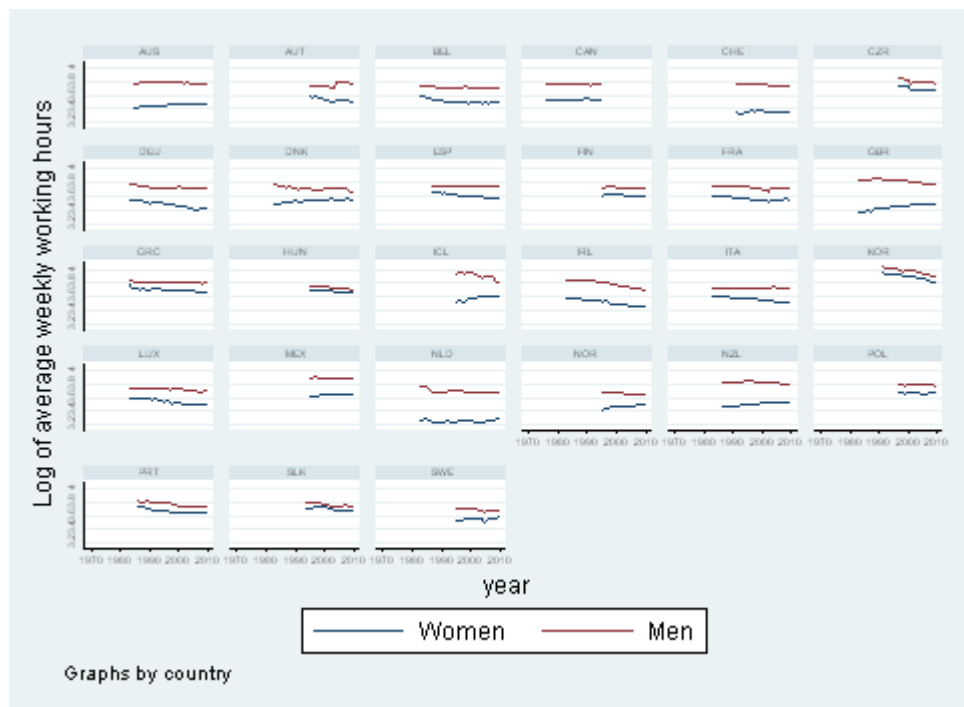
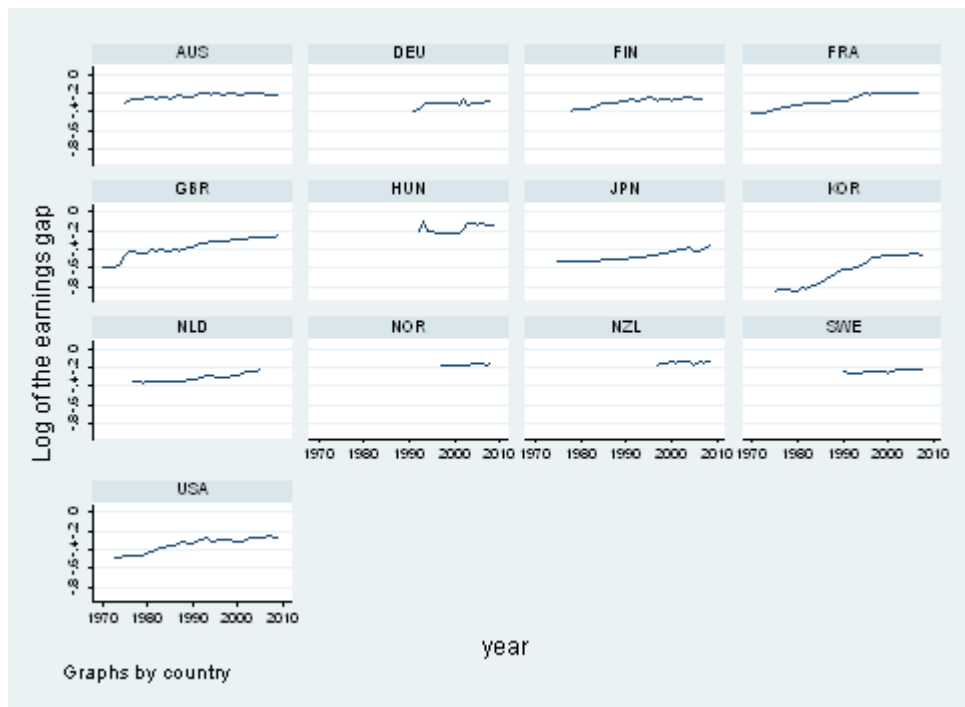**Figure A4: Weekly mean earnings – 1970-2010**

Panel A: Male and female mean earings

Graphs by country
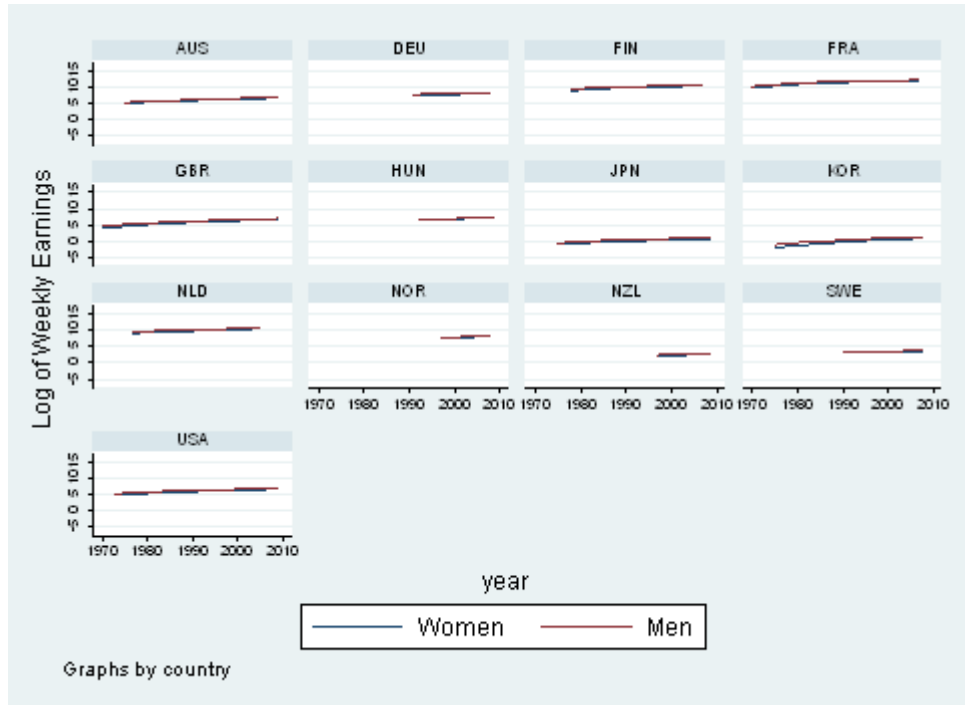
Panel B: Gender earnings gap

Graphs by country

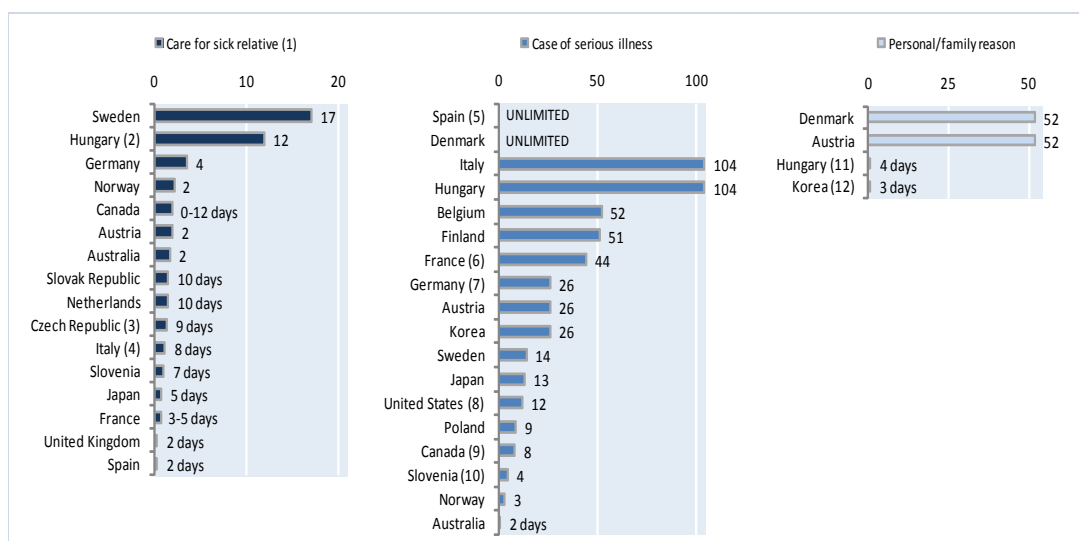# APPENDIX 1. ADDITIONAL LEAVE ENTITLEMENTS FOR PROVIDING CARE

Many OECD countries grant employees specific entitlements to care for a close relative, and/or sick and disabled children. Relevant leave arrangements are of three broad types: i) additional days leave granted to care for sick children and other family events; ii) longer-term specific leave periods to care for disabled children or dependent relatives; and iii) long-term leave for unspecified personal reasons. From country responses to a questionnaire on entitlements to additional leave, it emerges that the nature of such leaves varies considerably across countries, both in terms of duration, eligibility criteria, and whether such leaves are legal entitlements or subject to employer agreement. Nevertheless, the information in the chart below suggests that:

- Entitlements to provide care for sick children or dependent relatives range from two days to 17 weeks per year;

- Parents who care for a relative with a severe illness or disabilities are frequently entitled to longer periods of leave (Austria, Denmark, France, Hungary, Italy, Korea and Sweden); parents in Austria, Denmark and France could also use their "personal leave entitlement, as subject to employer agreement" for this purpose.

In general, prolonged periods of leave to care for sick relatives are unpaid. However, carers can sometimes claim a "carers–benefit" during this period (for example Australia or Canada). In Austria, low-income carers can receive payment during six months of "family hospice leave", and in France and Sweden parents of disabled children can claim specific allowances. In Australia, Italy, Japan and Korea, employers can provide payments for part of the leave period.

More generous provisions exist in Sweden, Hungary and Italy. In Sweden, employees can take between 3 and 12 months leave from work for various purposes – including family needs – under certain conditions (the replacement worker must be an unemployed person). Employees taking leave will receive 85% of the unemployment benefit, which is earnings-related up to a ceiling. In Hungary, parents of a child under age 12 with a serious illness or disabilities can claim child home-care allowance until age 10. Instead of the home-care allowance or upon the 10th birthday of the child, parents can also be partly reimbursed for the nursing fee, which is paid to a person who is taking care of a relative in need of permanent care. In Italy, a family entitlement of two years with public income support replacing earnings is granted to employees taking leave to care for disabled relatives, and on return to work an additional three days of paid leave per month are made available.

Duration of additional leave to care for sick relatives or children with disabilities in weeks

Chart 1 — Care for sick relative (1):
- Sweden: 17
- Hungary (2): 12
- Germany: 4
- Norway: 2
- Canada: 0-12 days
- Austria: 2
- Australia: 2
- Slovak Republic: 10 days
- Netherlands: 10 days
- Czech Republic (3): 9 days
- Italy (4): 8 days
- Slovenia: 7 days
- Japan: 5 days
- France: 3-5 days
- United Kingdom: 2 days
- Spain: 2 days

Chart 2 — Case of serious illness:
- Spain (5): UNLIMITED
- Denmark: UNLIMITED
- Italy: 104
- Hungary: 104
- Belgium: 52
- Finland: 51
- France (6): 44
- Germany (7): 26
- Austria: 26
- Korea: 26
- Sweden: 14
- Japan: 13
- United States (8): 12
- Poland: 9
- Canada (9): 8
- Slovenia (10): 4
- Norway: 3
- Australia: 2 days

Chart 3 — Personal/family reason:
- Denmark: 52
- Austria: 52
- Hungary (11): 4 days
- Korea (12): 3 days

1. No Federal entitlements in Canada, duration varies across Provinces: up to three days in Manitoba, New Brunswick, Nova Scotia, Prince Edward Island; five days in British Columbia; seven days in Newfoundland and Labrador; up to ten days in Ontario; ten days in Quebec; and 12 days in Saskatchewan.

2. Hungary: refers to specific entitlements for parents with a child between 1 and 3 years of age: duration is unlimited when the child is under 1 and limited to 42 days (respectively 14 days) when the child is under six and between 6 and 12 years, respectively.

3. Czech Republic: for parents with children under 10: unlimited, but a parent can take no more than nine days in one block of time.

4. Italy: for parents caring for a child aged 3 to 8 years, duration is unlimited for a child under 3.

5 Spain: since 1 January 2011, parents have been entitled to reduce their working hours by half (or more) with a proportionate reduction in wages during the periods of hospitalisation or other medical treatment of seriously ill children until 18 years old.

6. France: employees are entitled to 44 weeks of leave to care for children and up to 13 weeks for other relatives.

7. Germany: emergency leave for medical reasons is also possible up to ten days if a relative needs assistance because of very serious illness.

8. United States: for workers in private companies with 50 or more employees.

9. Canada: federal compassionate care benefit rules provide for eight weeks, in some provinces duration of employment-protected leave is longer (*e.g.* Saskatchewan, 16 weeks, and Québec up to 104 weeks).

10. Slovenia: an employee is entitled to 30 days of leave in case of severe illness of a relative (can be extended to six months.

11. Hungary: for parents with two children (two days for one child and seven days for more than two children).

12. Korea: leave for emergency reasons can be taken for a maximum of 40 hours per year, but for no more than three consecutive days at a time.