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Labour Market Effects of Parental Leave Policies in OECD Countries

Olivier Thévenon,

Anne Solaz

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ABSTRACT

1. This paper considers how entitlements to paid leave after the birth of children affect female labour market outcomes across countries. Such entitlements are granted for various lengths of time and paid at different rates, reflecting the influence of different objectives including: enhancing children's well-being, promoting labour supply, furthering gender equality in labour market outcomes, as well as budget constraints. Although parental care is beneficial for children, there are concerns about the consequences of prolonged periods of leave for labour market outcomes and gender equality. This paper therefore looks at the long-run consequences of extended paid leave on female, male, and gender differences in prime-age (25-54) employment rates, average working hours, and earnings in 30 OECD countries from 1970 to 2010.

2. It finds that extensions of paid leave lengths have a positive, albeit small, influence on female employment rates and on the gender ratio of employment, as long as the total period of paid leave is no longer than approximately two years. Additional weeks of leave, however, exert a negative effect on female employment and the gender employment gap. This paper also finds that weeks of paid leave positively affect the average number of hours worked by women relative to men, though on condition – once again – that the total duration of leave does not exceed certain limits. By contrast, the provision of paid leave widens the earnings gender gap among full-time employees.

RÉSUMÉ

3. Ce document analyse les effets des droits à congé suivant la naissance d'un enfant sur la situation des femmes sur le marché du travail des différents pays. Ces droits sont octroyés pour différentes durées et peuvent être rémunérés ou non à des taux variables, reflétant ainsi l'influence de différents objectifs, y compris : favoriser le développement des enfants, promouvoir l'offre de travail, soutenir l'égalité des sexes sur le marché du travail, tout en respectant les contraintes budgétaires. Bien que les soins provenant des parents soient bénéfiques aux enfants, on peut s'interroger sur les conséquences d'une période de congé prolongée sur la situation au regard de l'emploi et l'égalité entre hommes et femmes. Dans cette perspective, ce papier analyse les conséquences à long terme de période de congés rémunérés étendues sur les différences concernant les hommes et les femmes de 25 à 54 ans en matière de taux d'emploi, durée moyenne de travail et revenus du travail dans 30 pays de l'OCDE de 1970 à 2010.

4. Les résultats mettent en évidence un effet de la durée du congé rémunéré positif mais petit sur le taux d'emploi des femmes et sur la différence femmes/hommes, tant que la durée du congé n'excède pas environ deux années. Au-delà, l'extension de la durée du congé exerce un effet négatif sur l'emploi des femmes et sur les écarts d'emploi entre les hommes et les femmes. Un effet positif est aussi estimé sur la durée hebdomadaire moyenne de travail des femmes relativement à celle des hommes, là encore tant que la durée du congé reste limitée. En revanche, l'octroi d'une période de congé tend à accroître les différences hommes/femmes de revenus du travail perçus par les employé(e)s à temps plein.

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1. INTRODUCTION

5. Parental leave entitlements give employment protection, and sometimes income support, to workers who take time off work to care for their children. Parental leave policies have developed differently across countries due to differences in emphasis in underlying policy objectives and dimensions. Dimensions may be:

- economic, as parental leave affects labour force participation and labour market regulation;
- social, as parental leave may affect the health of working mothers as well as the physical and emotional development of children;
- demographic, since parents' decisions about whether or not to have children may be affected by leave, which is an integral part of the policies to support work-life balance.

6. Governments may, however, view weeks of leave as a less expensive family support solution than providing formal childcare services, although such an attitude overlooks the adverse effects that lengthy leave can have on labour market outcomes.

7. Different policy objectives have to be balanced in the design of leave entitlements. In particular, concerns about children's well-being may need to be weighed against the potentially positive effects of leave entitlements on parental labour market outcomes, especially with respect to a mothers' return to work when her leave is over (Galtry and Callister, 2005; Ray *et al*., 2010; OECD, 2011a).

8. Overall outcomes, however, also depend on the length of parental leave from work. If it is too short, the mother and child's well-being may be at risk. If too long, parents' careers may suffer. A balanced use of leave entitlements by both parents after childbirth is good for gender equality and improved female labour market outcomes. Although fathers are frequently entitled to leave days for their exclusive use, mothers are, by and large, the main users of parental leave. The upshot is that, in many countries, parental leave policies effectively perpetuate existing gender differences in the provision of care and unpaid household chores.

9. Other considerations may also affect the design of leave entitlements. Societal norms relative to the roles of mothers and fathers in the care and education of children influence the behaviour of working mothers and fathers. Norms vary across countries, but also change within them over time (Cameron and Moss, 2007). Employers' attitudes towards leave policies are also important. They may baulk at having to bear short-term costs of replacing employees on leave and contributing to leave payments. However, they may well reap long-term benefits – *i.e.* greater rates of return on their investment in human capital – as mandated paid leave makes their employees more likely to resume work.

10. Parents' entitlements to leave from work around the time of childbirth have greatly expanded over recent decades in most OECD countries. First introduced was a mothers' basic right to leave from work for a few weeks before and after the birth of their baby. All OECD countries now grant such periods of "maternity leave" and, with the exception of the United States, ensure that income support is paid during this period. They have also introduced additional parental leave entitlements for both parents, although their length, payment rates, and transferability between parents vary considerably from country to country.

11. Differences in the design of leave policy influence the extent to which parents use and share their rights. Payment rates are a key parameter. Since fathers are often the main earners in families, women are likely to take most of the available leave in order to keep the loss of household income to a minimum. Some countries have attempted to achieve a more gender-balanced use of leave entitlements by increasing payment rates and/or granting individual rights that parents cannot transfer to their partners. While non-negligible, success here is limited in that gender differences in the use of parental leave remain wide in practice. As a consequence, the labour market effect of leave chiefly impacts on women.

12. The effects of leave on female labour market outcomes are complex. On the positive side, the provision of leave for the birth of a child and/or the extension of existing rights can be expected to increase female labour supply before and after childbirth: working before having a child becomes a more attractive prospect, as does returning to work – provided, of course, that the mother has worked long enough to be eligible for parental leave.

13. However, if employees take up very long leave entitlements, they may become detached from the labour market as their skills depreciate. They might also have trouble getting the same job back.[1] Moreover, the extent to which leave mandates produce positive outcomes for women also depends on how employers respond. Some may be reluctant to hire women, whom they perceive as more likely to take leave, if similarly qualified male workers are available. They may also seek to keep women in jobs where time off has a limited impact on the production process or where it is relatively easy to replace them. Plainly, however, the different perspectives on the labour market outcomes of paid leave mandates make it difficult to draw conclusions with any certainty as to the overall effect.

14. This paper assesses how the extension of paid childbirth-related leave entitlements in OECD countries since the early 1970s has shaped gender differences in labour market outcomes. Three types of outcomes are considered:

1. employment rates
2. average working hours
3. weekly earnings of full-time employees.

15. The paper uses an empirical procedure that builds on the framework proposed by Ruhm (1998) who analysed how leave mandates affected the labour market in 19 European countries up to the early 1990s. It covers 30 OECD countries in the 1990s and 2000s, during which time many leave policy reforms were introduced. It also addresses estimation issues that Ruhm left out of his seminal paper, such as non-stationarity and the potential cross-country heterogeneity in relationships between leave duration and labour market outcomes. The paper is structured as follows. Section 2 overviews the cross-national differences in leave policies before a brief review of the literature on how leave affects labour market outcomes. The fourth section sets out the empirical strategy (outlined in the previous paragraph) which the paper uses to analyse the effect of leave mandates on the labour markets in the OECD area. The paper then devotes a short section to the data issues raised by extending the terms of the analysis, before Section 6 discusses the results it produced. The closing section brings together in a conclusion the various strands of the arguments the paper has addressed.

[1] There is often no strict guarantee that workers can go back to the same job.

2. PARENTAL LEAVE POLICIES IN OECD COUNTRIES

16. The legally enshrined entitlement to take leave from work to care for a newborn child has a long history in the OECD area. The basic right to stop work for a few weeks prior to and after the birth of a baby was first granted to working mothers to protect their health and their child's. That was "maternity" leave. Since then, the additional entitlement to leave from work after a child is born – "parental" leave – has been progressively introduced. Parental leave may either be shared by both parents or granted to each one separately. Its development has been especially rapid since the late 1980s, driven by considerations that are not only health related. The potential benefits of maternal care for very young children are among the main arguments put forward to justify prolonged periods of leave. There is limited evidence, however, that a mother's return to work within the six months of giving birth is harmful to her child (OECD, 2011a; Huerta *et al*., 2011).

17. Mothers are usually the main users of parental leave entitlements. In an attempt to promote greater gender equality in paid and unpaid work, however, some countries have introduced entitlements specifically for fathers. Another government motive for extending lengths of "parental" leave is that subsidising parents to take time off work and care for their children is often much less costly than expanding childcare capacity. Long leave can also be a means of deterring parents (particularly mothers) of very young children from supplying labour in periods of high unemployment (Kamerman and Moss, 2009; Martin, 2010).

18. The complexity of government motives results in significant variations in the design of leave entitlements across the OECD. A first main difference lies in the way entitlements to maternity (or pregnancy), paternity, and parental leave are combined (Box 1). Additionally, in some countries, parental leave is supplemented by a further period of leave (homecare leave/childcare leave) that parents can take to care for a very young child, often up to the age of three. This web of entitlements leads to substantial differences in total durations of leave. Such differences also appear to be linked to when entitlements were first introduced. Countries that first passed parental leave entitlement legislation in the early 1970s currently grant comparatively longer post-childbirth leave. And while entitlements have undergone reform in many countries, most of the cross-country differences have been either maintained or accentuated over time.

Box 1. Definitions of the different types of leave entitlements

Maternity (or pregnancy) leave is job-protected leave of absence for employed women prior to and after childbirth or, in some countries, adoption. Almost all OECD countries have ratified the minimum duration of 14 weeks of paid leave recommended by the International Labour Organisation (ILO), and many countries grant fixed maternity leave entitlements that exceed the 14-week minimum (ILO, 2010). Most countries allow beneficiaries to combine pre- and post-birth leave, while some mandate a short period of pre-birth leave and six to ten weeks after childbirth. Almost all OECD countries provide specific public income support payments that are tied to the length of maternity leave.

Paternity leave is employment- or job-protected leave of absence for employed fathers after childbirth. Paternity leave is much shorter than maternity leave – no more than two weeks. Because it is short, workers on paternity leave often continue to receive their full wages.

Parental leave is employment-protected leave of absence for employed parents that supplements maternity and paternity leave. In most, though not all, countries it follows maternity leave. Unlike eligibility for public income support that is often family-based, entitlement to parental leave is individual, so that only one parent can claim support at any one time.

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

In addition to parental leave entitlements, working parents may use a range of additional leave entitlements – *e.g.* holidays or sick leave – in order attend to family care, where needs often arise at short notice.

Source: OECD (2011b), OECD Family database, "Indicator PF2.3: Additional leave entitlements for working parents", Social Policy Division, Directorate of Employment, Labour and Social Affairs, www.oecd.org/els/social/family/database.

Maternity leave entitlements

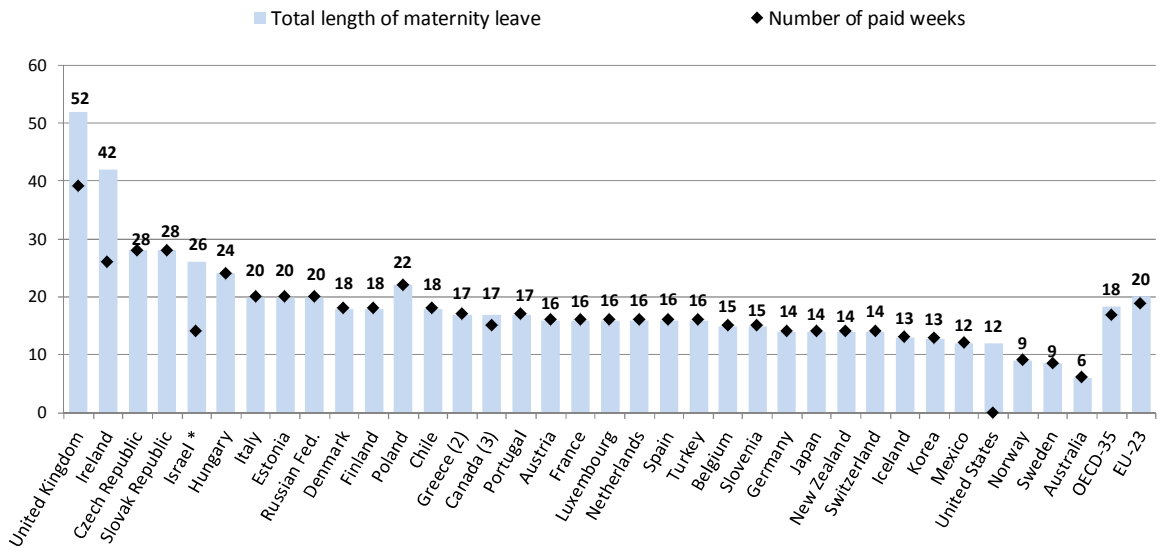
19. Because maternity (or pregnancy) leave entitlements were first introduced to protect the health of working mothers and their newborn children, they are often incorporated into social security systems, alongside health insurance and paid sick leave. They ensure women a period of rest from work before and after childbirth and a return to their 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. Maternity leave that begins and ends either side of childbirth is mandatory, although when it starts and how long it lasts vary across countries and can, in any event, be adjusted for medical reasons or by employer-employee agreement.

20. Across the OECD, the average duration of maternity leave was around 19 weeks in 2011 (Figure 1). It is longest in the United Kingdom (52 weeks), although the country has no parental leave scheme. There are no separate maternity and parental leave entitlements in Australia, but mothers may take only six weeks out of 52 weeks of parental leave prior to the birth of their child.[2] In the United States – the only

[2] In fact, there is no statutory entitlement to maternity leave as such in Australia, although the country has granted entitlements to paid and unpaid parental leave since January 2011. Entitlements provide for up to 12 months of postnatal leave for women, of which up to six weeks 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 leave under the Government's new Paid Parental Leave scheme.

OECD country that has no nationwide legislation on paid maternity leave – some states provide income support through either sick-leave insurance or maternity-leave programmes (Kamerman and Waldfogel, 2010).[3]

Figure 1. Weeks of maternity leave in OECD countries - 2011



Notes: (1) Total length of maternity leave refers to the aggregate length of paid and unpaid entitled weeks. The figures in the chart refer to the total length of job-protected maternity and parental leave in 2011. Australia, Norway and Sweden have no separate maternity leave entitlements. The figures shown for these countries refer to the weeks of parental leave reserved strictly for mothers.
(2) Greece has a basic maternity leave of 17 weeks. It also grants an additional six-month leave period that begins after basic maternity leave and before employees begin to use flexible working time.
(3) Canada's 17 weeks are for maternity leave in most provinces and territories, even though the provinces of Quebec and Saskatchewan, for example, grant 18 weeks of maternity leave.
* Information on data for Israel: http://dx.doi.org/10.1787/888932315602

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

[3] Payment during leave is most often obtained through sick leave insurance in the United States (Kamerman and Waldfogel, 2010). Five states (California, Hawaii, New Jersey, New York, and 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, and 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.

Parental leave entitlements

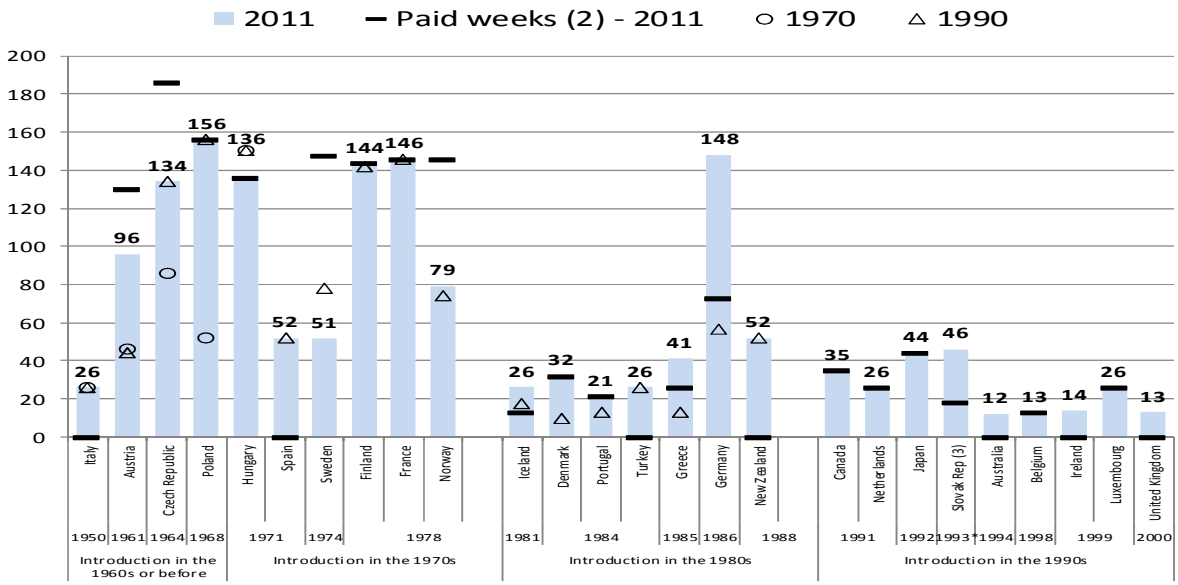
21. Parental leave entitlements offer parents additional opportunities to care for a newborn child. While they usually take parental leave taken just after maternity leave, some countries allow them to take it later on – usually before the child reaches eight years old. A few countries have no legal framework for maternity/paternity or parental leave, though they may set aside a certain period of leave for the specific use of each parent.

22. The legal basis of parental leave entitlements varies widely across countries. Widely introduced as supplementary rights for mothers only, most countries have now extended them to fathers. Parental leave can be granted as:

- **A family right** that parents can divide between themselves as they choose.
- **An individual right** which can be transferred to the other parent.
- **A non-transferable individual right** whereby both parents have an entitlement to a specified amount of leave. Often called "mommy and daddy quotas", this kind of leave has to be taken by fathers and mothers on a "use it or lose it" basis.

23. Figure 2 shows cross-country variations in the number of weeks granted by way of parental leave over the four decades from 1970 to 2010. It includes all the post-natal weeks available through homecare or childcare leave on top of those taken for maternity leave. The figure shows a clear divide between the forerunner countries – which first introduced parental leave entitlements in the late 1960s and early 1970s – and those which granted them from the 1980s onwards. The forerunners entitle parents to periods of between two and three years, while those that came to parental leave later make it much shorter – one year at the most. Cross-national differences have increased over time, though, with Austria, the Czech Republic and Poland substantially extending lengths of parental leave. By contrast, only a few countries – such as Sweden and, more recently, Germany – have actually shortened leave. Figure A1.1 in the Annex provides greater detail as to actual variations in total weeks of paid leave over the four decades.

Figure 2. Changes in parental leave entitlements, 1970-2011[(1)]



Notes: (1) Both paid and unpaid weeks of leave are shown. These totals refer to parental leave and subsequent prolonged periods of paid and unpaid leave (sometimes called "childcare" or "homecare" leave) that women can take after maternity leave to care for young children. Countries are ranked by the year they introduced entitlements, distributed by calendar year.(2) In some countries there are different payment options determined by the periods of time over which allowances received. The option considered here is the one where benefit is paid for longest. In Australia, after the first 12-month period of leave, a parent can request another 12 months (of their own or their partner's unused leave). In Canada, the Federal Employment Insurance Programme provides 35 weeks of paid parental leave, while unpaid leave periods can be longer. For example, the province of Québec provides 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, parental benefit can be received until a child is 48 months old, while the job-protected period of leave stops at month 36. In Germany, there is a family leave entitlement of up to three years, but the paid-leave period is limited – an income-related parental allowance ("Elterngeld") is paid for a period of 12 months, plus a two-month bonus if the father takes at least two months leave. Instead of 12 (+2) months the parental benefit may also be spread over 24 (+4) months. In the Netherlands, payment does not take the form of an allowance but of a tax credit. Norway offers 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 may be made to parents taking care of a child until he/she reaches his or her third birthday. In Sweden, a municipal child-raising allowance ("vårdnadsbidrag") was reinstituted since 2008 on top of the statutory period of leave. Since 2009, the country's municipalities have been able to choose whether or not to allocate benefit to parents with a child of between one and three years old who do not use publicly funded childcare services and who have already used 250 days of parental leave to care for the child. In Poland, the base period of paid leave is 24 months, but it can be extended to 36 months when there is more than one child. (3) Slovakia was governed by the leave legislation that applied in the Czech Republic until it passed its own legislation in 1993.

Source: Moss, P. (ed.) (2010), "International Review of Leave Policies and Related Research 2010", Employment Relations Research Series, No. 115, Department for Business Enterprise and Regulatory Reform, Institute of Education, University of London; European Commission, Mutual Information System on Social Protection/Social Security (MISSOC), and information provided by the authorities of non-EU countries; OECD Family database.

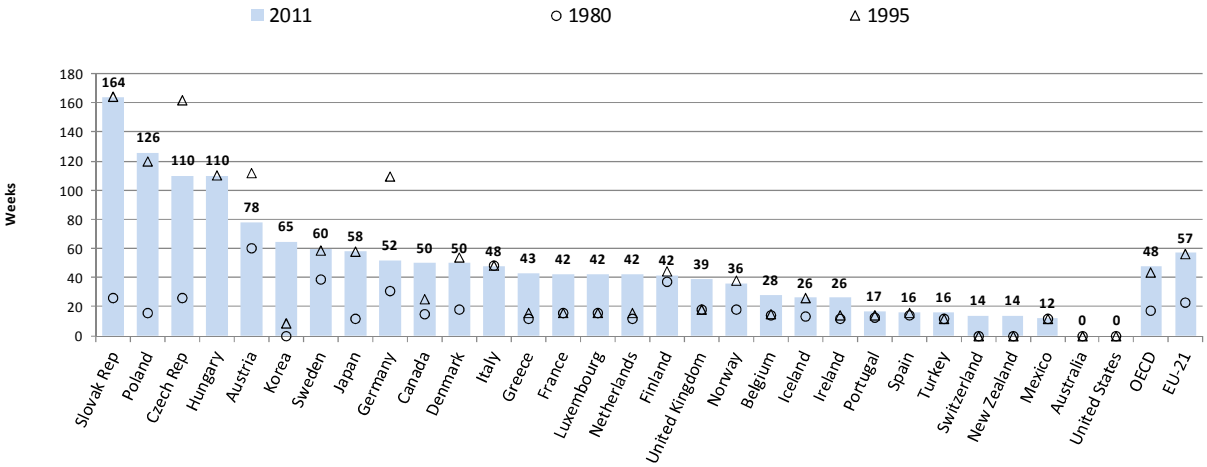
24. Parental leave is unpaid in Ireland, the Netherlands, Spain, Turkey, and the United Kingdom. In all other countries it is paid – at least for part of the leave period – although payment rates vary widely. Twelve countries supply benefits that cover the full period of leave, while 14 provide financial support for only part of the job-protected leave time. In the Czech Republic and Norway, payment spanned a longer period in 2011 than job protection, which could make it difficult for recipients of benefit for the full parental leave period to re-enter the labour market. France is the only country where the length of time for which allowances are received varies with the number of children.

25. Labour market outcomes are likely to depend on the total duration of leave. Figure 3 shows the total number of **paid** weeks of maternity and/or parental leave granted to mothers. The total varies greatly

across countries – from a few weeks of job-protected, but unpaid, leave in Australia and the United States to two to three years of paid leave (Austria, Czech Republic, Finland, Hungary, Slovakia, and France from the birth of a second child). Overall, there has been an increase in the average total period available for leave in OECD countries, even though there are wide disparities across countries (see Figure A1.1 in the Annex for further detail). It is also worth noting that mandated leave is on average longer in European countries where leave policies have been set by EU directives for decades.

Figure 3. Total weeks of paid leave granted to mothers[(1)] in 1980, 1995 and 2011

Countries ranked by number of paid weeks available in 2011



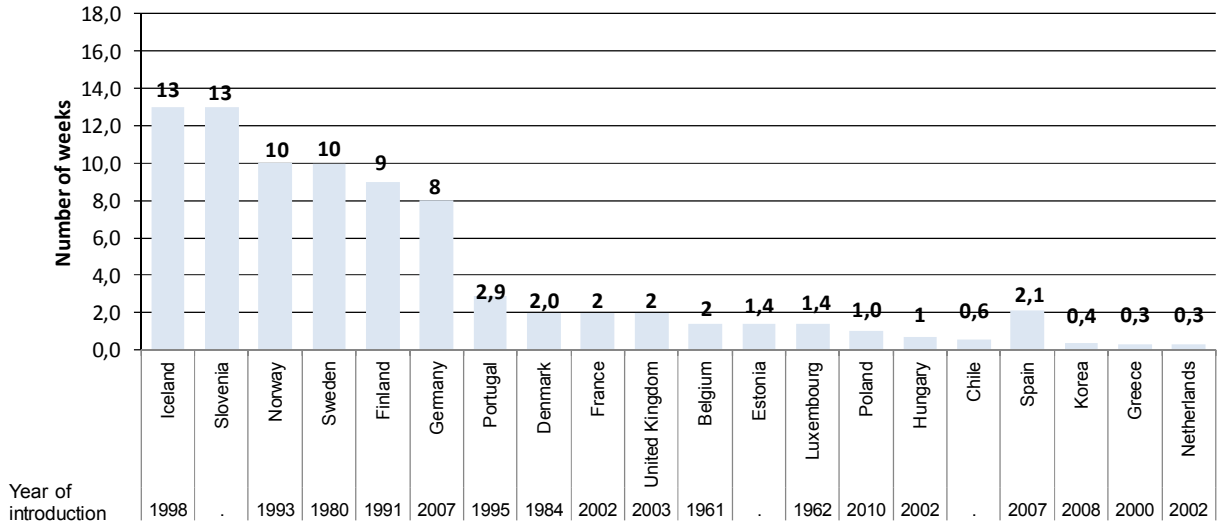
Notes: (1) Weeks of maternity and parental leave that women can take after maternity leave are included. Weeks of childcare or homecare leave have also been added where relevant. When there are several payment options, the shortest period with highest payment is taken into account.

Source: OECD Family database.

Father-specific leave entitlements

26. Many countries have introduced father-specific rights in their leave schemes. About one-half of OECD countries have separate paternity leave entitlements which allow fathers to take leave for the first 5-15 days that immediately follow childbirth. In addition, some countries earmark a particular period of parental leave for the exclusive use of each parent, with no possibility of transferring it to the partner. Reforms introducing such "quotas" have proved to be efficient in encouraging fathers to take some period of leave. Nordic countries (with the exception of Denmark) and Slovenia grant the longest father-specific leave, with Iceland and Slovenia allotting up to 13 weeks to each parent and replacing 80% of earnings – 100% in Slovenia below a certain threshold (Figure 4). However, the leave taken by fathers is less than the maximum authorised by legislation: despite the various schemes designed to encourage fathers to claim their father-specific rights, their overall take-up falls between 20% and 30% short of their entitlements (Moss, 2010).

Figure 4. Weeks of leave entitlement for fathers(1) in 2011



Note: (1) Estimates of the weeks of entitlement include paternity leave and father-specific "quotas" in parental leave entitlements.

Source: OECD Family database.

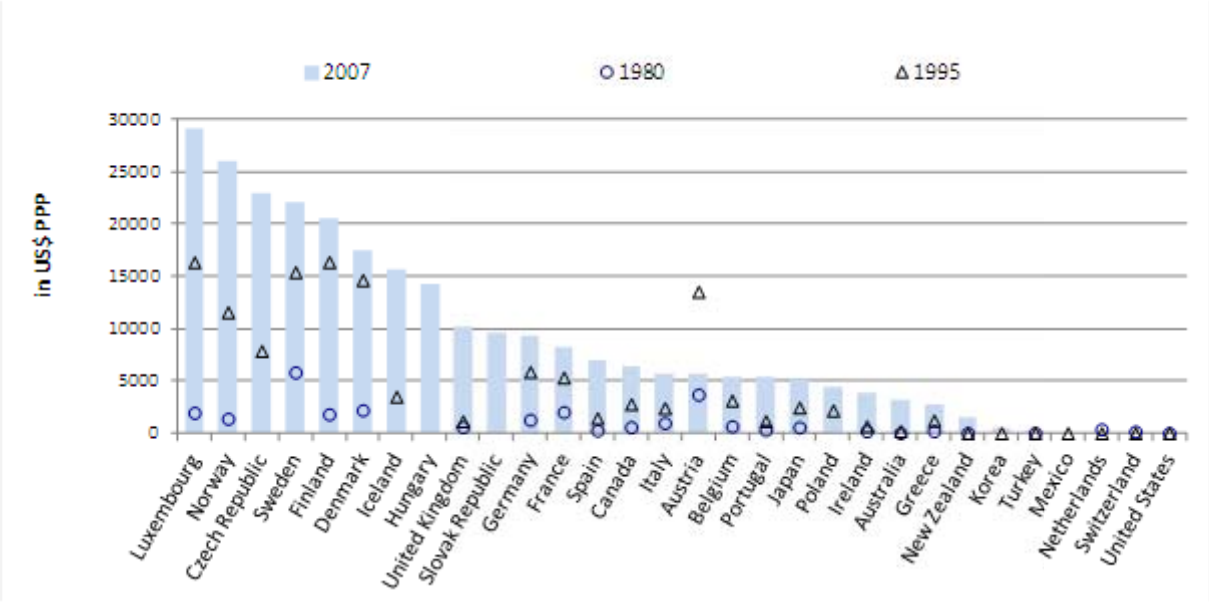
Government spending on leave

27. Governments often provide employees on parental leave with income support which varies according to lengths of leave and can be topped up by employers. Income support and total public expenditure on parents who take leave vary widely across countries. These differences are due to several parameters, such as the number of leave takers, payment rates, and the length of leave usually taken. Although these parameters vary across countries, maternity and paternity entitlements are generally insurance-based and salaries are replaced for the first few weeks of leave in most countries. Cross-national differences are wider when it comes to payment rules for parental leave. Long leave periods are very often associated with flat-rate family-based payments, so that only one parent – usually 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 Indicator PF2.4 in the OECD Family Database; OECD, 2011a). Such schemes are more likely than flat-rate payments to prompt high earners and men to claim part of their 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 still more likely than men to take up all, or most, of the leave entitlement.

28. These differences in payment conditions lead to substantial variations in the amounts governments spend on leave. Figure 5 shows the differences in public expenditure per childbirth when all types of leave and "birth grants" are considered. Spending can be high because leave covers more children than those born in the year under consideration. In 2007, spending ratios were much higher in countries like the Czech Republic, Finland, and Norway, where parental leave was relatively long and/or well paid, as in Iceland, Luxembourg, Norway, and Sweden. Only in Austria did expenditure per newborn child fall in 2007 compared to 1995.

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

Amounts is USD (adjusted for Purchase Power Parity)



Note: The year 2006, not 2007, applies to Italy.

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

3. THEORETICAL BACKGROUND AND REVIEW OF FINDINGS

29. The effect of parental leave on the cost of labour and, in turn, on its supply and demand is key to determining the consequences of leave policies for male and female labour market outcomes. Gender-asymmetric effects can be expected from the wide differences between women's and men's leave take-up. Because women are more likely than men to claim all their leave entitlements, their labour supply curve will rise slightly. Labour demand may not entirely adjust to such an increase in supply, however, because the provision of leave raises the non-wage costs of labour if employers need to change the production process or hire, and possibly train, temporary staff. Employers may even grow disinclined to recruit female workers.

30. At the same time, mandated leave increases the likelihood that employees will resume work following the birth of their newborn and employers will thus reap returns on their investment in human capital (Klerman and Leibovitz, 1994). This pattern is, of course, more likely to be true for skilled and qualified workers. It is therefore crucial that public funds share the cost of paid leave for low-skilled workers.

31. Overall, the downward demand response of employers may be slight compared with the shift in female labour supply, particularly as leave benefits in most OECD countries are paid primarily through public funds. Leave mandates may thus be expected to exert a positive influence on female employment rates and to have a stronger impact on women than on men. Such effects may only emerge over time as access to leave is what first encourages women to take short career breaks – these interruptions of employment not being always reported in employment statistics – see below section on data issues. Many women may nonetheless switch to part-time work or reduce their hours once they resume work if they want to spend time with their children or face childcare constraints. It is therefore probable that women's average working hours will fall below men's even after the introduction or extension of childbirth-related leave.

32. Leave policies can also have longer-term consequences for the total employment rates of women because normative attitudes to female employment change accordingly. If leave entitlements foster continuous female participation in the labour market, there will be growing acceptance from families and employers and greater career rewards for women. Social interaction may then produce a knock-on effect as more women feel they can enter the labour market, invest in a career before having children, time childbirth, take maternity leave, and return to work afterwards (Bernhardt, 1993; Gustafsson and Kenjoh, 2007).

33. Maurin and Moschion (2011) also show that the neighbourhood is an important vector for the transmission of socially normative attitudes mothers' labour force participation. In this context, women who are not yet in a position to claim paid parental leave would also benefit from its provision. They are also likely to benefit even further over time, as there is evidence that whole generations of women have been influenced by the shift in women's identity from a family-centred world to a more career-oriented one (Goldin and Katz, 2002; Goldin, 2006).

34. The potential impact on gender gaps in earnings is less straightforward. On the one hand, long periods of leave may damage women's earnings as the skills they have acquired deteriorate and reduce their opportunities for career advancement. And, as the female labour supply increases proportionately to the male supply, women's wages are likely to undergo a relative drop (even if binding equal pay legislation may curb such effects). On the other hand, however, employers may wish to invest in their qualified female employees if they expect them to resume work after leave, which increases labour productivity and women's relative earnings.

35. Paid leave provisions also affect men, even if they do not make much use of them. Employers may, for instance, recruit more men than women to avoid having too many employees on leave. Moreover, although fathers' take-up of parental leave is increasing, it remains too low to be a change that could affect employers' attitudes.

36. In sum, mandated leave generally has a positive influence on male labour market outcomes. And while its net effect on women's employment rates is also positive, it drives their earnings down. Long leave entitlements also have a greater effect on low-paid employees as their work has low marginal utility, which makes them less likely to return to work. The influence of leave on female employment rates thus follows an inverted U-shape – positive up to a certain point, then negative (Ruhm, 1998).

37. Empirical evidence corroborates the ambivalent influence of leave mandates on labour market outcomes. Several papers have established the leave mandates' positive effects on mothers' return to work in the United States, where leave entitlements are short: 12 weeks of unpaid leave after birth, supplemented in some states only by payment. For instance, Berger and Waldfogel (2004) find that mothers employed in jobs covered by leave entitlements return to work more quickly after the 12 weeks of mandated leave than those who are not. Similarly, Han *et al*. (2009) find that the introduction of leave mandates for family or health reasons in some states has been associated with a significant 4.7 point increase in the probability of working within nine months of childbirth. Women who enjoy paid and job-protected leave are also found to be more likely still to be employed when their child reaches their fourth birthday.[4]

38. Baker and Milligan (2008) obtain similar results for Canada. There the proportion of women quitting their jobs has fallen and the share of those returning to their pre-birth employers has increased since the introduction of 17-18 weeks of mandated leave. A further extension of job-protected leave, up to 70 weeks in some provinces, has been found to significantly increase the probability of women returning to their pre-birth employer.

39. The long-term effects of long periods of paid leave on labour market outcomes show mixed results, however. Leave in some countries (e.g. Austria, France, Germany, and Norway) can indeed last several years. A short-term effect of cash allowances for 2-3 years of leave has been to increase the time women spend off work. Norway, for example, introduced a "cash-for-care" allowance in 1998 for women who leave the labour market to care for a newborn child for up to three years. Partial payments were made to women who worked part-time. A few months after the allowance was introduced, the main effect was that women with children aged up to two years old shifted from full-time to part-time work (Ronsen, 2009). Some years later, they were more likely to leave work completely and receive the full rate of benefit. In all, Schone (2004) found that "cash-for-care" payment prompted an average 4% fall in the

[4] The effects are more pronounced for women with university degree or above than for those with lower qualifications. Parents with higher education degrees 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 the Family and Medical Leave Act (FMLA) on female employment rates has been positive and significant in states that complement the benefits and eligibility criteria of FMLA. They also stress the interplay of leave entitlements with other insurance scheme

labour force participation of women with children below the age of three – with high-earning households and those with high levels of educational attainment being relatively less likely to take up the benefits (Aassve and Lappegard, 2009).

40. In 1985, France also introduced a three-year cash-for-care allowance for women with three children, before extending it to households with two in 1994. Piketty (2005) finds the effects are similar to those reported in Norway: the 1994 extension of parental care allowance led to an 11% reduction in the employment rate of mothers with a second child under three years of age. Thévenon (2009) found that the employment rates of women with two children increased in France a few years after the reform, albeit at a limited pace.[5]

41. Evidence for Germany and Austria also suggests that long leave entitlements significantly increase the time women spend out of work, but not that they have a significant impact on the female labour supply. Germany had lengthened the duration of paid leave a number of times over the decades before shortening it in its most recent reform (in 2007). The earlier increases in the length of paid leave have been found to affect employment rates more than recent ones. Schönberg and Ludsteck (2006) show that the extension in job-protected paid leave from two to six months prompted the most delays in returns to work, while the 18-to-36 month extension in 1992 led to the least.[6] There is little evidence that lengthening leave has had any significant long-term impact on German mothers' labour supply (Schönberg and Ludsteck, 2007).

42. Austria has also made several changes to its leave legislation over recent decades, enacting two major reforms in 1990 and 1996. In 1990, it lengthened the maximum duration of parental leave by one year -from a child's first to second birthday – before cutting it from 24 to 18 months. Lalive and Zweimüller (2005) concluded that the 1990 increase led to a significantly longer time effectively spent out of work – between 0.4 and 0.5 months per additional month of entitlement – and considerable delays in returns to work.[7] The depressing effect on employment rates seems to have lingered on, even after the mandated period of leave came to an end, with a reduction of 11 percentage points in the probability of being back at work within 36 months of a child being born. The same authors also point out that parents resuming work after the job-protected period expires experience unwelcome labour market outcomes. Conversely, returns to work within the job-protected period exert no adverse effects on re-entry wages or other job characteristics (Lalive and Zweimüller, 2009).

43. Lalive *et al*. (2011) disentangle the effects of the job-protection guarantee from those of income support in Austria by considering variations in paid parental leave durations for a constant period of job protection.[8] The duration of payment is identified as the main determinant in the timing of returns to work.

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

[6] The effects vary according to educational attainment, however. Highly educated women show the greatest labour supply response to the increase from two to six months but the smallest to the increase from 18 to 36 months. By contrast, less well educated women were most likely to postpone their return to work when leave was extended above 18 months.

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

[8] 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 leave of at least six 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 six months.

However, the authors also find a strong interaction between the resumption of work and the length of time that allowances are paid. Although an extended period of benefit payment in itself delays a mothers' return to work, this effect also combines with that of the job-protection guarantee on the labour supply response of high- but not low-earners.[9] The interaction between the job-protection guarantee and the provision of payment is also observed in cross-national comparisons. Pronzato (2009) interprets differences in the times that women resume work after having their baby in Europe between 1994 and 2001 as a consequence of variations in leave entitlements. She suggests that although job guarantees have no significant effect during the child's first year, they do during the second and third years. By contrast, leave payments do appear to postpone returns to work within the first year of a child's life, though not thereafter. And once again, mothers' labour supply responses are found to vary widely according to their standard of educational attainment.

44. A number of studies have also looked at the effect of leave mandates on earnings in the short and long run. Most observe a negative impact: women who make full use of their maternity or parental leave entitlements receive, on average, lower wages in the years following their resumption of work than those who return before leave expires. Evidence on how long this effect lasts is mixed, however. Several studies identify the persistence of wage penalties even as earnings grow. In Germany, for example, each year of leave is estimated to lower the wage received upon resuming work by 6% to 20% (Ondrich *et al*., 2002; Kunze and Ejrnaes, 2011; Beblo *et al*., 2006). Schönberg and Ludsteck (2007) find that wage penalties can be observed as long as eight years after a mother returns to work. Lequien (2012) observes that in France – where the three-year paid leave period was extended to families with two children in 1994 – wage growth over the six years following the birth of a second child is lower among women who gave birth after the reform than among those who did so before. Each year of absence from work – up to 10 years after the reform – is estimated to lower wages by 7% to 17%.

45. These results, however, are challenged by studies that find no adverse effect on mothers' labour market outcomes in the medium or long term. For example, Lalive *et al*. (2011) did not discover any wage penalty in Austria, suggesting that the assurance of returning to the same or a comparable job is a good arrangement for protecting earnings. Zhang (2010) advances the same argument, estimating that Canadian mothers who return to work apparently recover their lost earnings in about seven years. Mothers who return to their original employers recover their wage levels fastest, even though they incur substantial income losses in the first two years after resuming work.

46. The relationship between extensions of leave entitlements, labour market outcomes, and gender differences has seldom been examined at the macro level. The most prominent study is Ruhm (1998), which looks at the impact of paid leave durations on employment trends in nine European countries[10] from 1969 to 1993. The results show that lengthening paid leave has been associated with increases in female-to-male employment rates, but with (small) reductions in their relative wages. A modest, albeit negative impact, is also found for the duration of leave on the female-to-male ratio in weekly working hours.

47. This paper here performs an analysis which builds on Ruhm's approach, while expanding it in four areas to cover:

- Geographical spread, widened to 30 OECD countries with diverse parental leave policies.

[9] To be precise, the introduction of a time limit on job protection clearly speeds up returns to work among high-income mothers, whereas the extension of the job-protection deadline has no effect on the timing. By contrast, any change in the period covered by the job guarantee seems to have no effect on low-wage mothers. The two effects combine for workers with average earnings.

[10] These nine countries are: Denmark, Finland, France, Germany, Greece, Ireland, Italy, Norway and Sweden.

- The period of time studied, which has been extended to 2010, so taking into consideration developments that took place after the 1990s.
- The effect on labour market outcomes not only of the duration of leave, but also of leave payments. Higher spending per birth is assumed to increase leave take-up and have a potentially negative (income) impact on female labour force participation and gender differences.
- Potential inconsistencies in estimates due to non-stationarity and heterogeneity in the data.

Box 2. Optimal periods of leave and different policy objectives

Maternity, paternity, parental and childcare (or homecare) leave policies are not stand-alone but an integral part of national family policies. Such policies are multifaceted and have a range of inter-dependent objectives:

- help parents to achieve work-life balance;
- foster conditions that enable employees to have the number of children they want when they want;
- harness the female labour supply in order to foster economic growth and underpin the financial sustainability of social protection systems;
- combat child and family poverty;
- promote child development and generally enhance children's wellbeing throughout their early lives.

Maternity leave serves the objectives of ensuring the health and wellbeing of mothers and children, while parental leave policies may also be used to pursue gender equality objectives. Increasing leave payment rates and allotting periods of leave for the exclusive use of fathers are measures that seek to bring about greater gender equality in the use of parental leave and, ultimately, in the sharing of care responsibilities and other unpaid household work.

There are many studies which consider the effect of parental leave policies on employment. From a narrow labour market perspective it is sometimes argued that leave which is either too short or too long diminishes the probability of mothers returning to work, and that there might be an "optimal period of leave" which enhances attachment to the labour market. However, even when narrow labour market objectives identify such an optimal period, it may not fit with the other objectives of a parental leave policy.

OECD (2011a) shows that mothers' returns to work within six months of having their baby, especially on a full-time basis, may be negatively related to children's cognitive outcomes. The association is slight, however, and not universally observed. It occurs principally among children in intact families or where parents have high levels of education and are likely to engage in stimulating parenting activities. Those with low levels of educational attainment are less likely to do so. However, the slight negative relationship between a mother's resumption of work and children's outcomes in less well educated households is more likely to be counterbalanced by the positive association between maternal income and participation in formal childcare.

Although such effects may not be extensive, the findings clearly show that results can differ among individual parents and children, which makes it even more difficult to come up with one single "optimal" design for parental leave policy design. OECD (2011a) also shows that formal childcare participation and parenting activities are often more significant than parental leave policy and maternal employment in determining children's cognitive and behavioural outcomes. This finding emphasises the importance of investing in good-quality formal childcare – effective parental leave policy development cannot do without.

4. DATA ISSUES

48. As well as aggregate data spanning the 1970-2010 period for 30 OECD countries, this analysis presented in this study also draws on the information on changes in childbirth-related leave legislation collected for the OECD Family database.[11] The total duration of paid leave that women may are authorised to take just before and after childbirth their children are born has been estimated each year on the basis of this information. Figure A1.1 in the Annex shows changes in the main explanatory variable, *i.e.* the duration of *paid* leave. With the exception of Australia and the United States, all the OECD countries considered have either lengthened or shortened leave. Major changes are rare, though, and have been implemented only in Austria, the Czech Republic, Finland, France, Germany, Poland, and the Slovak Republic.

49. Using the information on leave entitlements to code trends in leave duration is not a straightforward matter. It requires assumptions about the schemes and options considered. Many countries provide paid (or unpaid) childcare leave which can be used as a complement to basic parental leave. Furthermore, parents can often choose between options with different payment rates and durations. In that event, the present authors' analysis considers the total period of time for which a woman can receive payment after her maternity leave has ended, regardless of the duration of job protection guarantees. Payment can take the form of a parental leave benefit or a cash-for-care allowance. When there are several payment options, the analysis codes the shortest period of leave with the highest pay. Alternative restrictions can be used to compare leave duration, describe changes,[12] and capture different trends in duration. Since changes are not very frequent in any country, results are likely to be sensitive to how the independent variable is estimated. For this reason, the analysis in this paper examines the sensitivity of results to definitions of variables.

50. Information on legal entitlements does not necessarily coincide fully with variations in the actual use of leave, for which there is no data available on a time-series basis. However, changes in legislation governing the length of leave are likely to shadow the most important changes in behaviour. That being said, if leave entitlements are not fully used, the effect of changes in legislation on employment outcomes overestimates the effect of actual use. The inclusion of government spending on leave and other childbirth-

[11] This includes maternity and parental leave entitlements but neither periods of maternity leave that overlap with parental leave entitlements nor parental leave entitlements for exclusive use by the father. The total duration of paid leave takes into account the period for which a family can receive a homecare allowance, even though it can be made separate from the right to take leave from work and job protection. OECD countries that have a parental allowance are Austria, the Czech Republic, Estonia, France, Finland, Germany, Norway, Poland, and Spain. For France, the entitlements considered are those attached to the birth of a second or subsequent child, as such payments are granted for longer periods than for the first birth.

[12] 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. A combination of the two types of entitlements is considered here because the distinction between the two is not possible in countries where there is only one legislative framework for parental leave. The total period a mother can leave work is probably, therefore, a more accurate proxy for analysing the influence of leave policies on labour market outcomes.

related benefits in this paper's analysis may partly correct such an error, as spending reflects take-up rates rather than available entitlements. The analysis draws its data on leave payments from the OECD's Social Expenditure database (SOCX), although they are available only from 1980 onwards. It then estimates annual purchasing power parity (PPP) amounts paid per live birth, disregarding the actual labour market status of parents.

51. The dependent variables are natural logs of gender-specific employment-to-population ratios, average working hours, and hourly wage rates. The analysis focuses on women and men aged 25 to 54. Young adults and seniors are consequently excluded, as they face specific employment issues and are less likely to be affected by leave legislation. This group is large enough to consider the effect that leave entitlements can have on the outcomes of population categories which make use of leave entitlements or not.

52. The analysis draws its data on employment rates from the OECD Labour Force Statistics, which provides time-series data on employment ratios by age category. Figure A2 in the Annex shows a continuous increase in employment rates for women aged 25 to 54 over the years in almost all countries. In contrast employment rates for men between 25 and 54 years old were relatively stable or declined slightly over the same period. Measurement errors may, however, affect the comparison of employment rates across countries since, despite international conventions,[13] national employment statistics use different standards in accounting for employees on leave.

53. Data on working hours in the analysis refer to the average number of hours worked per week job per worker in his/her main job, disregarding his or her age. These data are available for 27 countries and a time span that varies from country to country. The data for weekly earnings (in USD 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 A1.3 in the Annex). The analysis considers only those countries where earnings have been observed for at least nine years, all of which show either a stable or increasing ratio of female-to-male earnings.

[13] For European countries for instance, EU guidelines stipulate that parents on parental leave must be counted as employed if the period of absence is less than three 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 three years for parents with two children or more) are counted as inactive, while leave is technically unpaid (although 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 homecare leave (which is often taken when the child is between one and three years of age) are included in the employment statistics.

5. EMPIRICAL SETTING

54. To analyse the effect of paid leave length on the labour market, the analysis in this paper uses an empirical model. It measures in two steps the effect of extensions in the length of paid leave on gender differences in employment rates, average working hours, and earnings:

- Fixed-effect models are used to estimate the impact of within-country changes in leave duration on employment outcomes for men and women separately.
- The effect on the gender gaps is estimated.

55. The labour market outcome Y_{ijt} – measured in natural logs – for each sex i (where f indicates female and m males) in country j in year t is assumed to be determined by:

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

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

- L_{jt} is the duration of paid leave in weeks;
- C_j is 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 is year dummies which capture the impact of the time-specific circumstances that all countries faced over the 1970-2010 period;
- $e_{ij}.t$ denotes exogenous trends in outcomes (assumed to be country and sex-specific and linear).

β_i provides an unbiased estimate of leave effect if ε_{ijt} and L_{jt} are uncorrelated. If, however, the time-varying country effects are correlated with changes in parental leave entitlements (as, for example, when countries lengthen leave entitlements at times of growing unemployment) bias is introduced into the estimates. One possible way of overcoming this issue is to estimate the influence of lengthening leave duration leave on the female-to-male difference in labour market outcomes:

$$Y_{fjt} - Y_{mjt} = (\beta_f - \beta_m).L_{jt} + (\alpha_{fj} - \alpha_{mj})C_j + (\theta_{fjt} - \theta_{mjt})(X_{fjt} - X_{mjt}) \quad [2]$$

$$+(\partial_{ft} - \partial_{mt})T_t + (e_{fj} - e_{mj})T + (\varepsilon_{fjt} - \varepsilon_{mjt})$$

or equivalently,

$$\Delta Y_{jt} = \beta L_{jt} + \propto C_j + \theta \Delta X_{jt} + \partial_{jt} T_t + e_j T + \varepsilon_{jt} \quad [3]$$

which can be interpreted as a "difference-in-difference-in-difference" estimate (Ruhm, 1998) where β measures the effect of paid leave duration on gender gap changes in labour market outcomes.

56. Since women use almost all days of parental leave, β_m may be equal to zero. In this case β will provide an unbiased estimate of β_f. However, since men are increasingly taking days of leave, β_m could also be positive, but smaller than β_f. Under these circumstances, using β to approximate β_f results in an overestimation.[14]

57. The effect of the duration of the parental paid leave might not be linear. A short period of leave may, for example, be expected to have a positive influence on employment rates, whereas a negative or lesser effect may arise from long leave entitlements. Moreover, a continuous variable may poorly capture the effects of parental leave mandates if threshold effects exist. For instance, women may very much wish to stay at home for a brief time following childbirth, then return rapidly to work. In such cases, entitlements to short absences from work may have a substantial impact on the labour supply, while further extensions of periods of leave may have little additional influence. The potential non-linearities are first tested by the inclusion of quadratic values of leave duration in the equation. To allow for "step effects", models are also re-estimated with an "any leave" dummy (equal to 1 if the country has enacted a paid leave mandate and 0 otherwise) included as a covariate.

58. Possible changes (or non-linearities) in the influence of leave duration on labour market outcomes are further investigated with piecewise linear regressions that allow parameters measuring this influence to change along with the increase in leave length. This requires dividing leave length into segments that are able to capture, as far as it is possible to do so, the change in the relationships between leave length and outcomes. In this perspective, leave length is divided into four categories to clearly distinguish between short and long periods of leave. The results presented in Section 6 consider the following categories for leave duration: less than 18 weeks – which is the average OECD duration of maternity leave in 2011; between 19 and 52 weeks; between 52 and 104 weeks; and more than two years.

59. Lastly, it should be stressed that the empirical model that the analysis uses may capture not only the effect of leave duration *per se*, but also the effect of differences in payments and take-up rates. A more precise distinction between these parameters would require data on take-up rates which are unfortunately not available on a time-series basis. Against this background, government spending on leave was used as a proxy variable to control for the cross-country differences in the overall use of leave entitlements. This information is available for only 20 countries on a yearly basis, not for the full period for all of them, which sharply reduces the sample size. For this reason, the results obtained when this variable is added as a separate regressor are not wholly convincing. They are therefore discussed not in "Results", but presented in Table A1 in the Annex.

60. Because changes to leave duration are infrequent, it is important to control for other country- and time-specific confounding factors (denoted by X'_{jt}) that may be correlated with changes in leave duration. Annual variations in the relative increase in GDP *per capita* are used. Time trends are systematically included in the regression to account for exogenous trends in labour market outcomes.

[14] β_f and β_m might also have opposite signs, if employers respond to longer leave by substituting employment away from females and toward males, or *vice versa*. In this case, approximating β_f with β will result in an underestimation. This is an unlikely scenario, however, because discriminatory practices are usually prohibited by the law.

61. Some additional issues complicate the estimation of equations [1] and [3]:

- **The nature of changes in the duration of leave**
  The nature of changes in the number of paid weeks of parental leave exhibits high persistence with a non-stationary profile that has to be taken into account in the estimation (Moss and Kamerman, 2009). Although the overall number of changes in leave duration is quite large (a total of 110 changes are counted over 40-year period under consideration), the number of changes within each country is often small (3.6 changes per country on average), and the duration of leave remains unchanged for long periods of time in between changes.

- **The non-stationary nature of data**
  The trends in labour market outcomes show a non-stationary profile due to the multiple factors which, over and above leave policies, drive their country- and sex-specific increases. In order to remove these trends, country- and sex-specific (linear) time trends ($e_{ij}.t$) can be added to the set of regressors, with the advantage that they are exogenous and fit the changes in (the log) of labour market outcomes in Figure A1.1 to Figure A1.4 in the Annex. Nevertheless, time trends may not be sufficient, as the variables need to be cointegrated in order to guarantee the consistency of the estimations. This condition was therefore tested with the unit root test proposed by Im *et al*. (2003). The test was applied to the residuals obtained from the estimations of equations [1] and [3]. The test assumes independence across the cross-sections, an assumption which is in turn tested through the test of cross-section independence designed by Pesaran (2004)[15].

- **The potential delay between policy implementation and behaviour changes**
  Because it may take a long time before labour market behaviours are affected by changes in leave legislation, current labour market outcomes could be the consequences of both current and past changes in leave rights. Lagged values of the leave variable should therefore be included in the estimation. However, none of the four-year lagged leave values that were tested exhibit a better explanatory power for labour market outcomes than the contemporary value of leave duration.[16] Consequently, the results are commented not in "Results", but in Table A1 in the Annex.

- **The possible reverse causality between employment trends and leave policies**
  The causation between changes in employment outcomes and in leave duration may be reversed, if, for example, leave is lengthened when tensions occur in the labour market. One standard strategy for overcoming this endogeneity problem involves using instrumental variables to approximate the effect of leave on labour market outcomes. However, there is no obvious variable for instrumenting leave durations because the available time-series variables are all correlated with both the probability of taking parental leave and labour market outcomes. The use of endogenous variable lagged values has become popular under such circumstances. Here, however, it is not the best strategy because the lagged leave values are only weakly correlated to their current value when there is a policy change, while correlating with labour market outcomes after a few years. Nevertheless, IV-regressions with two-stage least squares with time-lagged observations of leave duration have been carried out to check the robustness of our results. However, the results obtained in this case do not differ from those with no instrumentation of leave duration. For that reason, they are presented not in "Results", but in Table A1 in the Annex.

[15] The test is performed for the analysis of employment rates for which there is enough common observations across panel, which is not the case for data series on working hours and earnings. Furthermore, the data set on earnings does not meet the requirement of having at least 10 observations per country to perform the Im-Pesaran-Shin test of residuals stationarity.

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

- **Heterogeneity in relationships across countries and over time**
  A final concern is that models with (country-) fixed effects applied to pooled time series assume *a priori* that the effect of leave duration on outcomes is homogenous across countries. Using the results from this estimation to inform country-specific policies might, therefore, could lead to oversimplification if the relationships between leave duration and labour market outcomes are heterogeneous across countries (Lee *et al*., 1997). A useful approach in such an event is to use the Mean Group estimator (MG) proposed by Pesaran and Smith (1995). It allows idiosyncratic country adjustment by running country-specific regression analyses, then averaging out the coefficients across the panel.[17] Although this approach is consistent under a wide range of conditions, mean group estimation does not perform well in narrow and/or highly unbalanced panels (N=30 and T=40), such as the one used here (Mark and Sul, 2003). None of the estimations give significant parameters and are not, therefore, presented in the "Results" section. Full results are reported in Table A1 in the Annex, however[18].

[17] The possible correlation between units in cross-section also poses challenges, as it violates the assumption of unit independence. Although time dummies are often used to address this issue, they may be not sufficient if countries react differently to the same shock, e.g. changes in leave policies. An alternative is to use the common correlated effects (CCE) specification (Pesaran, 2006), which is appropriate when the remaining error term still contains a country-specific component. For mean group estimators, this involves augmenting the model specification with (weighted) averages of the dependent and independent variables – consistent with both heterogeneity and cross-sectional dependence. The procedure was applied to the model specifications used to explain employment rates. The resulting estimated coefficients were insignificant, though it is unclear whether that is because there is no effect or because the panel was too narrow for some countries to secure an efficient and reliable estimate. No similar model specifications were estimated for the other two labour market outcomes, where panel sizes are even narrower.

[18] Note that a "pooled mean group" with error-correction estimation (Pesaran et al., 1997) was also tested to filter out the short-run deviations from the long-run relations between leave duration and employment levels that were the purpose of the analysis. The estimates obtained were not significant either and, therefore, not presented.

6. RESULTS

The effect of paid leave duration on employment trends

62. Table 1 reports a first set of employment rate estimates, as described in equations [1] and [3]. Female and male employment rates are expressed as a function of the highest number of paid weeks of leave (divided by 100 for ease of parameter interpretation) as spelled out by the legislation. All model specifications include country-fixed effects to capture the effects of within-country changes in leave duration. Time dummies and country-specific (linear) time trends are also added to eliminate the effect of exogenous factors on (changes in) labour market outcomes. Yearly variations in the relative increase in log GDP are used to further control for any time- and country-specific events that may have occurred at the same time as changes in the leave legislation.

63. Furthermore, five OECD countries (Canada, Iceland, Korea, New Zealand and Switzerland) actually introduced paid leave after 1970, the incidence of which can be captured with the inclusion of a dummy variable in the model specification. “Any paid leave” is therefore equal to 1 if the country has enacted a leave mandate and 0 otherwise, so that it captures the existence of a step effect due to the introduction of leave entitlements of a few weeks – Columns 3, 4 and 6.

64. Table 1, which presents results for each sex and the gender gap separately, leads to the following observations. First, the influence of leave periods on employment rates is positive but not a linear function of the number of weeks, as suggested by the lack of statistical significance of the leave duration coefficients in Columns 1 and 3. Estimations with non-linear relations between leave duration and employment rates perform better and also give prominence to gender differences in the reaction of employment to leave entitlements.

65. The estimation in Column 2 thus assumes that the influence of leave duration on outcomes decreases continuously and gradually with the extension of the leave period. The coefficients suggest that female employment rates are at their highest when leave is slightly longer than two years (125 weeks), then start to fall with additional weeks of leave, as Figure 6 illustrates. Moreover, Column 4 suggests that female employment rates are most affected by the duration of leave, while the introduction of paid leave *per se* – captured by the dummy variable – does not have a significant independent impact. It also suggests that the extension of leave duration contributes to an increase in female employment up to a certain limit, after which employment rates are negatively affected by additional extensions of leave.

66. By contrast, the duration of leave hardly affects male employment rates (Column 2 in Table 1 and Figure 6). Nevertheless, the "any-leave coefficient" is very small[19] but positive and statistically significant in column (3), which suggests that an introduction of paid leave had some upward effect on male employment rates. This finding contrasts with Ruhm's (1998) findings. Then again, Ruhm (1998) covered European countries of which many were most advanced in the development of parental leave policies. Our study also includes countries that were late with introducing paid maternity and parental leave, which suggests the presence of more unfavourable attitudes towards parental leave taking, also

[19] The gender gap in employment rates rises by no more than two percentage points with the introduction of a few weeks of paid leave (Figure 6) – and the estimate is, in fact, closer to one percentage point if only statistically significant coefficients are taken into account.

among employers. This may contribute to slightly higher demand for male rather than female employees in the aftermath of the introduction of paid leave.

67. An interesting profile also emerges from Columns 3 and 4. They suggest that the gender gap narrows with longer paid leave, even though the leave duration coefficients are not statistically different from zero. The large standard errors of the estimated coefficients suggest that the quadratic specification does not adequately capture the relationships between leave duration and employment rates.

68. The results of the piecewise linear regression analysis afford a better grasp of the changes in the incidence of leave with the gradual extension of leave duration. The results are especially useful for contrasting the effects of short and long leaves. Interestingly, results indicate different profiles for men and women (Columns 5 and 6 in Table 1 and Figure 6). The provision of leave clearly boosts women's employment rates, but the increase happens only when paid leave is for a certain period of time, ranging here from one and two years. Shorter periods of leave seem also to have a positive effect on female employment rates, but coefficients are not statistically significant and the assumption that short leave has no effect cannot be dismissed. A more interesting finding is the significant and substantial negative effect that leave longer than two years is estimated to have a negative effect on female employment and the gender employment gap.

69. Piecewise regression also confirms that male outcomes are affected positively by the provision of few weeks of leave, whereas the extension of paid leave to around two years does not seem to have any major effect on male employment rates. In any case, the evidence clearly suggests that extending prolonger of paid leave has a negative effect on female employment relative to male. The estimations in Column 5 suggest that each additional week above two years of paid leave reduces female employment rates by 0.01% relative to men's.

70. In all, the estimates given by piecewise linear regressions show clearly that the effect of extending periods of paid leave varies along with the duration of leave. It also throws light on the complex relationship between labour supply and demand which may react to the provision of paid leave in order to explain macro-level outcomes. The results thus suggest that the provision of a few weeks of paid leave has a positive effect on male employment rates and increases the employment gender gap as long as the period of leave is not long enough to increase women's employment rates significantly. If it is, then the incremental increase in the length of paid leave is found to gradually increase female employment. However, the effect on female employment and the gender gap of lengthening the period of paid leave turns from positive to negative for durations of leave exceeding two years. As the estimation procedure does not yield a precise duration after which the extension of leave turns negative, estimates should not be over-interpreted in that sense. It does help, nevertheless, to provide a clear contrast of the opposite effects that short and long leave schemes have on employment outcomes and gender equality.[20]

71. These results are robust if paid leave is measured with an alternative variable that uses the longest paid period to measure leave duration when different options are available: estimated coefficients are of the same size and sign (Table A1). By contrast, the mean-group estimations do not perform better than the fixed-effect models: although coefficients are basically of the same sign, there are large standard errors that causing most of them to be statistically insignificant (Table A1).

[20] Getting a more precise estimation from a cross-national model is not feasible because the increase in leave duration is not, as pointed out in Section 2, a linear and gradual process. This reason, together with the very limited number of observations for each change in leave duration, prevent the use of threshold regression analyses such as those suggested by Hansen (2000). Moreover, the duration from which the extension of paid leave takes effect changing from positive to negative is certainly country-specific and a more precise estimation of such turning point would require a country based approach.

72. Finally, residual properties were also tested. First, a unit root test was performed on them – using an Im-Pesaran-Shin test for heterogeneous panels – in order to check residual stationarity. For all model specifications, the test rejects the assumption of co-integration between data series and suggests that residuals are stationary[21]. It further suggests that the country-specific time trends included in the model specification help to efficiently eliminate trends in employment series which are clearly non-stationary. A drawback, nevertheless, arises when the test firmly rejects cross-sectional independence between panels in most cases, although the absolute correlation is reasonably low for the gender gap in employment rates. Consequently, the bias which can affect the estimated coefficient if unobserved common factors affect simultaneously leave policies and employment trends cannot be completely ignored.

[21] We present the tests on the residuals obtained from regressions on the gender gaps only to save space. The tests yet perform similarly for each sex-specific outcomes (results available on request).

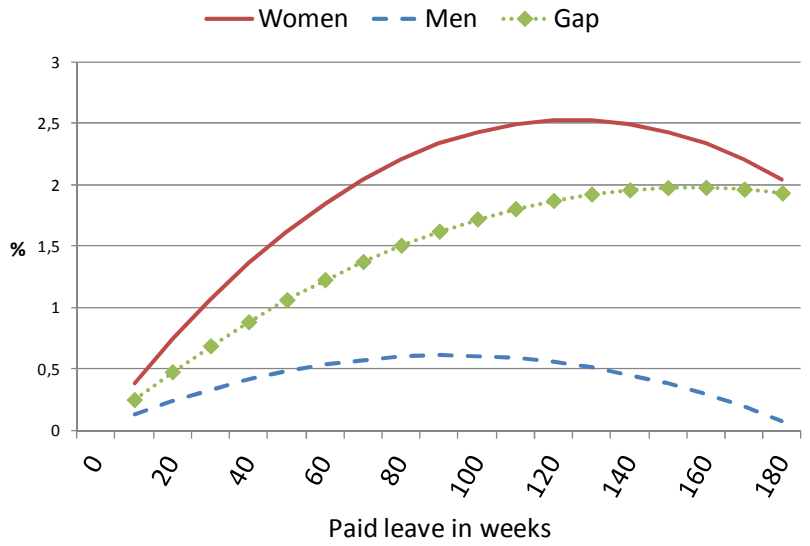
Table 1. Influence of paid leave on employment rates

		(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: natural log of female employment rates (25-54 years old)							
Any paid leave > 0 weeks (dummy)		-	-	0.006 (0.006)	0.006 (0.006)	-	-0.002 (0.020)
Leave duration		0.014 (0.009)	0.040** (0.0017)	0.012 (0.009)	0.038** (0.018)	-	-
Leave duration squared		-	-0.016* (0.008)	-	-0.016* (0.008)	-	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	0.082 (0.084)	0.096 (0.175)
	19 to 52 weeks	-	-	-	-	-0.007 (0.030)	-0.008 (0.036)
	53 to 104 weeks	-	-	-	-	0.058*** (0.022)	0.058*** (0.022)
	> 104 weeks	-	-	-	-	-0.330** (0.010)	-0.032***
Im-Pesaran-Shin cointegration test (p-value of $\tilde{Z}$)		0.03	0.02	0.02	0.01	0.01	0.01
Pesaran test of cross-section dependence – abs.correlation (p-value)		0.30 (0.001)	0.29 (0.001)	0.29 (0.001)	0.29 (0.001)	0.30 (0.001)	0.30 (0.001)
Dependent variable: natural log of male employment rates (25-54 years old)							
Any paid leave > 0 weeks (dummy)		-	-	0.034*** (0.007)	0.033*** (0.007)	-	0.030** (0.013)
Leave duration		0.006 (0.006)	0.023* (0.012)	0.001 (0006)	0.013 (0.013)	-	-
Leave duration squared		-	-0.011** (0.005)	-	-0.007 (0.007)	-	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	0.182*** (0.051)	0.025 (0.098)
	Btw 19 and 52 weeks	-	-	-	-	-0.021 (0.017)	-0.004 (0.018)
	Btw 53 and 104 weeks	-	-	-	-	0.021* (0.011)	0.020* (0.011)
	> 104 weeks	-	-	-	-	-0.018** (0.007)	-0.019*** (0.007)
Im-Pesaran-Shin cointegration test (p-value of $\tilde{Z}$)		0.04	0.03	0.05	0.04	0.03	0.03
Pesaran test of cross-section dependence abs.correlation (p-value)		0.31 (0.005)	0.31 (0.004)	0.32 (0.002)	0.32 (0.002)	0.31 (0.002)	0.31 (0.002)
Dependent variable: female-to-male difference in natural log of employment rates (25-54 years old)							
Any paid leave > 0 weeks (dummy)		-	-	-0.025*** (0.007)	-0.026*** (0.007)	-	-0.033* (0.017)
Leave duration		0.007 (0.007)	0.017 (0.015)	0.011 (0.007)	0.025 (0.016)	-	-
Leave duration squared		-	-0.005 (0.006)	-	-0.008 (0.006)	-	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.099 (0.066)	0.070 (0.140)
	19 to 52 weeks	-	-	-	-	0.014 (0.025)	-0.003 (0.028)
	53 to 104 weeks	-	-	-	-	0.037* (0.020)	0.038* (0.020)
	> 104 weeks	-	-	-	-	-0.014** (0.007)	-0.013* (0.007)
Im-Pesaran-Shin cointegration test (p-value of $\tilde{Z}$)		0.000	0.000	0.000	0.000	0.01	0.01
Pesaran test of cross-section dependence abs. correlation (p-value)		0.27 (0.001)	0.27 (0.001)	0.27 (0.001)	0.27 (0.001)	0.27 (0.001)	0.27 (0.001)
Number of observations		847	847	847	847	847	847

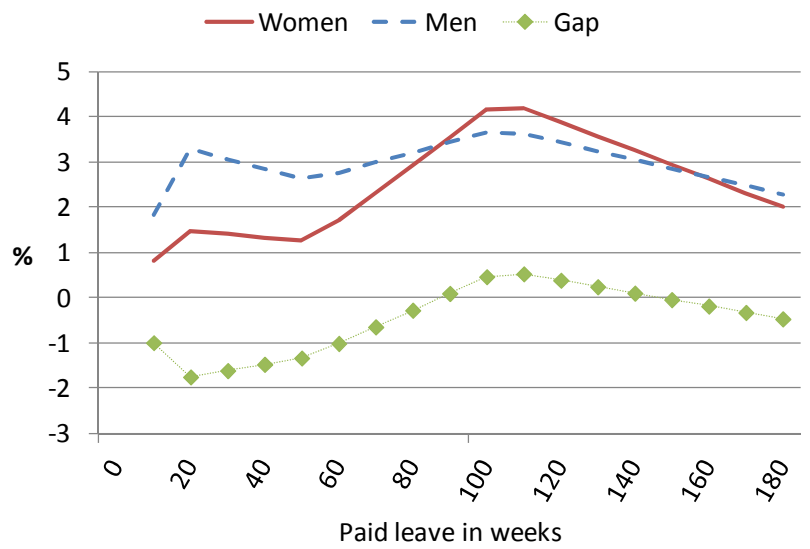
Note: Robust standard errors in brackets. ***, ** and *: significant at the 1%, 5% and 10% levels, respectively. All models include time dummies, country-specific linear time trends, and year-to-year variations in the log of GDP. The dependent variables are the log of employment rates and their difference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

Figure 6. How employment rates vary with the extension of parental leave

Panel A: Employment rates expressed as a quadratic function of leave duration



Panel B: estimation with a piecewise linear function



Note: These estimates show predicted differences in employment rates compared with no paid leave entitlements. Panel A show the profiles estimated from coefficients reported in Table 1, Column 2. Panel B refers to the coefficients obtained by the piecewise linear regression estimations, the results of which are reported in Column 5 of Table 1. These profiles take into account all reported coefficients, whether statistically significant or not.

The effect of leave entitlements on average working hours

73. The effect of leave entitlements on average working hours is summarised in Table 2, which shows a positive association between leave duration and women's average working hours in various model specifications. The significant negative sign of the squared leave duration coefficient in Column 2 indicates that the influence of a marginal increase in leave duration declines with the gradual extension of paid leave up to the point where working hours start to decline (Figure 7). The profile for men is much flatter and their average working hours are actually not found to be affected by leave duration. The 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.

74. Results from the specifications including the any-leave dummy (columns 3 and 4) and those from the piecewise linear model (columns 5 and 6) basically confirm this finding. They also suggest, however, that male working hours are negatively affected by the provision of short paid leave. An explanation might be the coincidence between the general upward trend of the time spend by parents with children (both mothers and fathers) observed in many countries in the period (Bianchi 2000) and the introduction of parental leave. But this effect remains very weak for men and limited to the provision of parental leave does not undermine the overall positive effect of paid leave on the ratio of female-to-male average working hours, cleaned of such general trend effect[22].

75. The influence of a marginal increase in leave duration declines with the gradual extension of paid leave, as shown by the significant negative sign of the squared leave duration coefficient (Column 2). For instance, 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 (at 1.8 hours) when a period of leave is slightly longer (by 14 weeks) than two years, then decreases. This finding is consistent with a situation where women who stay on leave for two or more years are more likely to go back to work on a part-time or reduced-hours basis. There appears to be no evidence of any step effect due to the introduction of paid leave (Columns 3 and 4). By contrast, the results suggest that the extension of paid leave has contributed to helping women maintain or increase their working hours in the vast majority of countries, thereby contributing to a reduction of the gender gap in working hours.

[22] Note also that the residuals from all modesl pass the Im-Pesarna-Shin test of stationarity, with a probability of non-stationarity below 0.01. The unbalanced nature of the data on working hours prevent from testing further the presence of cross-sectional dependence.

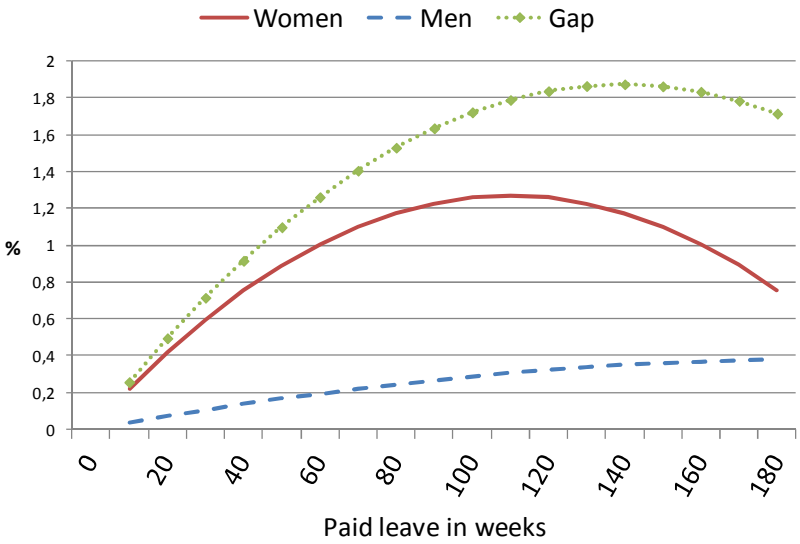
Table 2. Influence of paid leave on weekly working hours

		(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: natural log of female average weekly working hours							
Any paid leave > 0 weeks (dummy)		-	-	-0.012*** (0.003)	-0.017*** (0.004)	-	0.005 (0.016)
Leave duration		0.006 (0.004)	0.022** (0.009)	0.009* (0.005)	0.036*** (0.014)	-	-
Leave duration squared		-	-0.010** (0.004)	-	-0.015*** (0.005)	-	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.108*** (0.030)	-0.143 (0.116)
	19 to 52 weeks	-	-	-	-	0.033** (0.015)	0.036* (0.018)
	53 to 104 weeks	-	-	-	-	0.024*** (0.006)	0.024*** (0.006)
	> 104 weeks	-	-	-	-	-0.022** (0.009)	-0.022** (0.009)
Dependent variable: natural log of male average weekly working hours							
Any paid leave > 0 weeks (dummy)		-	-	-0.006* (0.003)	-0.007* (0.004)	-	0.004 (0.016)
Leave duration		0.00694 (0.00555)	0.00856 (0.0111)	-0.003 (0.010)	0.002 (0.012)	-	-
Leave duration squared		-	-0.00130 (0.00553)	-	-0.003 (0.006)	-	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.058** (0.029)	-0.086 (0.115)
	19 to 52 weeks	-	-	-	-	0.015 (0.017)	0.017 (0.020)
	53 to 104 weeks	-	-	-	-	-0.009 (0.009)	-0.010 (0.008)
	> 104 weeks	-	-	-	-	-0.003 (0.015)	-0.003 (0.015)
Dependent variable: female-to-male difference in natural log of average weekly working hours							
Any paid leave > 0 weeks (dummy)		-	-	-0.005 (0.004)	-0.009** (0.004)	-	-
Leave duration		0.011* (0.005)	0.026** (0.011)	0.013** (0.006)	0.034*** (0.012)	-	-
Leave duration squared			-0.009** (0.005)	-	-0.012** (0.006)	-	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.048* (0.028)	-0.056 (0.086)
	19 to 52 weeks	-	-	-	-	0.018 (0.017)	0.018 (0.021)
	53 to 104 weeks	-	-	-	-	0.034*** (0.011)	0.034*** (0.011)
	> 104 weeks	-	-	-	-	-0.019 (0.014)	-0.019 (0.014)
Number of observations		542	542	542	542	542	542

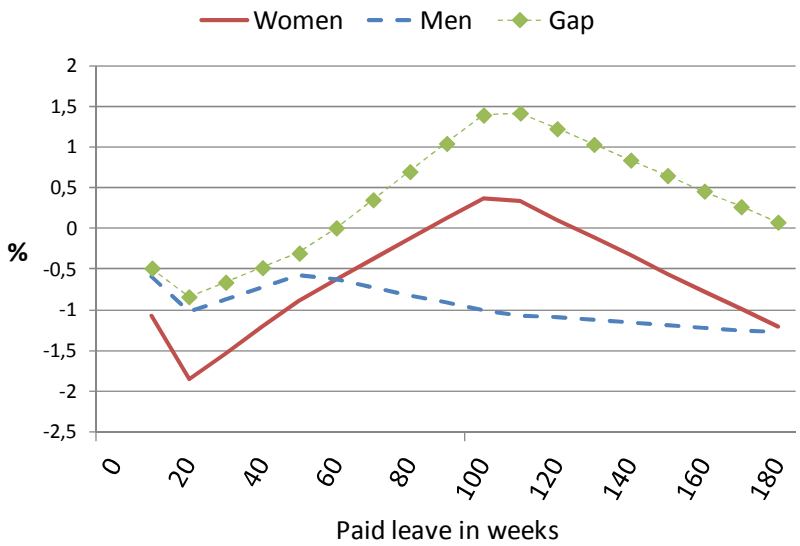
Note: All models include country-fixed and time dummies, as well as country-specific linear time trends, and year-to-year variations in the log of GDP. The dependent variables are the log of the weekly average working hours and their ratio by gender in the bottom section. Leave duration refers to the 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.

Figure 7. How average weekly working hours vary with duration of paid leave

Panel A: Working hours expressed as a quadratic function of leave duration



Panel B: Estimation from piecewise linear regression



Note: These estimates show predicted differences in average working hours compared with no paid leave entitlements. Panel A show the profiles estimated from coefficients reported in Table 2, Column 2. Panel B refers to the coefficients obtained by the piecewise linear regression estimations, the results of which are reported in Table 2, Column 5. These profiles take into account all reported coefficients, whether statistically significant or not.

The effect of leave entitlements on the gender earnings gap

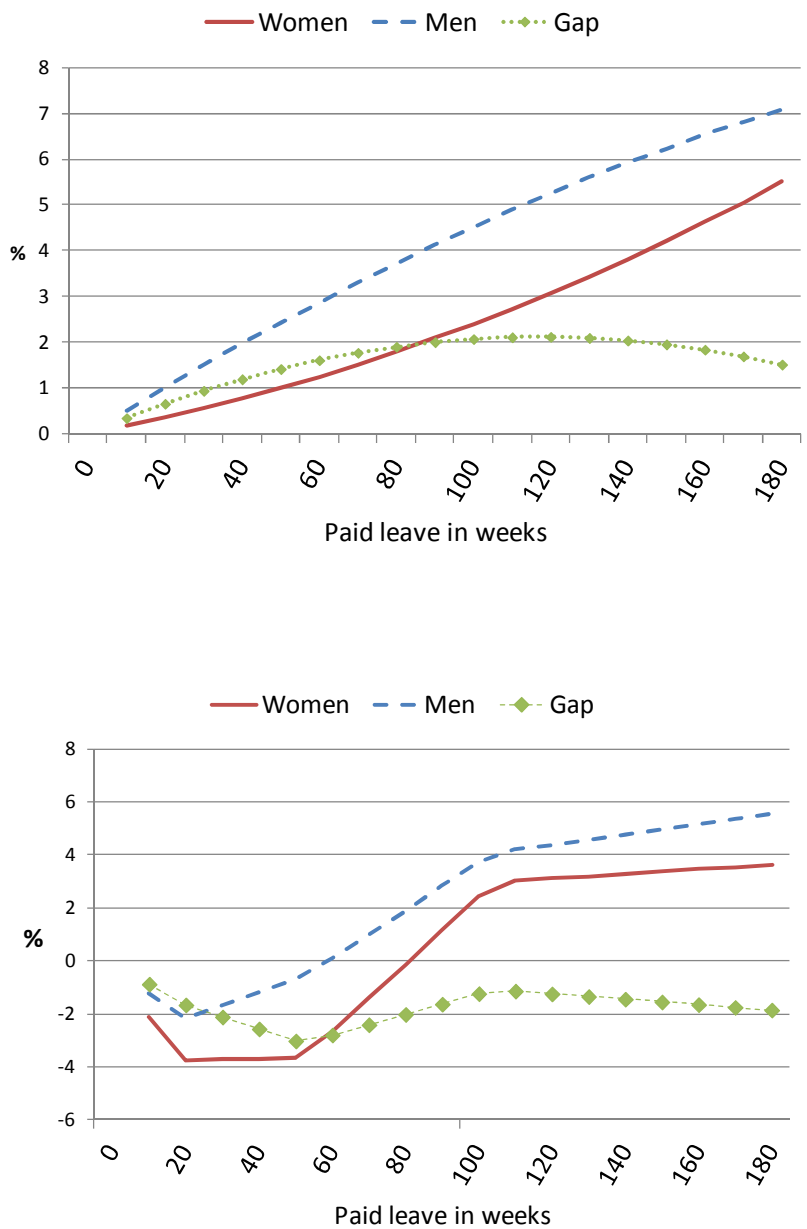
76. Table 3 shows the results obtained for the estimation of the effect of leave duration on the weekly earnings of full-time employees. Because earnings data are much more limited than for the previous outcomes, the estimations here apply to a sample of 10 countries and for a limited period of time. The estimates obtained with the piecewise linear regression show large standard errors and for this reason do not provide more information than the model estimated in Columns 2 and 3. Although not all these later estimations find statistically significant associations with the average earnings of women and men, they do show a significant negative effect on the earnings gap between men and women working full-time. The gap is also found to grow slightly more sensitive with the length of the leave period (Figure 8). It stops increasing for periods longer than one year, as also confirmed by the piecewise linear model. The explanation for such a profile might be due to the fact that women who work full-time were selected from a group with a higher earnings potential, whose earnings drop sharply (and below those of men) after a break from work of one year and more.

Table 3. Influence of paid leave of weekly earnings - country-fixed effect

		(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: natural log of female average earnings							
Any paid leave > 0 weeks (dummy)		-	-	0.056 (0.050)	0.058 (0.052)	-	0.163*** (0.057)
Leave duration		0.028 (0.036)	0.016 (0.075)	0.018 (0.037)	-0.006 (0.081)	-	-
Leave duration squared		-	0.007 (0.030)	-	0.015 (0.032)	-	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.213 (0.492)	-1.375** (0.586)
	19 to 52 weeks	-	-	-	-	0.003 (0.136)	0.185 (0.141)
	53 to 104 weeks	-	-	-	-	0.128 (0.083)	0.135* (0.081)
	> 104 weeks	-	-	-	-	0.008 (0.048)	0.006 (0.049)
Dependent variable: natural log of male average earnings							
Any paid leave > 0 weeks (dummy)		-	-	0.017 (0.051)	0.016 (0.053)	-	0.065 (0.058)
Leave duration		0.039 (0.035)	0.051 (0.071)	0.036 (0.036)	0.045 (0.079)	-	-
Leave duration squared			-0.007 (0.029)	-	-0.005 (0.032)	-	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.126 (0;509)	-0.590 (0.601)
	19 to 52 weeks	-	-	-	-	0.049 (0.138)	0.123 (0.142)
	53 to 104 weeks	-	-	-	-	0.088 (0.085)	0.091 (0.084)
	> 104 weeks	-	-	-	-	0.018 (0.048)	0.017 (0.048)
Dependent variable: female-to-male difference in natural log of average earnings							
Any paid leave > 0 weeks (dummy)		-	-	-0.038*** (0.011)	-0.041*** (0.011)	-	0.098*** (0.016)
Leave duration		-0.011 (0.010)	-0.035* (0.020)	0.017 (0.011)	0.052** (0.021)	-	-
Leave duration squared			0.015* (0.008)	-	-0.021** (0.008)	-	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.087 (0.102)	-0.785*** (0.163)
	19 to 52 weeks	-	-	-	-	-0.046 (0.028)	0.062 0.031
	53 to 104 weeks	-	-	-	-	0.039 (0.026)	0.044* (0.025)
	> 104 weeks	-	-	-	-	-0.010 (0.014)	-0.011 (0.014)
Number of observations		445	445	445	445	445	445

Notes: Countries included are: Australia, Germany, Finland, France, Japan, Korea, Netherlands, Sweden, the 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.

Figure 8. How average weekly working hours vary with duration of paid leave



Note: These estimates show predicted differences in employment rates compared with no paid leave entitlements. Panel A show the profiles estimated from coefficients reported in Table 3, Column 2. Panel B refers to the coefficients obtained by the piecewise linear regression estimations, the results of which are reported in Column 5 of Table 3. These profiles take into account all reported coefficients, whether statistically significant or not.

7. CONCLUSIONS

77. This study has reviewed parents' entitlement to leave their jobs temporarily when their child is born and the consequences of such leave on parental labour market outcomes. There is an increasing diversity of leave mandates across OECD countries, which generally include maternal leave and parental as well as paternity leave and homecare leave in some countries. Such diversity reflects the different options chosen by countries to meet, within budgetary constraints, various objectives related to child education, labour market, and gender equality.

78. A divide persists between countries that first promoted rights to parental leave in the late 1960s and early 1970s – and which still grant long periods of paid leave – and those that introduced such rights from the 1980s onwards. Some 110 changes in leave duration were identified in the 30 OECD countries between 1970 to 2010, which makes it possible to estimate their influence on employment rates, average working hours, and weekly earnings. The macro-level perspective adopted here makes it possible to consider both the direct effect of leave policies on the working age population that uses leave entitlements and the indirect effects produced through labour market forces and the diffusion of labour market practices. In order to fully appreciate how the provision of (paid) leave impacts on labour market achievements and gender inequalities, the findings emphasise the importance of fully appreciating how the provision of (paid) leave affects labour market achievements and gender inequalities. In that light, it is important to consider not only the direct effects of leave entitlements on the outcomes of employees who use them, but the indirect "macro-level" effects mediated by the adjustments of the labour market which can affect other categories of workers.

79. Ruhm's (1998) seminal paper predominantly focused on relatively short periods of maternity leave. The dataset developed here also facilitate analysis of the effect s prolonged periods of leave may have on male and female labour market behaviour. Compared with Ruhm's (12998) findings our study confirms that the provision of a relatively short period of paid leave reduces the gender employment gap, but prolonged periods of leave have the opposite effect. By contrast, short and long periods of paid leave contribute to gender pay gaps, also of full-time employees.

80. Overall, the provision of paid leave has a positive effect on the employment rates of prime-age women and has contributed to reducing the gender employment gap. This finding is consistent with those initially made by Ruhm (1998) and many other micro-level studies which indicate that entitlements to a *few* weeks of leave tend to favour mothers' attachment to labour market. It also suggests that the effect is even more positive when paid leave is extended beyond the few weeks generally granted for "maternity" reasons.

81. Extending paid leave beyond two years has counterproductive effects on female employment rates and, by the same token, on the gender employment gap. That being said, the effects of paid leave on employment rates are relatively small, since variations in the duration of paid leave are estimated to be responsible for variations in the employment gender gap of no more than 2 percentage points. Lengthening paid leave may have had a positive influence on the average number of hours worked by women relative to men. Longer paid leave may allow women to work slightly longer hours than when paid leave is not granted.

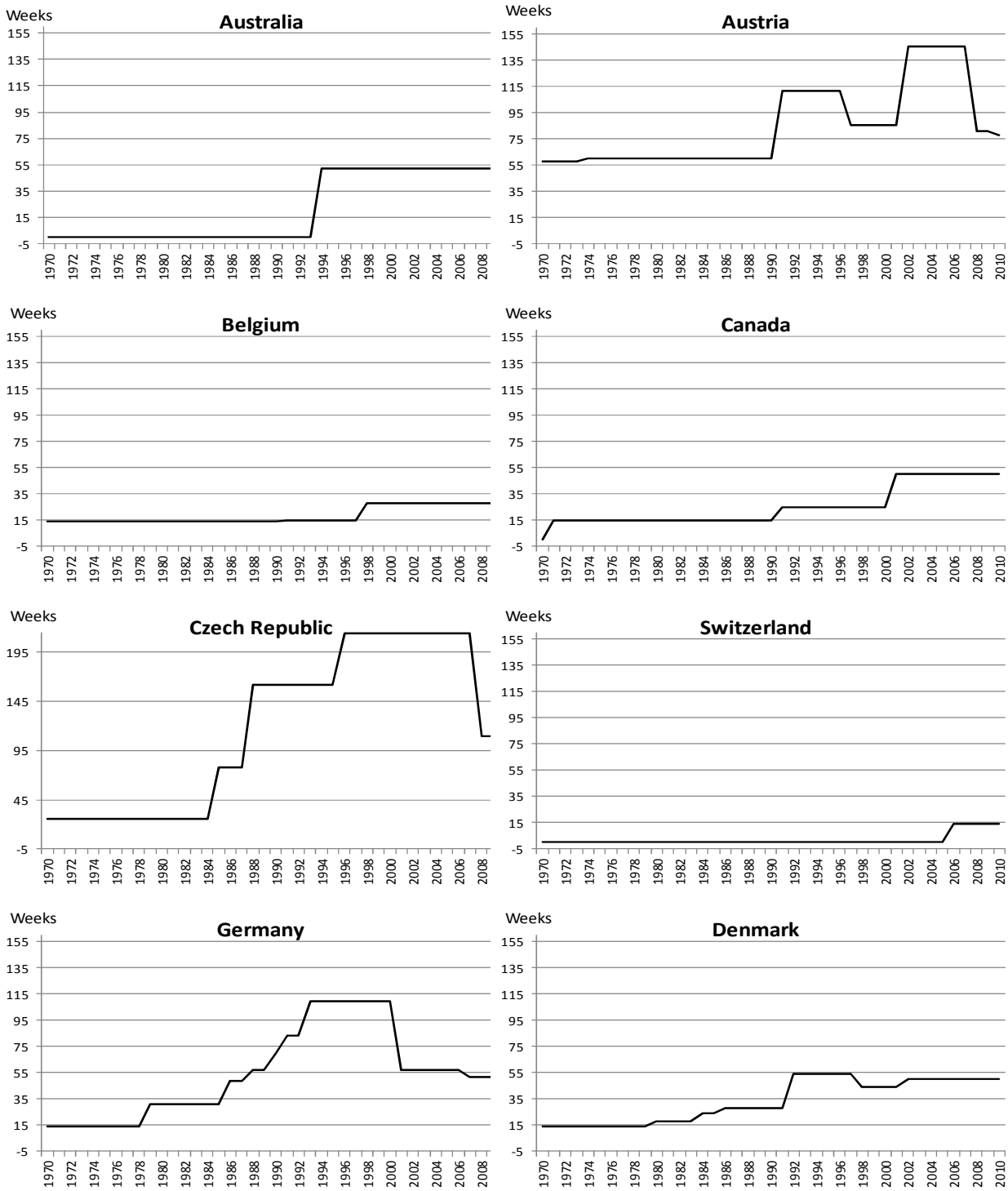
82. Finally, the provision and gradual lengthening of paid leave have contributed to a widening in the gender pay gap of full-time employees. This may reflect the fact that women experience slower career and earnings progression on returning from leave to full-time employment than men, much fewer of whom take leave. In sum, the development of parental leave policies in most countries appears to have had a positive,

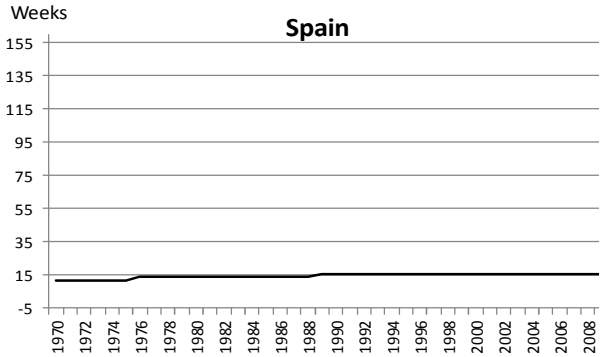
albeit marginal, role in the rise of female employment, although women pay a price in the form of reduced earnings progression.

ANNEX

Additional figures

Figure A1.1. Weeks of paid leave in OECD countries - 1970-2010




Weeks
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95
75
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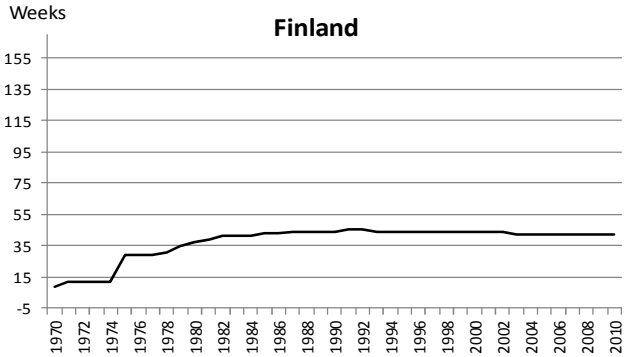
35
15
-5
1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008


Weeks
Finland
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115
95
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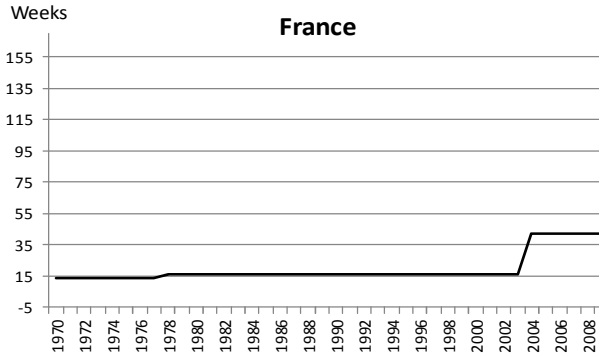
55
35
15
-5
1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010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35
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-5
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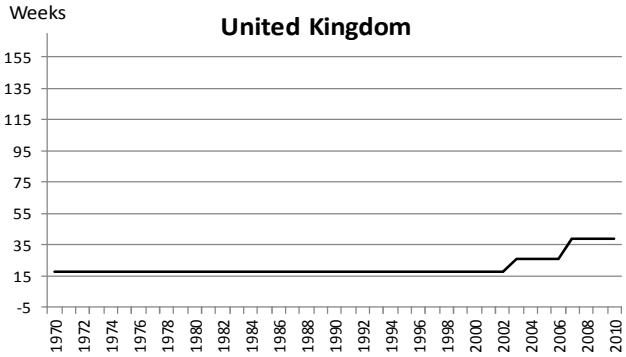
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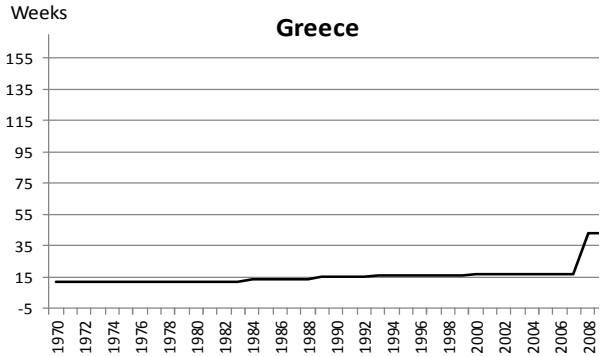
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Greece
155
135
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95
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35
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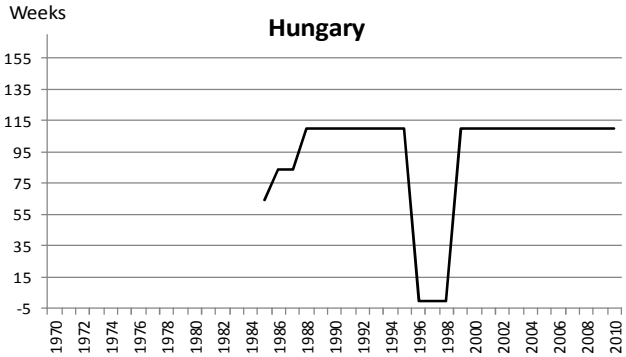
-5
1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008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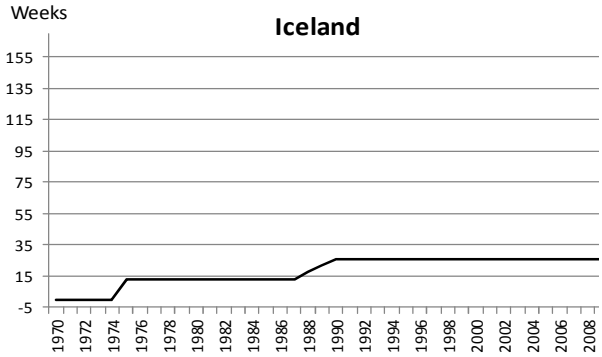
1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010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15
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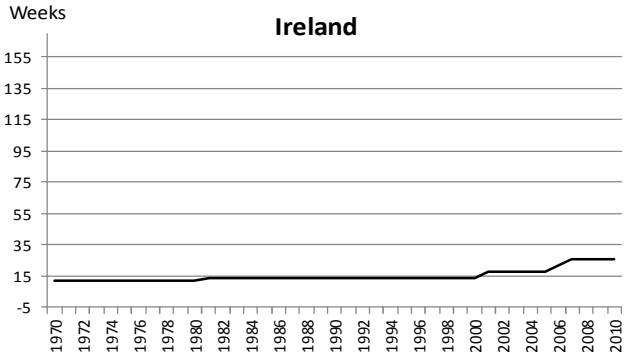
1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008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Ireland
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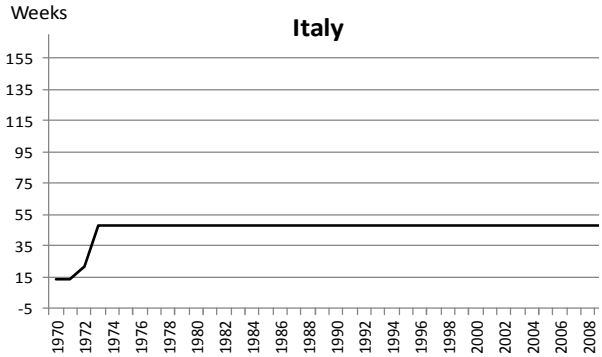
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95
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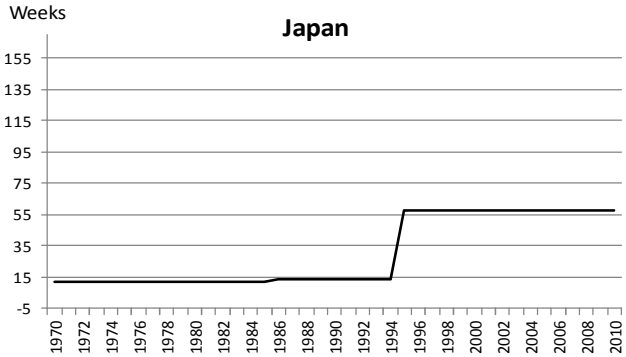
-5
1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008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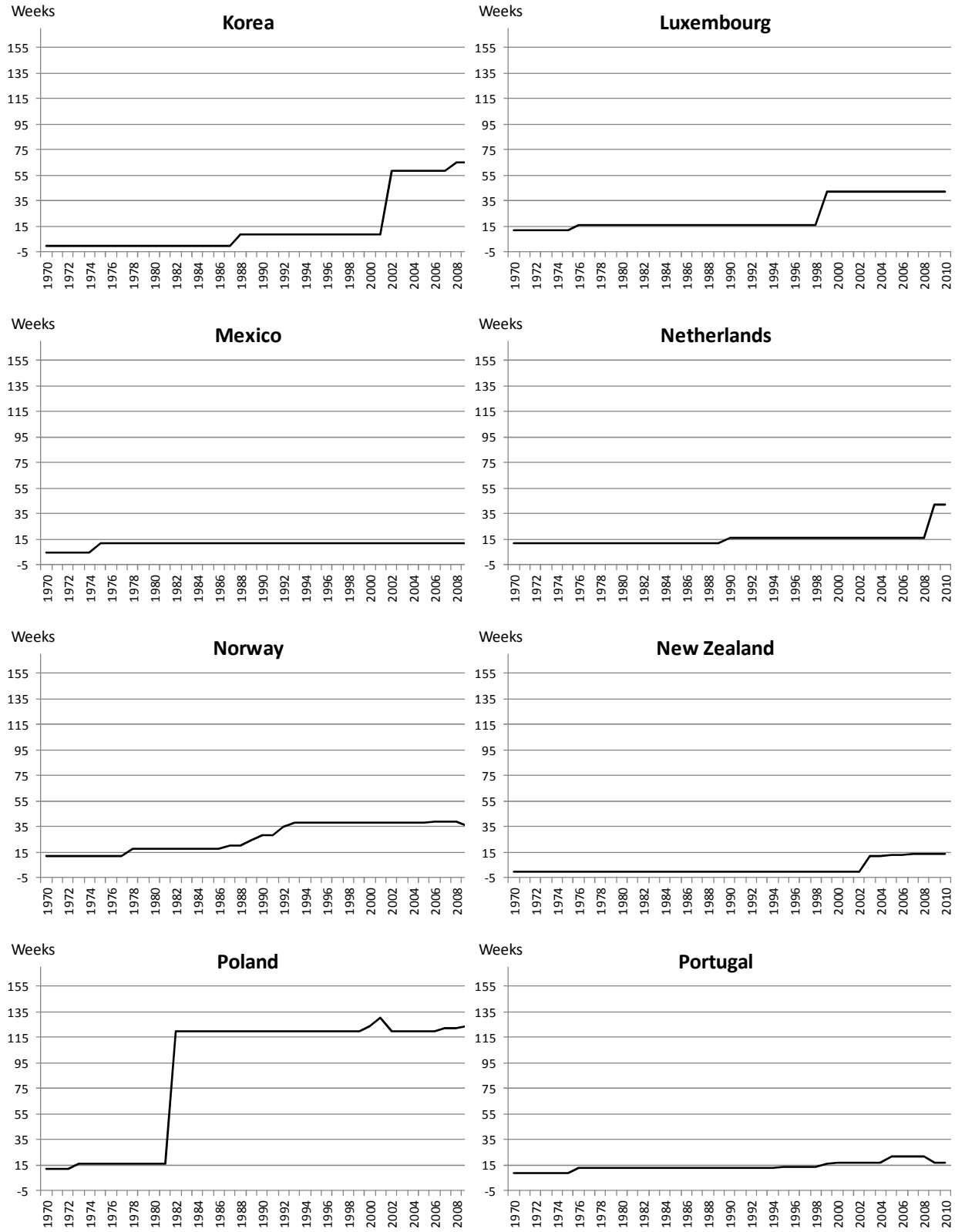
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Luxembourg
Mexico
Netherlands
Norway
New Zealand
Poland
Portugal
Weeks
155
135
115
95
75
55
35
15
-5
1970
1972
1974
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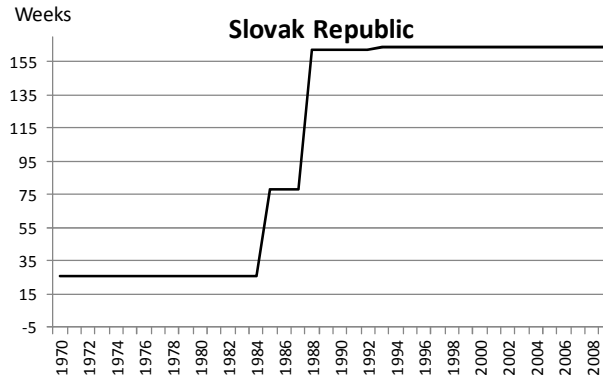
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Slovak Republic
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115
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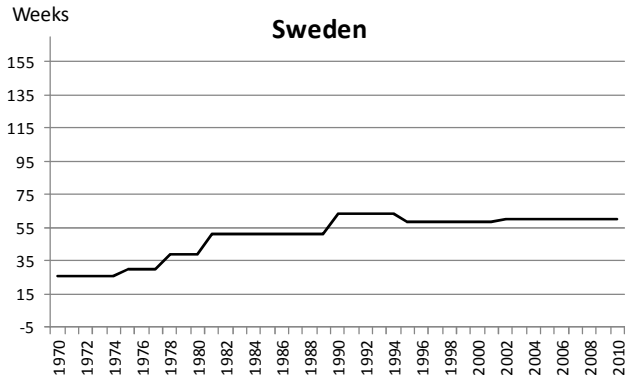
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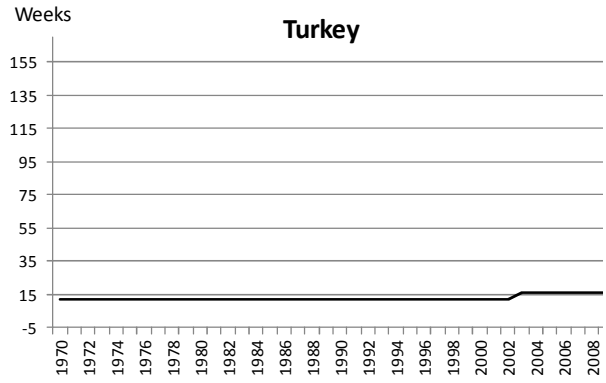
1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010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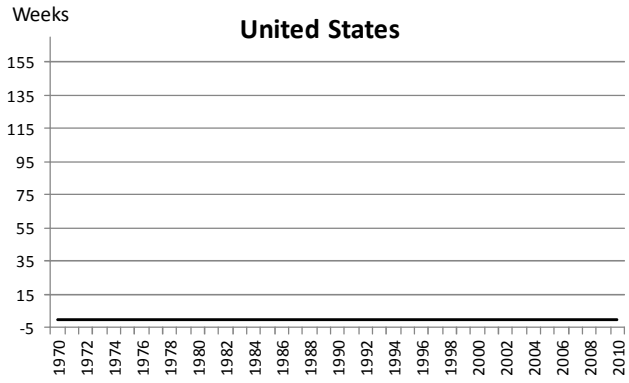
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95
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-5
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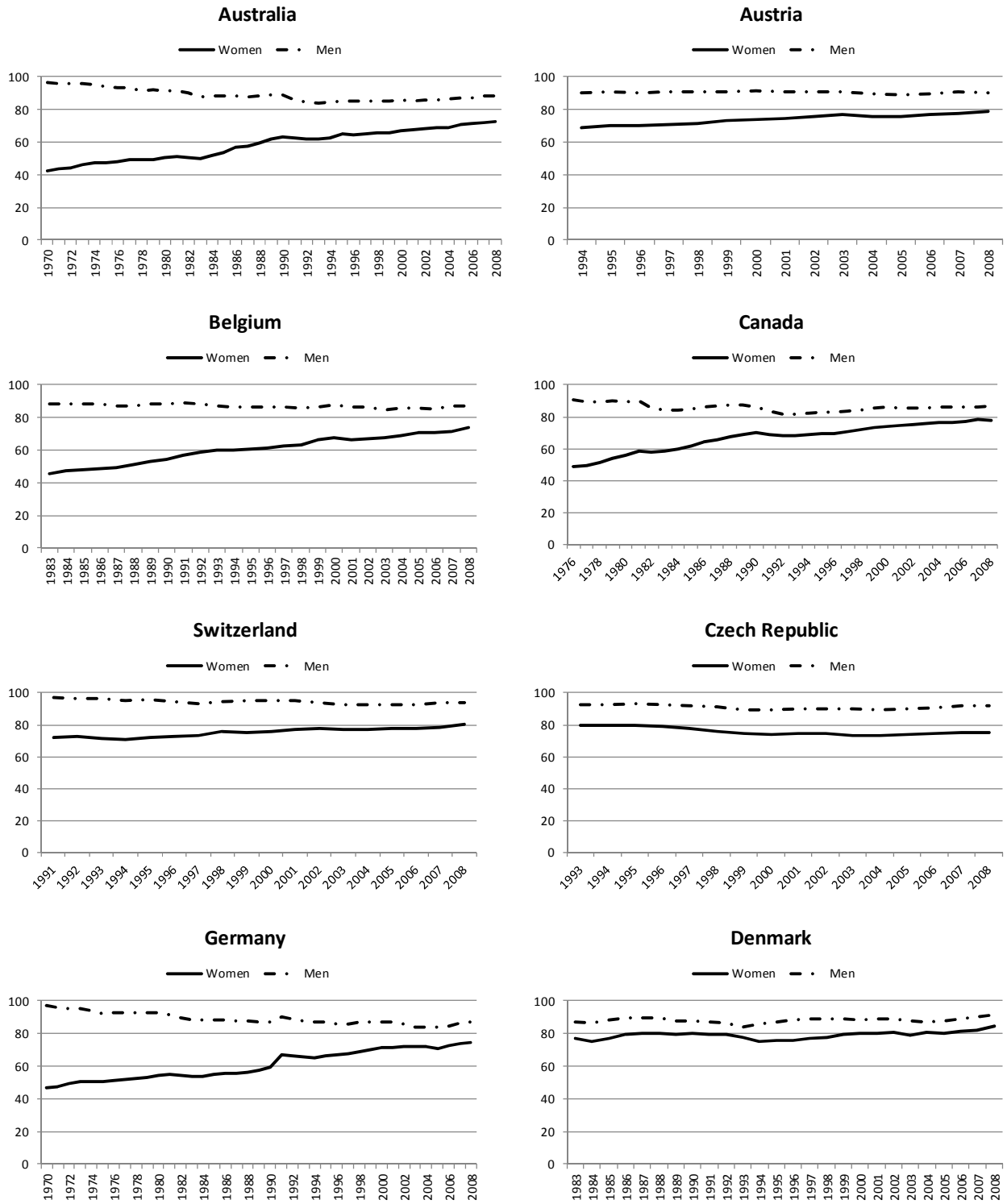
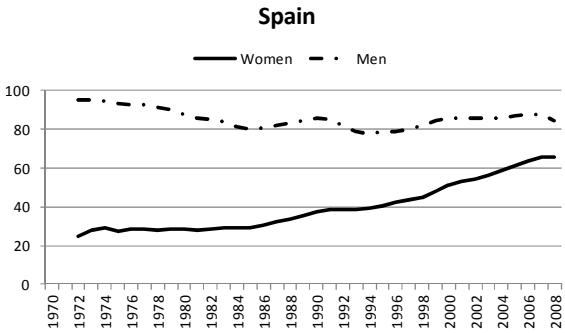
Figure A1.2. Employment rates in OECD countries - 1970-2010

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Women
Men
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40
20
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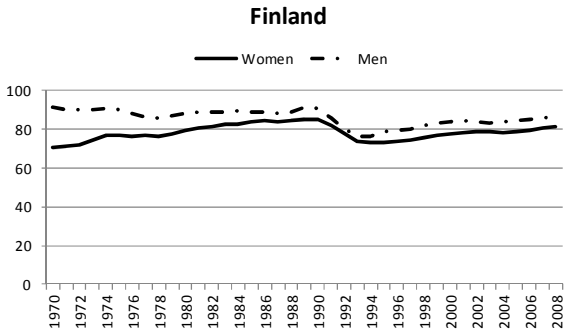
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Men
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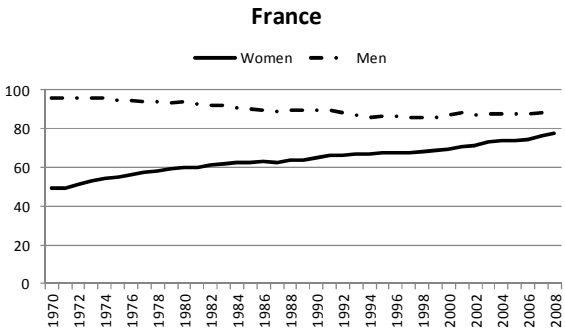
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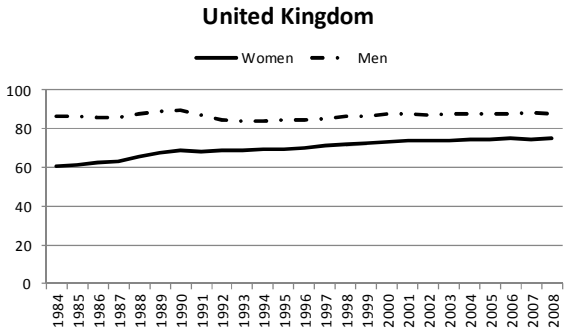
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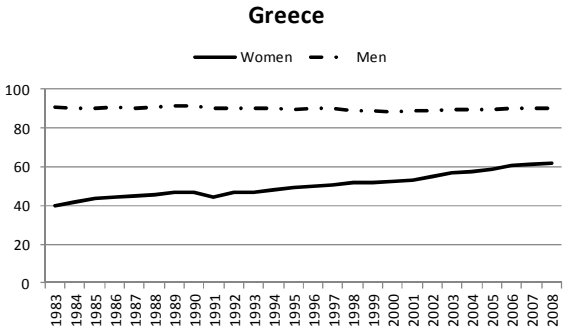
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Women
Men
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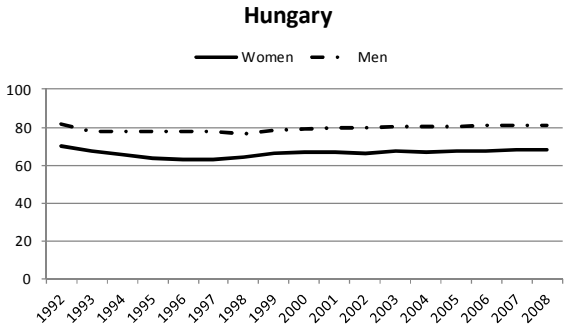
1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008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Men
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1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

Iceland
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60
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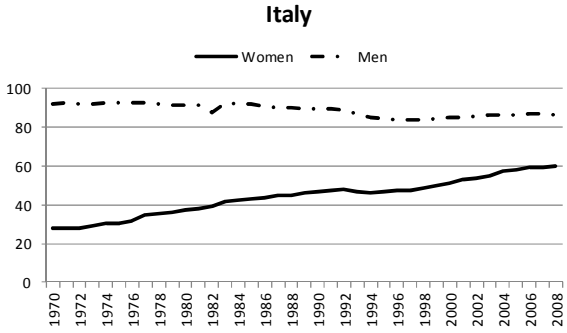
20
0
1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008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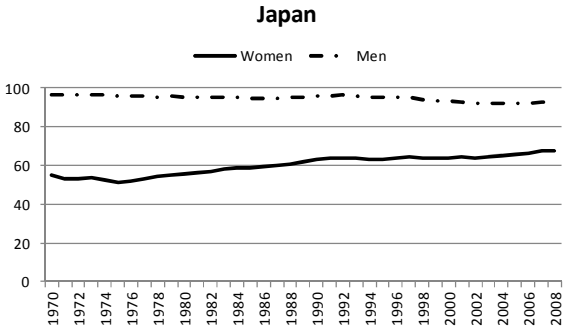
1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008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Men
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80
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20
0
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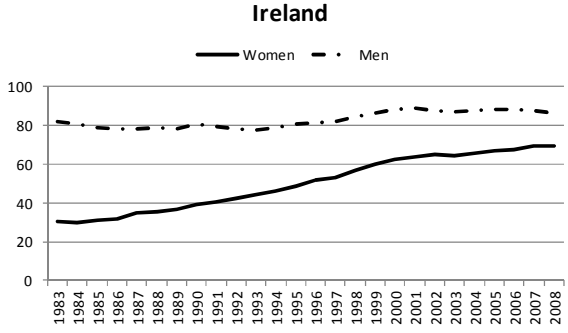
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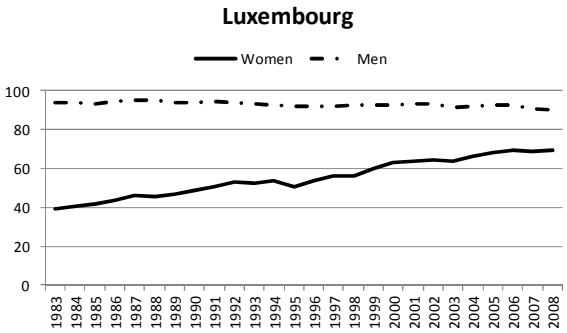
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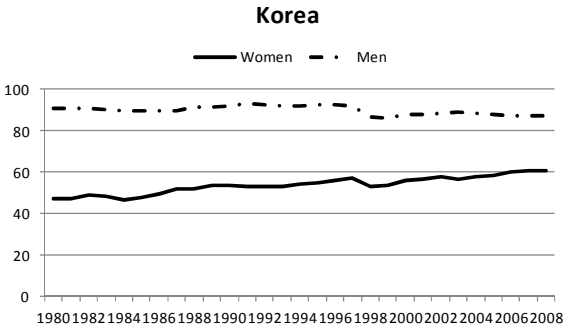
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Women
Men
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20
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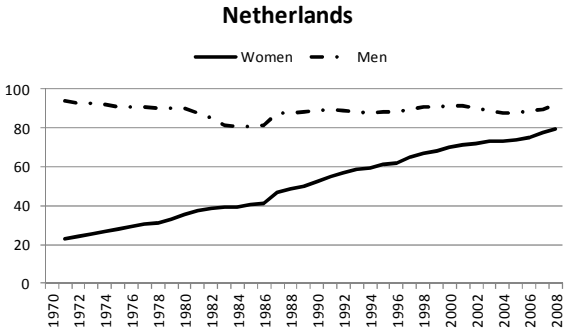
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008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Men
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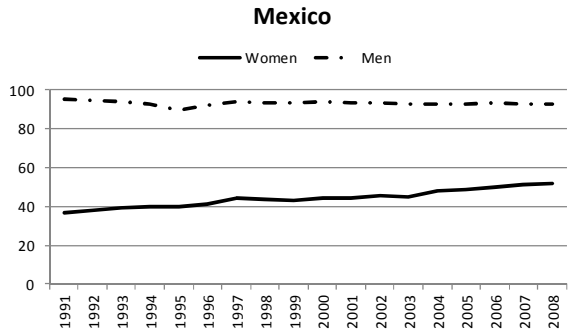
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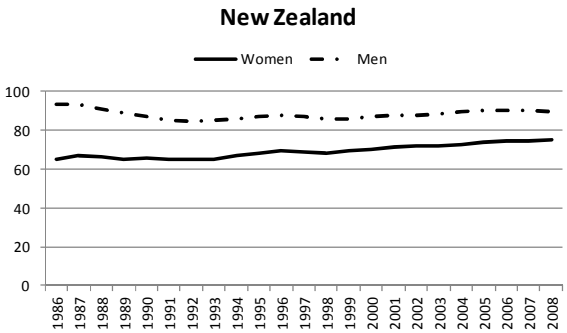
1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008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Men
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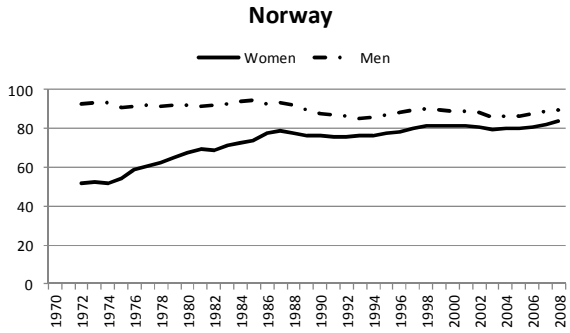
1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008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Men
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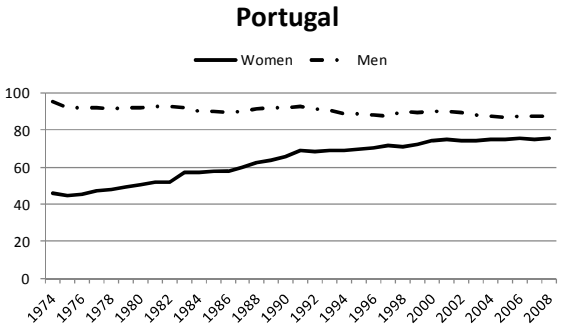
Portugal
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Men
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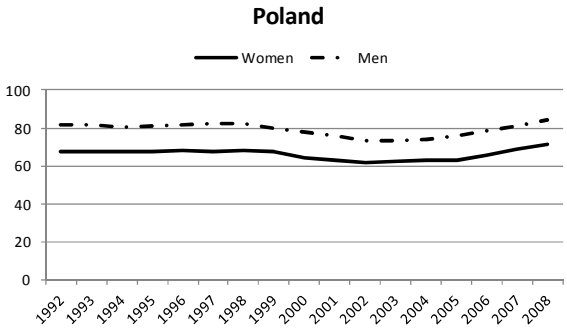
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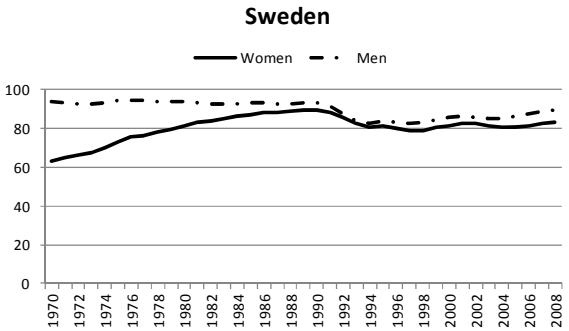
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Women
Men
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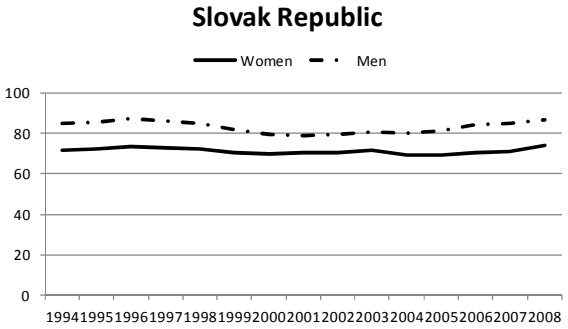
Slovak Republic
Women
Men
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80
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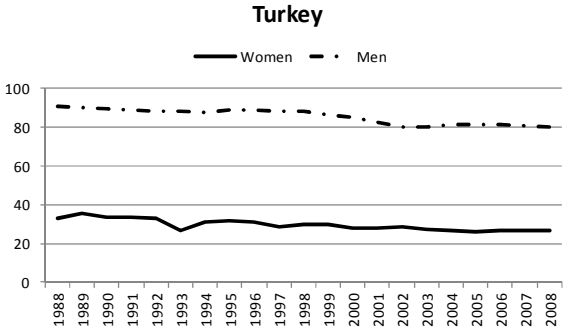
40
20
0
1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008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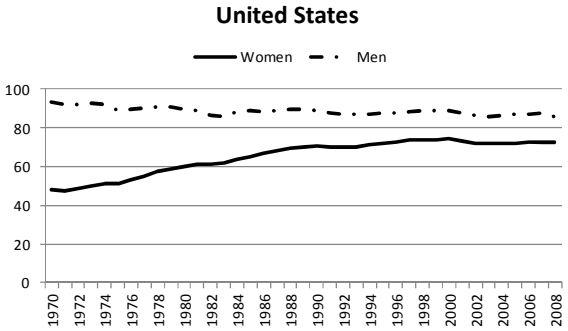
1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008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60
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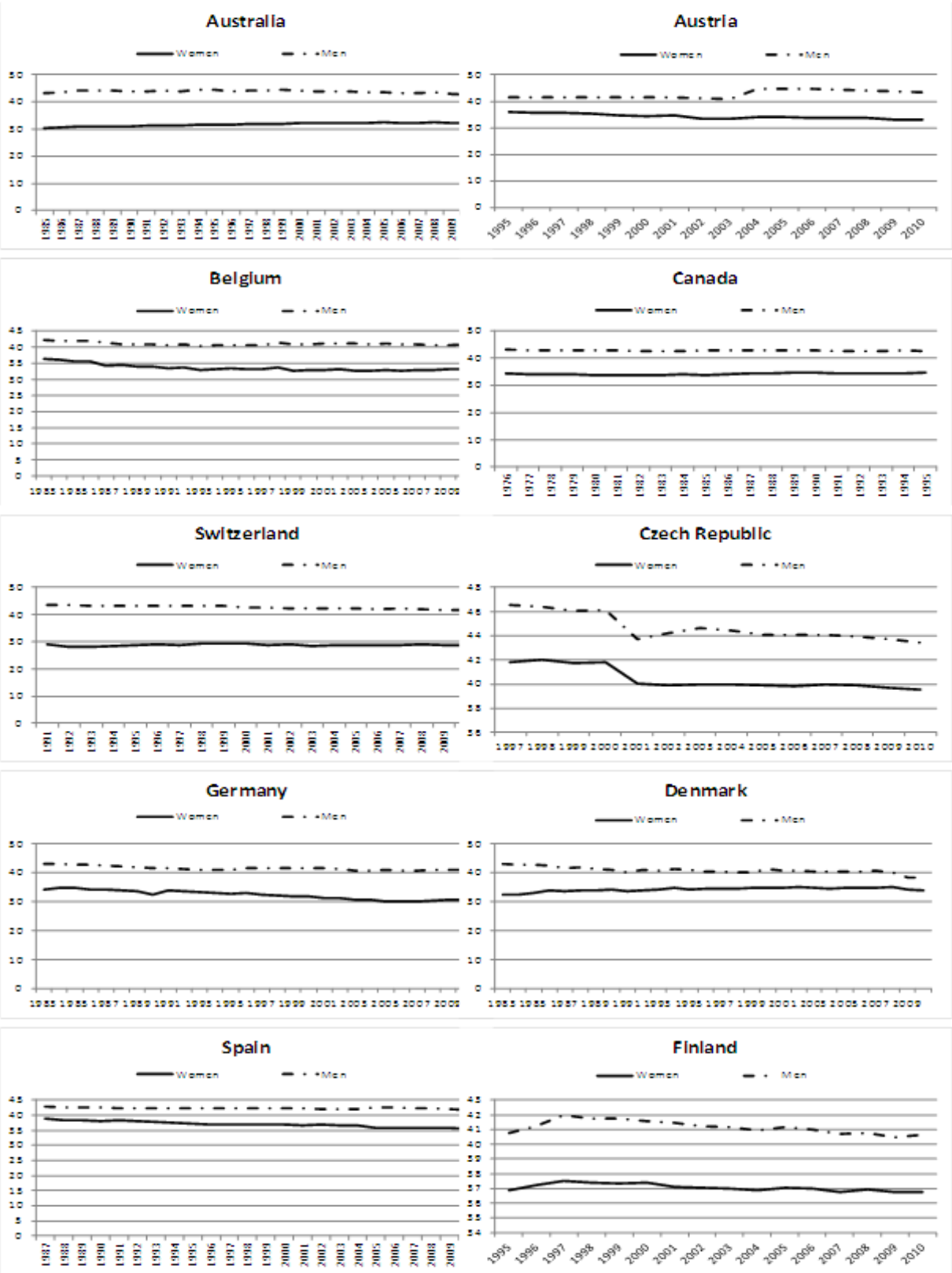
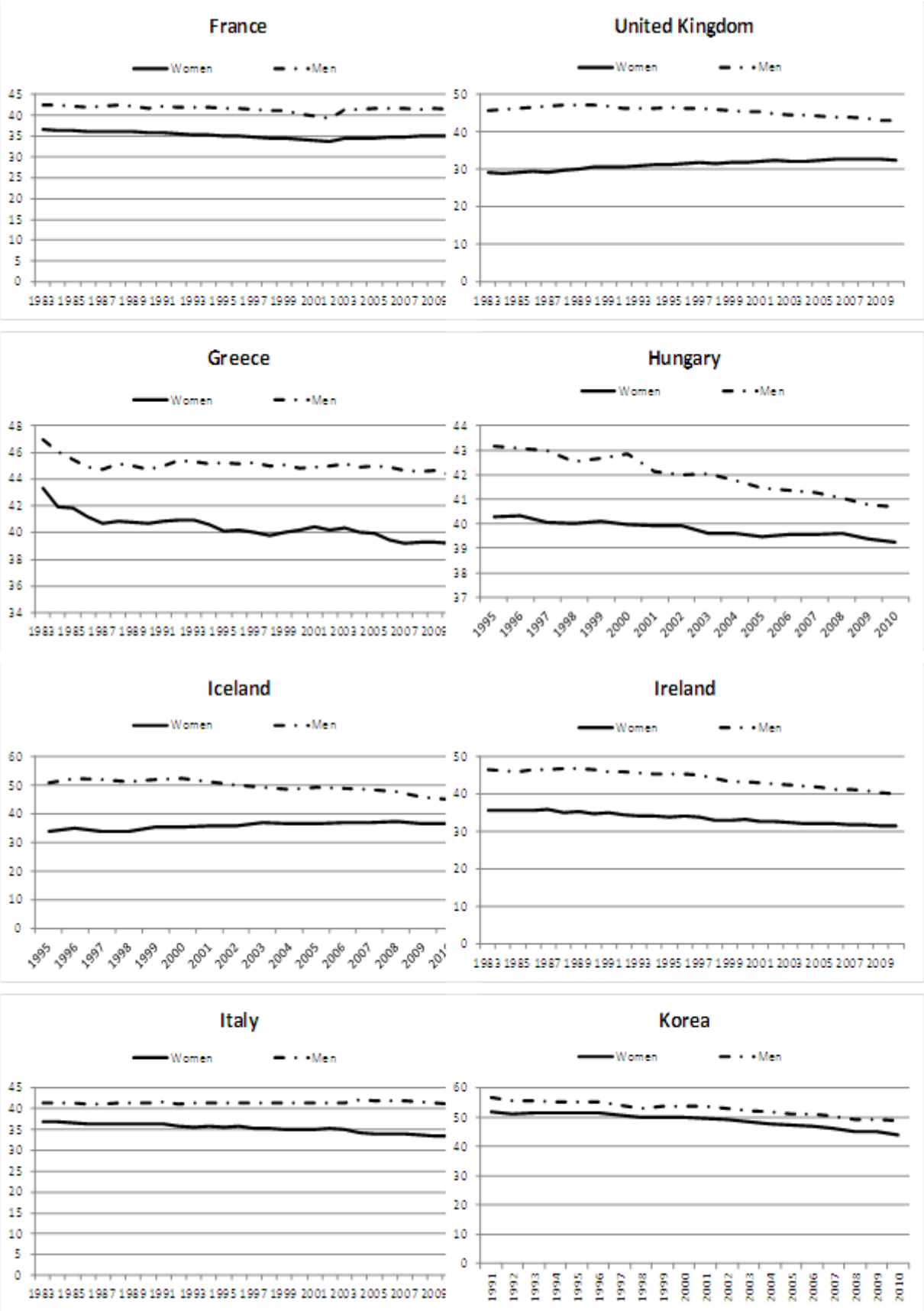
Figure A1.3. Average working hours - 1970-2012

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Women
Men
United Kingdom
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Greece
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Hungary
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Iceland
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Ireland
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Italy
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Korea
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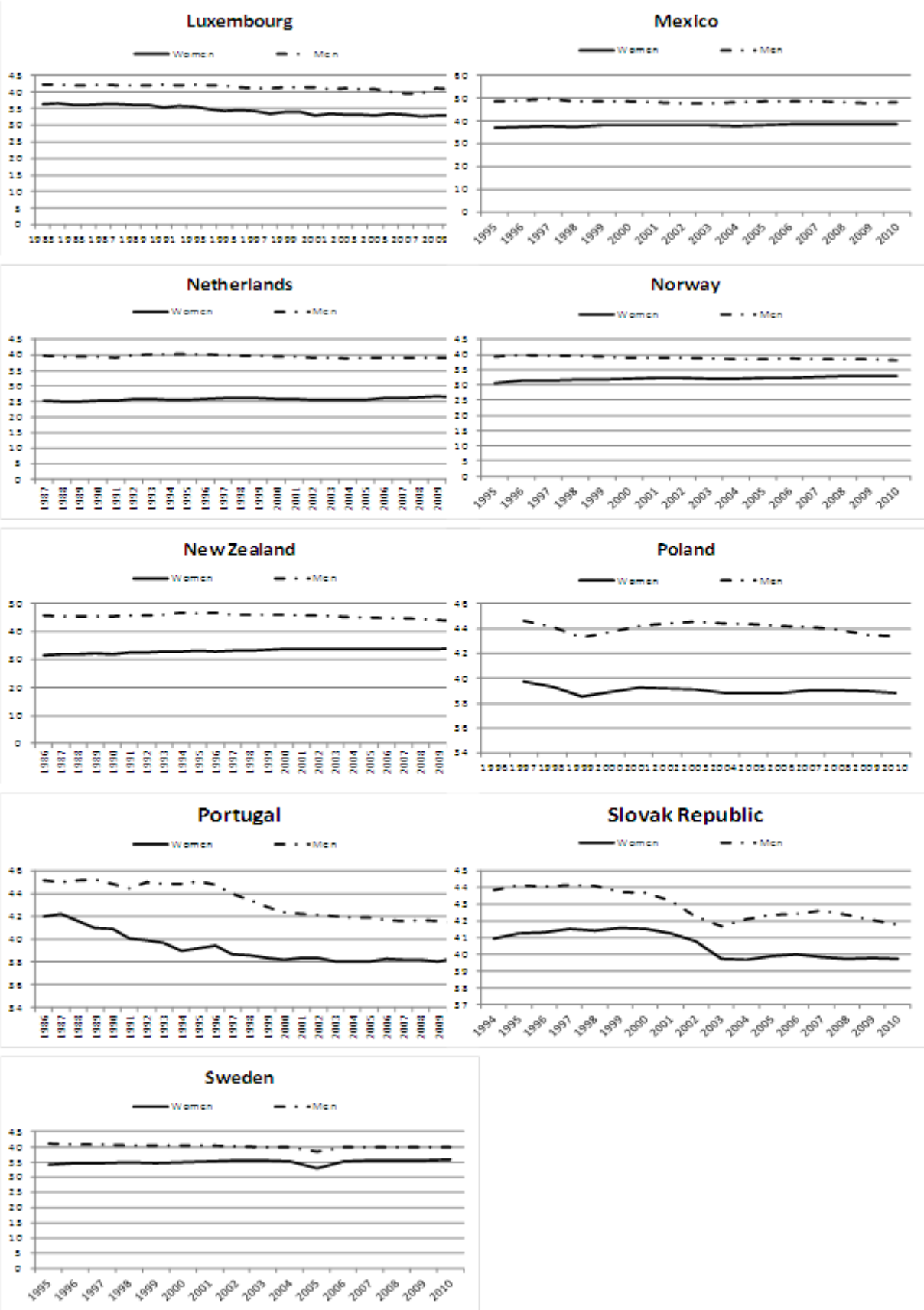
Men


Luxembourg
Women
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Mexico
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Netherlands
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Norway
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New Zealand
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Poland
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Portugal
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Slovak Republic
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Sweden
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Men

Figure A1.4. Weekly mean earnings - 1970-2012

Mean earnings of male and female full-time employees

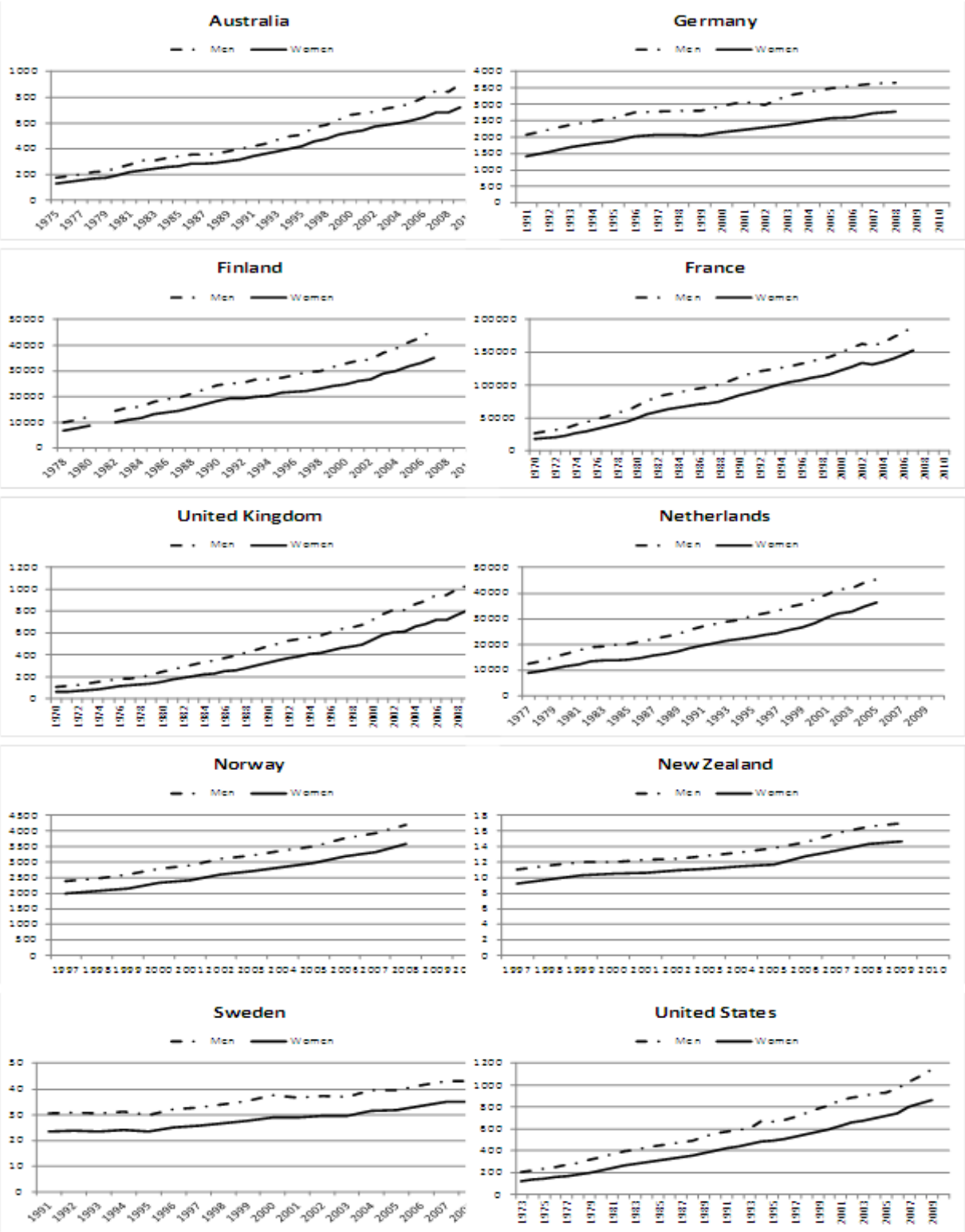

Table A1. Influence of paid leave on employment rates - additional results

	Country fixed-effects			IV-2SLS	MG	CCE
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: Natural log of female employment rates (25-54 years old)						
Leave duration	-	0.006 (0.011)	0.016 (0.011)	0.013 (0.010)	-0.43 (0.34)	-0.083 (0.227)
Leave duration squared	-	-	-	-	-	-
Leave duration t-1	0.016* (0.008)	0.012 (0.010)	-	-	-	-
Gov. spending	-	-	-0.000 (0.001)	-	-	-
Im-Pesaran-Shin cointegration test (p-value of $\tilde{Z}$)	0.038			0.032	0.000	0.000
Pesaran test of cross-section dependence (p-value)	0.001			0.001	0.000	0.083
Dependent variable: Natural log of male employment rates (25-54 years old)						
Leave duration	-	0.003 (0.007)	0.017** (0.007)	0.010 (0.007)	-0.082 (0.067)	-0.003 (0.061)
Leave duration squared	-	-	-	-	-	-
Leave duration $_{t-1}$	0.007 (0.006)	0.005 (0.006)	-	-	-	-
Gov. spending	-	-	-0.000* (0.000)	-	-	-
Im-Pesaran-Shin cointegration test (p-value of $\tilde{Z}$)	0.048			0.048	0.000	0.000
Pesaran test of cross-section dependence (p-value)	0.006			0.004	0.000	0.789
Dependent variable: Female-to-male difference in natural log of employment rates (25-54 years old)						
Leave duration	-	0.003 (0.008)	-0.000 (0.008)	0.001 (0.009) -	0.014 (0.074)	-0.28 (0.28)
Leave duration squared	-	-	-	-	-	-
Leave duration $_{t-1}$	0.009 (0.008)	0.006 (0.009)		-	-	-
Gov. spending	-	-	0.000** (0.000)	-	-	-
Im-Pesaran-Shin cointegration test (p-value of $\tilde{Z}$)	0.000			0.000	0.000	0.000
Pesaran test of cross-section dependence (p-value)	0.001			0.001	0.000	0.000
Number of observations	847	847	847	490	700 847	847 847

Note: 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 bottom section. Leave duration refers to the number of weeks of paid leave (irrespective of the wage replacement level) divided by 100. 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, the United Kingdom, the United States.

Table A2. Influence of paid leave on employment rates
Regressions with another variable for leave duration[1]

		(1)	(2)	(3)	(4)	(5)
Dependent variable: Natural log of female employment rates (25-54 years old)						
Any paid leave > 0 weeks (dummy)		-	-	0.011 (0.006)	0.010 (0.006)	-
Leave duration		-0.006 (0.008)	0.018 (0.025)	-0.006 (0.008)	0.016 (0.025)	-
Leave duration squared		-	-0.013 (0.013)	-	-0.013 (0.013)	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	0.105 (0.096)
	19 to 52 weeks	-	-	-	-	-0.019 (0.029)
	53 to 104 weeks	-	-	-	-	0.083* (0.045)
	> 104 weeks	-	-	-	-	-0.087** (0.039)
Dependent variable: Natural log of male employment rates (25-54 years old)						
Any paid leave > 0 weeks (dummy)		-	-	0.034*** (0.006)	0.034*** (0.006)	-
Leave duration		-0.002 (0.006)	0.003 (0.018)	0.002 (0006)	-0.001 (0.018)	-
Leave duration squared		-	-0.003 (0.010)	-	-0.000 (0.0102)	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	0.214*** (0.058)
	Btw 19 and 52 weeks	-	-	-	-	-0.021 (0.016)
	Btw 53 and 104 weeks	-	-	-	-	0.009 (0.026)
	> 104 weeks	-	-	-	-	0.007 (0.027)
Dependent variable: Female-to-male difference in natural log of employment rates (25-54 years old)						
Any paid leave > 0 weeks (dummy)		-	-	-0.023*** (0.007)	-0.024*** (0.007)	-
Leave duration		-0.004 (0.005)	0.015 (0.019)	0.003 (0.005)	0.017 (0.020)	-
Leave duration squared		-	-0.010 (0.010)	-	-0.012 (0.010)	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.109 (0.073)
	19 to 52 weeks	-	-	-	-	0.001 (0.024)
	53 to 104 weeks	-	-	-	-	0.092*** (0.031)
	> 104 weeks	-	-	-	-	-0.094*** (0.022)
Number of observations		847	847	847	847	847

Note: 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 bottom section. Leave duration refers to the number of weeks of paid leave (irrespective of the wage replacement level) divided by 100.
1) When there are several options for parental leave, the longest period is taken into account, while the shortest was considered previously.

Table A3. Influence of paid leave on weekly working hours
Regressions with another variable for leave duration[1]

		(1)	(2)	(3)	(4)	(5)
Dependent variable: Natural log of female employment rates (25-54 years old)						
Any paid leave > 0 weeks (dummy)		-	-	-0.008*** (0.003)	-0.008** (0.003)	-
Leave duration		-0.006 (0.003)	-0.007 (0.016)	-0.005 (0.003)	-0.000 (0.018)	-
Leave duration squared		-	0.000 (0.009)	-	-0.002 (0.009)	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.098*** (0.036)
	19 to 52 weeks	-	-	-	-	-0.002 (0.015)
	53 to 104 weeks	-	-	-	-	0.033** (0.013)
	> 104 weeks	-	-	-	-	-0.040*** (0.015)
Dependent variable: Natural log of male employment rates (25-54 years old)						
Any paid leave > 0 weeks (dummy)		-	-	-0.006* (0.003)	-0.003 (0.003)	-
Leave duration		-0.015*** (0.004)	-0.052*** (0.018)	-0.015*** (0.004)	-0.049*** (0.018)	-
Leave duration squared		-	0.021** (0.010)	-	-0.020* (0.011)	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.093*** (0.034)
	19 to 52 weeks	-	-	-	-	-0.027* (0.014)
	53 to 104 weeks	-	-	-	-	-0.021 (0.015)
	> 104 weeks	-	-	-	-	0.005 (0.021)
Dependent variable: Female-to-male difference in natural log of employment rates (25-54 years old)						
Any paid leave > 0 weeks (dummy)		-	-	-0.002 (0.003)	-0.005 (0.003)	-
Leave duration		0.009* (0.004)	0.044** (0.019)	0.009** (0.004)	0.048** (0.020)	-
Leave duration squared			-0.020** (0.010)	-	-0.022** (0.011)	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.004 (0.028)
	19 to 52 weeks	-	-	-	-	0.024 (0.018)
	53 to 104 weeks	-	-	-	-	0.054*** (0.019)
	> 104 weeks	-	-	-	-	-0.046** (0.020)
Number of observations		542	542	542	542	542

Note: 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 bottom section. 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.

1) When there are several options for parental leave, the longest period is taken into account, while the shortest was considered previously.

Table A4. Influence of paid leave on weekly earnings
Regressions with another variable for leave duration

		(1)	(2)	(3)	(4)	(5)
Dependent variable: Natural log of female employment rates (25-54 years old)						
Any paid leave > 0 weeks (dummy)		-	-	0.059 (0.048)	0.057 (0.047)	-
Leave duration		-0.001 (0.036)	-0.18 (0.120)	0.000 (0.035)	-0.177 (0.119)	-
Leave duration squared		-	0.103 (0.063)	-	0.099 (0.062)	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.545 (0.565)
	19 to 52 weeks	-	-	-	-	-0.132 (0.145)
	53 to 104 weeks	-	-	-	-	0.307 (0.196)
	> 104 weeks	-	-	-	-	-0.202 (0.175)
Dependent variable: Natural log of male employment rates (25-54 years old)						
Any paid leave > 0 weeks (dummy)		-	-	0.022 (0.049)	0.021 (0.049)	-
Leave duration		-0.015 (0.037)	-0119 (0.119)	-0.014 (0.037)	-0.116 (0.118)	-
Leave duration squared			0.058 (0.062)	-	0.057 (0.062)	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	-0.453 (0.586)
	19 to 52 weeks	-	-	-	-	-0.096 (0.149)
	53 to 104 weeks	-	-	-	-	0.269 (0.202)
	> 104 weeks	-	-	-	-	-0.225 (0.182)
Dependent variable: Female-to-male difference in natural log of employment rates (25-54 years old)						
Any paid leave > 0 weeks (dummy)		-	-	-0.037*** (0.012)	-0.035*** (0.011)	-
Leave duration		-0.014** (0.006)	0.065* (0.038)	-0.015** (0.006)	0.060 (0.036)	-
Leave duration squared			-0.044* (0.020)	-	-0.042** (0.019)	-
Piecewise linear function	Leave < 18 weeks	-	-	-	-	0.092 (0.129)
	19 to 52 weeks	-	-	-	-	0.035 (0.030)
	53 to 104 weeks	-	-	-	-	-0.037 (0.068)
	> 104 weeks	-	-	-	-	-0.023 (0.060)
Number of observations		445	445	445	445	445

Notes: 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.
1) When there are several options for parental leave, the longest period is taken into account, while the shortest was considered previously.

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