

Family and career: an analysis across Europe and North America

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Abstract

Using data on 17 countries in Europe and North America, we compare the career trajectories of mothers and fathers and of women and men without children across cohorts, and at different points of their life cycle. There is wide variation across countries in employment and earnings gaps at age 30. At age 50, however, the employment gap between mothers and non-mothers has closed in most countries. We also observe convergence in employment gaps between mothers and fathers by age 50, but these gaps do not fully close. Motherhood gaps in earnings also close by age 50 between mothers and non-mothers, particularly among the highly educated. But there is strong persistence in earnings gaps between mothers and fathers even among highly educated parents. The main reasons for the remaining gaps at later stages in the life cycle are part-time work among women and fatherhood premia as fathers' earnings outperform non-fathers' over their life cycle.

KEYWORDS

children, earnings, employment, gender gaps

JEL CLASSIFICATION

J12, J13, J16, J21, J22

1 | INTRODUCTION

The recent literature on gender gaps in the labour market shows that the effects of parenthood on women relative to men account for a substantial part of the observed gender inequality in outcomes (Kleven, Landais and Leite-Mariante 2023). The estimated gender gap at childbirth is substantial and,

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for most of the countries, persists even ten years later (Kleven et al., 2019a).¹ But what happens when children eventually grow? Do mothers in their 50s increase their hours of work again or are they still doing more unpaid housework and care work? Do they catch up relative to fathers or to women without children?

Goldin, Kerr and Olivetti (2024) use longitudinal data from US college graduates in the National Longitudinal Survey of Youth 1979 (NLSY79) to understand what happens to the careers of mothers and fathers as their children mature and require less care. They find that mothers increase employment as their children get older and by their 50s the motherhood penalty or the earnings gap relative to women without children is greatly reduced. But, at the same time, fathers manage to maintain their relative gains and do monumentally better than mothers, women without children and men without children, which results in a fatherhood premium that is widening over the life cycle.²

Here, we extend the analysis to include 16 additional countries in Europe and North America. We compare the career trajectories of mothers and fathers and of women and men without children to separate career differences between women and men that are due to family formation from those that are due to genuine gender differences in career profiles in the absence of childbearing. Our set-up allows us to make these comparisons across countries, cohorts, educational groups, and at different points of the life cycle.

We construct synthetic cohorts based on national data from all countries included in the Deaton Review Country Studies project (available at <https://ifs.org.uk/inequality/country-studies/>). The data span multiple decades and include detailed information on household members' labour market outcomes along with the ages of their children. The evidence indicates that there is wide variation in employment and earnings gaps at age 30 across our sample of countries. At age 50, however, mothers in most countries have closed the gap in employment relative to non-mothers, but not fully relative to fathers. Regarding the intensive margin of labour supply, gaps between mothers and non-mothers in part-time shares open at age 30 when children are young in most countries. By age 50, we see again some closing of the motherhood gaps in part-time work. But the pattern is quite different, however, when we compare mothers and fathers, with highly persistent gender gaps in part-time employment. Finally, with respect to earnings gaps, mothers do not only catch up to non-mothers, but in several countries mothers even do better than non-mothers in the long run, which is reflected in positive earnings gaps at age 50. On the contrary, the earnings gaps remain substantial over the life cycle between mothers and fathers, even among highly educated individuals. We also find evidence of fatherhood premia with earnings gaps that are increasing over the life cycle between non-fathers and fathers in some countries.

The rest of the paper is organised as follows. In Section 2, we briefly summarise the most recent literature on this topic. In Section 3, we present the data and the approach we use. In Section 4, we present the main results. Finally, we conclude in Section 5.

2 | LITERATURE REVIEW

A large and internationally wide body of literature documents that men and women have divergent earnings growth paths after the arrival of the first child, even when they were previously on the same

¹ Ten years after childbirth, the penalties in earnings for mothers relative to fathers are 21–26 per cent in Scandinavian countries, 31–44 per cent in English-speaking countries, and 51–61 per cent in German-speaking countries. See also Berniell et al. (2018), De Philippis and Lo Bello (2023) and de Quinto, Hospido and Sanz (2021) for similar figures in Chile, Italy and Spain, respectively.

² Other studies also suggest that the presence of children is positively associated with men's earnings. However, evidence on the reasons for this fatherhood premium is scarce. Kunze (2020) shows that the cross-sectional comparison of men who have a child and men who remain childless overestimates the (positive) effect of having children on male earnings, as the earnings profiles of men who have a child and childless men differ already before the arrival of the first child. Once accounting for selection, she finds no significant effect of children on male earnings profiles. For females, Staff and Mortimer (2012) find only very small differences between future mothers and those who never have children in the amount of time spent out of the labour force (and not in school) prior to motherhood.

career trajectory. This result holds both within couples, when data permit, and also comparing mothers with fathers (Bertrand, Goldin and Katz, 2010; Angelov, Johansson and Lindhal, 2016; Goldin and Mitchell, 2017; Juhn and McCue, 2017; Kleven, Landais and SØgaard, 2019b, 2021; Andresen and Nix, 2022; Cortés and Pan, 2023; Kleven, 2023). Those estimated motherhood penalties could be even underestimating the true wage gaps if participation after childbirth is especially selective among women (Andrew et al., 2024).

Much of the initial divergence between male and female earnings after the first child is born is due to the reduction in days employed (extensive margin) as well as in the hours of paid work of mothers (intensive margin). But over time additional factors seem also to matter, particularly so in professions with more nonlinear wage structures (Bütikofer, Jensen and Salvanes, 2018). Fewer hours at work may reduce mothers' attachment to the labour force (Costa Dias, Joyce and Parodi, 2020), their probability of training (Blundell et al., 2021), promotion (Bronson and Thoursie, 2021), job opportunities (Jayachandran et al., 2023) or accessing a more permanent job position when working temporarily or in mini-jobs (Collischon, Cygan-Rehm and Riphahn, 2023).

Other commonly suggested mechanisms driving the child penalty are gender norms, preferences for childcare, and within-household specialisation (comparative advantage). Andresen and Nix (2022) compare the child penalties among same-sex male and same-sex female partners to the ones experienced by heterosexual couples in Norway. This comparison allows them to relate pre-set gender roles with child penalties: for female same-sex couples, the initial drop in the income of the partner who gives birth is smaller than the one experienced by the mother in heterosexual couples; and her female partner also experiences a drop in income, in contrast to the no child penalty men experience in heterosexual couples. The child penalty disappears five years after birth in female same-sex couples. These patterns attribute child penalties to preferences and dominant gender norms in heterosexual couples. Regarding within-household specialisation, Angelov et al. (2016) find that earnings' potential is important for how monetary costs of parenthood are split between the parents and that the gender gap decreases as women's level of education increases relative to her spouse.

The multi-country approach here helps us better understand how motherhood penalties can vary with political and cultural institutions. Kleven et al. (2019a) find that those developed countries with larger child penalties are also the ones with much more conservative views. Berniell et al. (2021) document that societies with more conservative social norms or with weak policies regarding work-life balance are characterised by larger motherhood effects in employment. They find that Eastern European countries have small or close to zero effects on employment, part-time employment and self-employment as a result of Socialist policies to reach gender equality during the Soviet era, while Western European countries display the largest motherhood effects. Family policies such as parental leave and childcare provision may affect mothers' incentives to work in the short run in a way that differences in parental leave schemes across countries play a role in child penalty variation. A longer and more generous parental leave scheme, such as that of Sweden, implies larger child penalties in employment and earnings in the short run (Kleven et al., 2019a).

Our study contributes to the literature by extending the multi-country approach to the analysis of motherhood gaps over a larger part of the life cycle. While most of the existing studies focus on gaps up to ten years after childbirth, our data span motherhood gaps over a 20-year horizon between age 30 and age 50.

3 | DATA AND DEFINITIONS

To evaluate the impacts of children on gender gaps in employment and earnings outcomes over the life cycle, we take advantage of the data that were compiled for the country reports in the Deaton Review Country Studies project (available at <https://ifs.org.uk/inequality/country-studies/>). While some countries base their analyses on longitudinal register data, most use repeated cross-sectional data from household surveys, such as the Labour Force Survey. These data span multiple decades and

include detailed information on household members' labour market outcomes along with the ages of their children.

We define synthetic cohorts to approximate careers over the life cycle, which we construct in the following way. Per country, we consider individuals who were born in five-year birth cohorts in the first half of each decade, from 1940–1945 to 1990–1995. We observe labour market outcomes of individuals in these cohorts around age 30 (aged 28–32), around age 40 (aged 38–42), and around age 50 (aged 48–52). Further, we group them by gender – female or male – and family-type – parents with children, or non-parents without children. To focus on children who are ageing along with their parents, we restrict the sample to individuals in the age 30 group with young children who are less than 7 years old, or individuals in the age 40 group with school age children (10–15 years old) and individuals in the age 50 group with grown children (16–20 years old). Non-parents are defined as individuals who do not have any children.

For each country, we compute average labour market outcomes in cohort, age, family-type and gender cells, first, for the full population, and second, separately by three educational categories, according to the International Standard Classification of Education (ISCED) scale: low, ISCED 0–2, primary and lower secondary school; middle, ISCED 3–5, upper secondary school and vocational training; high, ISCED 6–8, university (bachelor degree and higher). In terms of labour market outcomes, we consider the employment rate, the share of part-time employed among employed individuals,³ and labour market earnings including zeros for the non-employed. In each cell, we compute three child related gaps: the motherhood gap comparing mothers and non-mothers, the parental gap comparing mothers and fathers, and the fatherhood gap comparing non-fathers and fathers.

The data structure with synthetic cohorts results in simple stylised measures of child-related gender gaps over the parents' life cycle. These measures follow the main concepts used in the literature on child penalties and allow us to compare four groups of parents and non-parents, not just mothers and fathers, to investigate the nature of the gaps (Goldin et al., 2024). Furthermore, we can compile a consistent data set for a large number of countries – in total, we have data from 17 countries⁴ – and for multiple cohorts per country to investigate the career gaps across cohorts.

The disadvantages compared with individual panel data, which are used in most of the child penalty literature, are threefold. First, with the strict definition of age groups we cannot take into account changes in sorting into motherhood over time. The age at first birth is heterogeneous across countries and it has been rising over time.⁵ We use cohort fixed effects when comparing gaps across cohorts, which should take care of the change of the selection into motherhood due to the age at birth. Reassuringly, we do not find evidence of changes in the patterns by which gaps evolve over the life cycle across cohorts. Second, as in Kleven (2023), in household surveys we only observe children living in the household but not necessarily all biological children. This gives rise to two types of selection issues. On the one hand, we do not observe fathers if they move out of their children's household. On the other hand, we do not observe children if they have already left the household. This point is especially relevant when we consider mothers in the age 50 group with children aged 16–20. Finally, the use of repeated cross-sections does not account for the changing sample composition over time.⁶

³ Part-time is defined as working 30 hours or fewer per week.

⁴ Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, the UK and the US.

⁵ The mean age at first birth has risen from 1970 to 2020 by 3.8 years on average across the countries in our data (OECD Family Database). We use five-year age bands when defining age groups, which ensures that there is overlap in mean child ages across cohorts and limits concerns that care responsibilities might change too much over age groups across birth cohorts.

⁶ There are certainly multiple alternative methods of defining career gaps. We want to focus on one of them and we will make the data available online. We leave experimentation with alternative approaches to future research. Ideally, our paper can be seen as the starting point of a wider discussion.

In total, we compiled data for 15 European countries plus the US and Canada. Table A.1 in the online Appendix shows the number of countries with data available in each of the age and cohort cells for employment and earnings outcomes. Table A.2 provides details about the country-specific data sources and definitions. As the data from most of the countries span the period between 1970 and 2020, we have the highest data coverage in terms of available countries for the cohorts born in the 1970s (see Table A.1). This is why we start our analysis with this cohort.

4 | CHILD-RELATED GAPS OVER THE LIFE CYCLE

4.1 | Graphical evidence

To visualise the persistence of motherhood gaps over the life cycle for the cohorts born in the first half of the 1970s, we show a series of scatter graphs, plotting for each country a measure of the child-related gap at age 30 on the horizontal axis against the corresponding gap at age 50 on the vertical axis. Regional country groups are distinguished by colour and symbol in the figures: green triangles, Western European countries (Austria, Belgium, France, Germany and the Netherlands); pink crosses, Southern European countries (Italy, Portugal and Spain); red diamonds, Nordic countries (Denmark, Finland and Sweden); blue circles, countries that can be described as Anglo-Saxon (Canada, Ireland, the US and the UK). We add a dashed 45-degree line in each figure, which indicates the area of persistence of the gap over the life cycle. Scatter clouds of dots above the 45-degree line indicate convergence, where countries with large (negative) gaps at age 30 close the gaps over the life cycle relative to countries with small gaps at age 30. Scatter clouds below the 45-degree line indicate divergence over the life cycle. We also add the horizontal axis at zero, which indicates the area where the gap has closed over the life cycle.

Figure 1(a) presents gaps in employment rates between mothers and non-mothers. There is wide variation in employment gaps at age 30 across our sample of countries. In Austria, mothers at age 30 are 50 percentage points less likely to be employed compared with non-mothers, while in the Nordic countries and Portugal the gaps are close to zero. At age 50, however, mothers in most countries have closed the gap in employment relative to non-mothers. All the dots in the figure are above the 45-degree line and they cluster around the zero line, indicating convergence across countries. Interestingly, the Southern European countries remain closest to the 45-degree line, while the Anglo-Saxon and Western European countries mostly close the gap. In the Nordic countries, the gap reverses and mothers have higher employment rates than non-mothers, which might be due to positive selection into motherhood. Overall, in terms of employment rates, mothers seem to close the gap to non-mothers once their children grow older. Figure 1(b) shows parental gaps in employment rates between mothers and fathers. The general pattern of countries with larger gaps at age 30 catching up to countries with smaller gaps by age 50 is similar to Figure 1(a). But in most countries, mothers do not fully close the gap in employment rates with fathers even at age 50.

Next, we focus on the intensive margin of labour supply and show gaps in the share of employed individuals working part-time in Figure 2. At age 30, gaps in part-time shares between mothers and non-mothers are around 10 percentage points in most countries (see Figure 2(a)). But there are three countries with much larger gaps: Germany, the Netherlands and the UK. By age 50, we see again some closing of the gaps as non-mothers become more likely to work as much part-time as mothers. The pattern is quite different, when we compare mothers and fathers in Figure 2(b). In this figure, most countries cluster around the 45-degree line indicating that mothers have persistently higher shares of part-time employment than fathers throughout their life cycles. There is no evidence of catching up, except in the countries with very high gaps at age 30. Overall, mothers and non-mothers become more alike in terms of part-time work as their children grow older. But part-time work choices that women make once they have young children seem to persist over the life cycle, which is why the gaps never close in comparison with fathers.

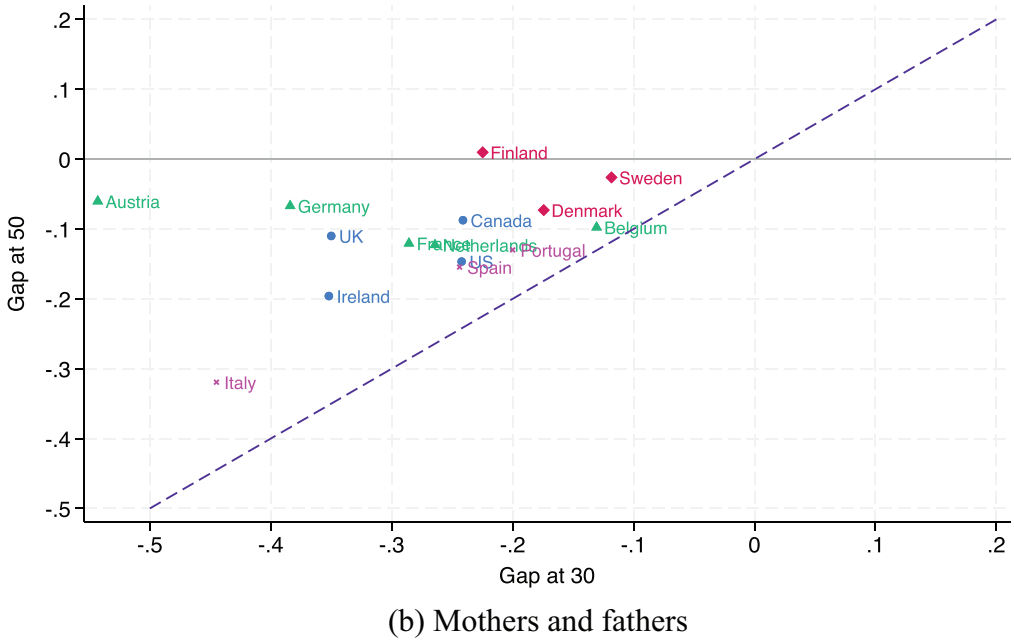
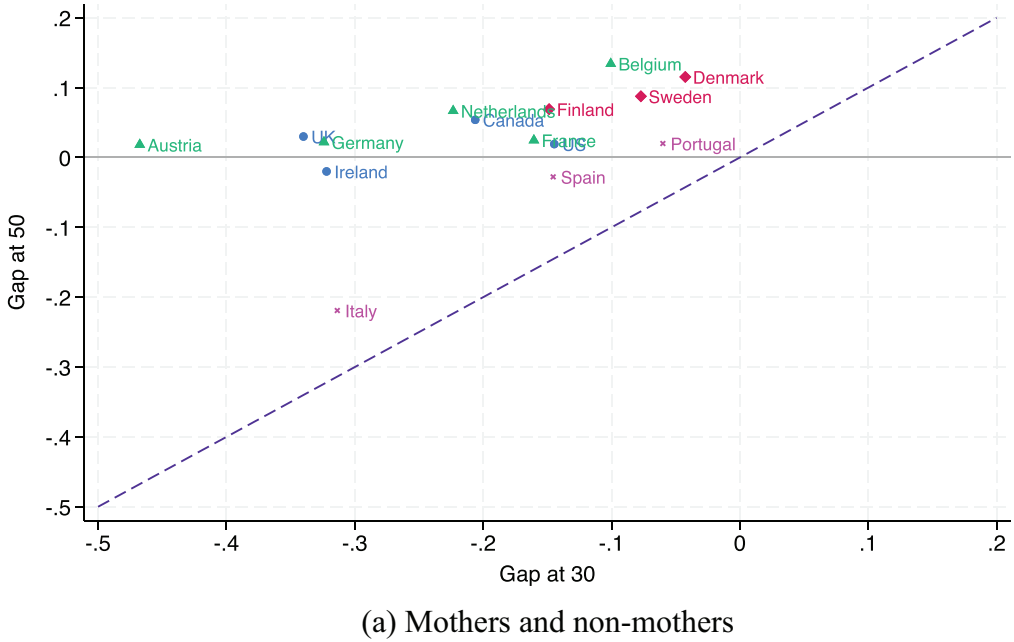
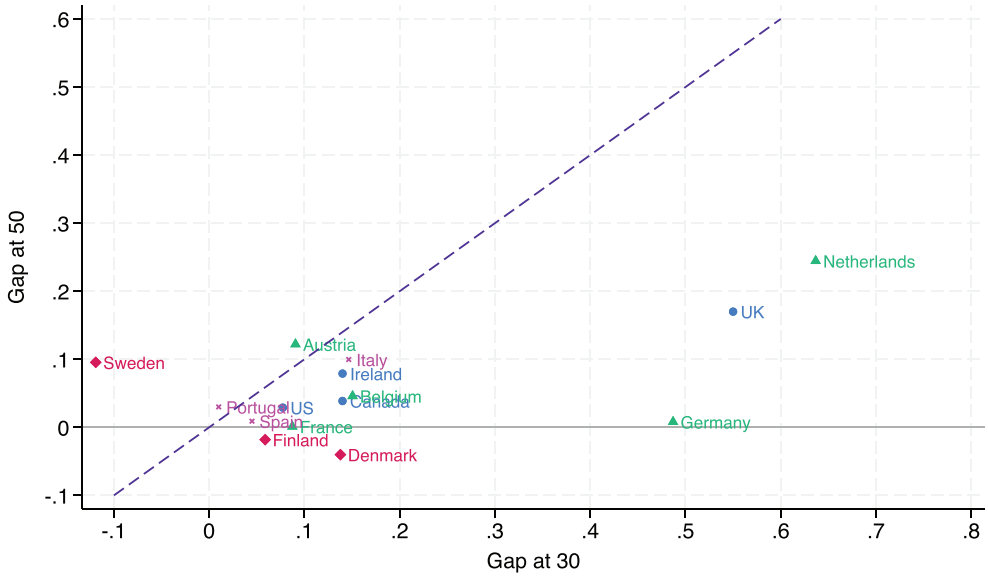
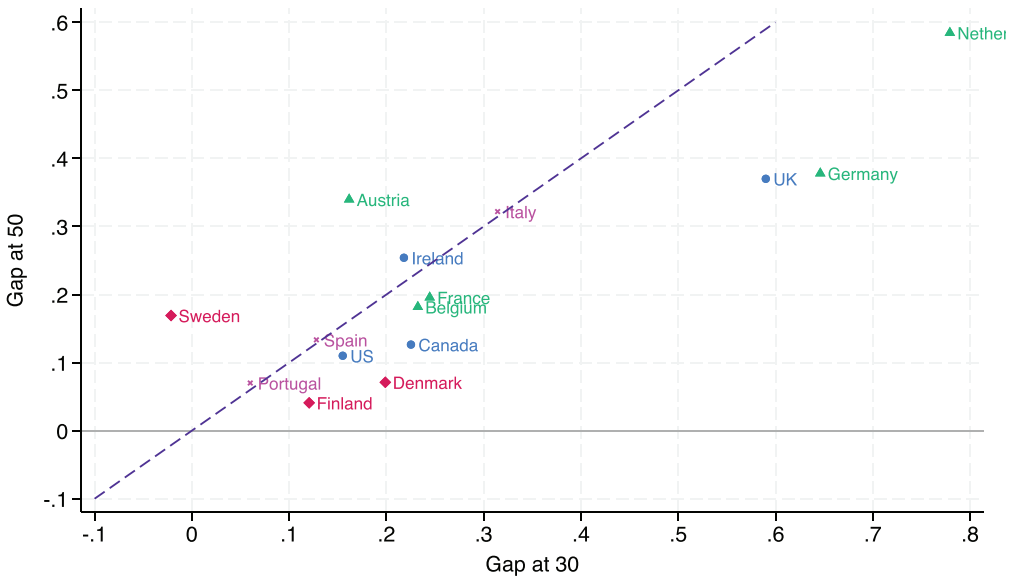


FIGURE 1 Employment gaps. *Note:* Gaps in employment rates (a) between mothers and non-mothers and (b) between mothers and fathers. Cohort 1970, 15 countries. The four regional country groups are distinguished by colour and symbol (see main text for details). [Colour figure can be viewed at wileyonlinelibrary.com]



(a) Mothers and non-mothers



(b) Mothers and fathers

FIGURE 2 Part-time gaps. *Note:* Gaps in part-time employment rates (a) between mothers and non-mothers and (b) between mothers and fathers. Cohort 1970, 15 countries. The four regional country groups are distinguished by colour and symbol (see main text for details). [Colour figure can be viewed at wileyonlinelibrary.com]

What are the consequences of labour supply choices for gender earnings gaps? Figure 3 shows relative earnings gaps between mothers and non-mothers in panel (a) and between mothers and fathers in panel (b). Here the contrast between both panels is quite striking. Mothers not only catch up to non-mothers in terms of their earnings, but in several countries mothers even do better than non-mothers in the long run, which is reflected in positive earnings gaps at age 50. However, the convergence in earnings is much lower once we compare mothers and fathers. In panel (b), earnings gaps remain negative at age 50 in all countries and the dots lie just above the 45-degree line, which indicates highly persistent earnings gaps. The latter pattern is well in line with part-time choices, which reduce the earnings of mothers relative to fathers also after their children have grown older.

In panel (c), we show the earnings gap between non-fathers and fathers to examine the evidence for the fatherhood premium documented by Goldin et al. (2024) for the US. Indeed, in several countries, fathers outperform non-fathers in terms of earnings already at age 30, which indicates positive selection into fatherhood. But fathers also gain in earnings relative to non-fathers at a later stage in their life cycles as gaps turn negative in all countries by age 50. While fatherhood gaps in earnings are mostly persistent over the life cycle in Central and Western European countries as well as Spain and Portugal, we find evidence of widening fatherhood premia in Nordic and Anglo-Saxon countries.

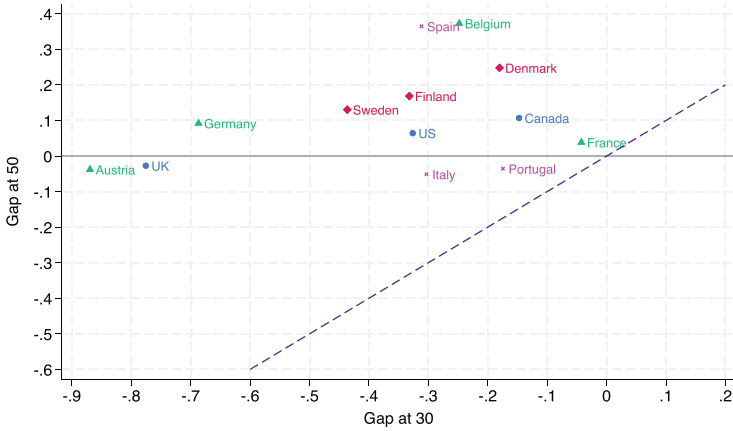
Figures 1–3 show interesting evidence about changes in child-related gaps over the life cycle. But they also indicate that positive selection of mothers and fathers may play a role in shaping the gaps. We next study child-related gaps by education where the impact of selection should be reduced.

Figure 4 compares motherhood gaps and parental gaps in employment for low-educated individuals (ISCED 0–2) in the left panels (a and c), and for highly educated individuals (ISCED 6–8) in the right panels (b and d). These figures show very clear patterns of convergence for highly educated groups. While there is a wide variation in employment gaps at age 30, the gaps close across all countries over the life cycle relative to non-mothers, and they converge to the lowest country levels relative to fathers. The patterns are much less systematic among low-educated groups. Especially, parental employment gaps for low-educated individuals remain large over the life cycle in many countries. In these figures, we show cohorts born in the 1970s by blue dots with country labels and add older cohorts born in the 1950s and 1960s using green and red dots, respectively, from the subset of countries where these cohorts are available. The main patterns are relatively stable across cohorts and visual evidence does not show dramatic cohort effects.

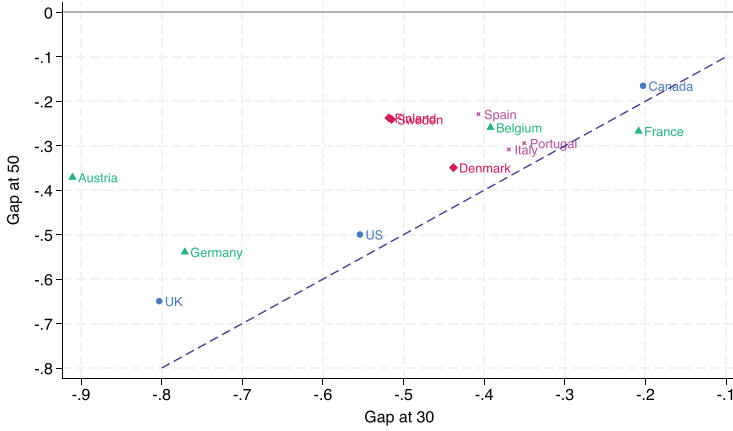
Figure 5 shows the corresponding child-related gaps in earnings by educational groups in the left and right columns. The top panels (a and b) confirm convergence in earnings gaps between mothers and non-mothers. The pattern for mothers outperforming non-mothers by age 50 in terms of earnings in many countries is mainly driven by the highly educated groups. The patterns for maternal gaps strongly contrast with those for parental gaps in panels (c) and (d). Earnings gaps between mothers and fathers are persistent especially among highly educated parents. Even though highly educated mothers outperform non-mothers in terms of earnings, they do not catch up with fathers. In panels (e) and (f), we show the parental earnings gap to find out if the divergence over the life cycle in earnings gaps between non-fathers and fathers is related to education. We conclude that a pattern of widening earnings gaps across several countries over the life cycle is visible in both education groups.

4.2 | Regression results

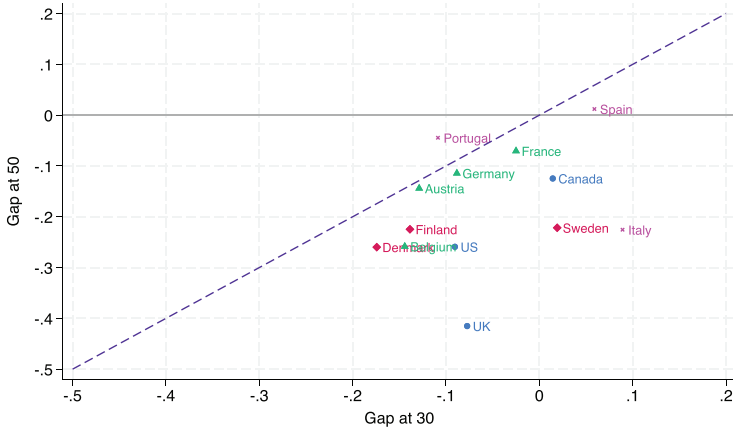
To analyse the convergence of motherhood gaps over the life cycle across countries more systematically and to include information from the remaining cohorts in our data, we resort to regression analysis. The idea is to fit regression lines through the country scatters in Figures 1–3



(a) Mothers and non-mothers

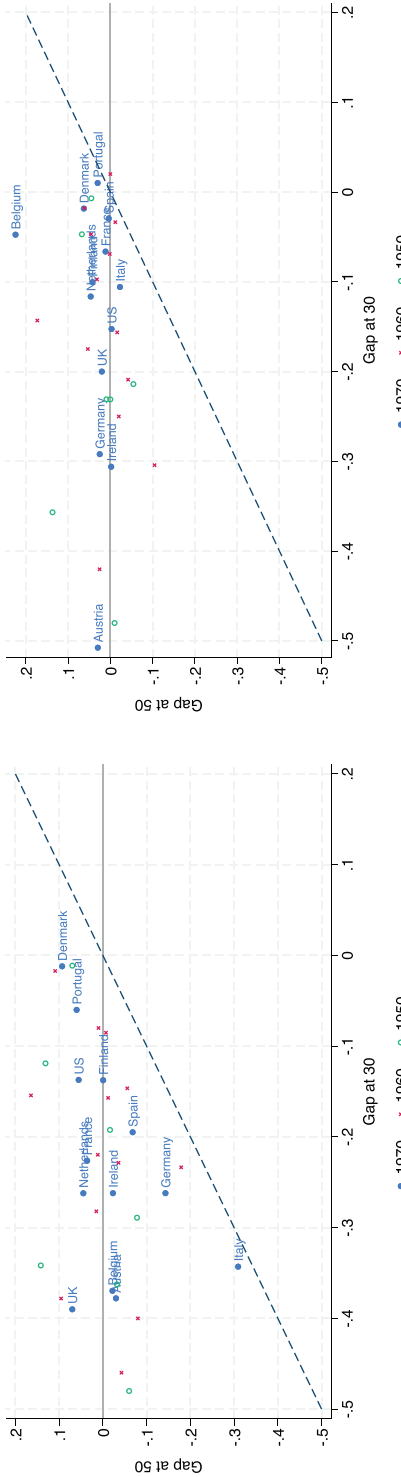


(b) Mothers and fathers

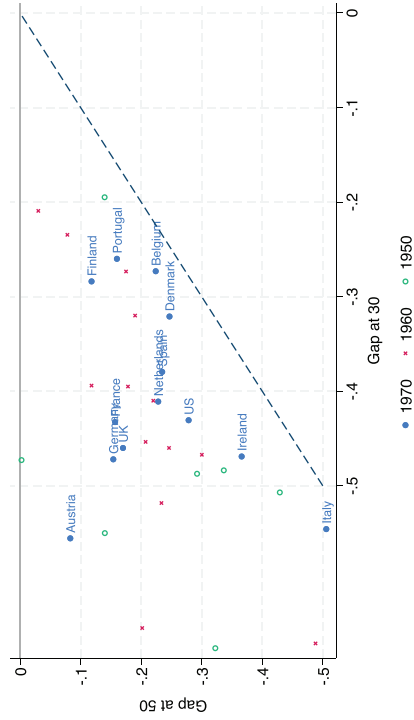


(c) Non-fathers and fathers

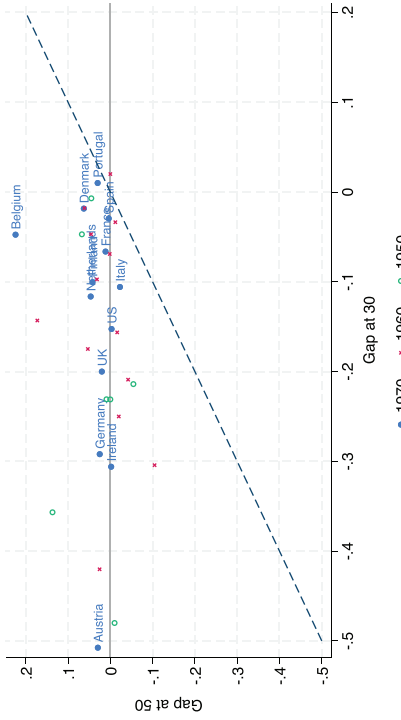
FIGURE 3 Earnings gaps. *Note:* Earnings gaps (a) between mothers and non-mothers, (b) between mothers and fathers and (c) between non-fathers and fathers. Cohort 1970, 13 countries. The four regional country groups are distinguished by colour and symbol (see main text for details). [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1111/1475-8890.12366)]



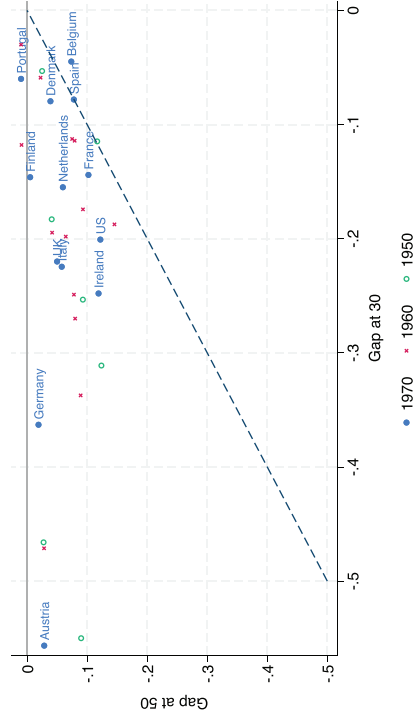
(a) Mothers and non-mothers, ISCED 0-2



(c) Mothers and fathers, ISCED 0-2



(b) Mothers and non-mothers, ISCED 6-8



(d) Mothers and fathers, ISCED 6-8

FIGURE 4 Employment gaps by education. *Note:* Gaps in employment rates between mothers and non-mothers in the top panels and mothers and fathers in the bottom panels, for low-educated individuals (ISCED 0-2) in the left panels and for highly educated individuals (ISCED 6-8) in the right panels. 14 countries. [Colour figure can be viewed at wileyonlinelibrary.com]

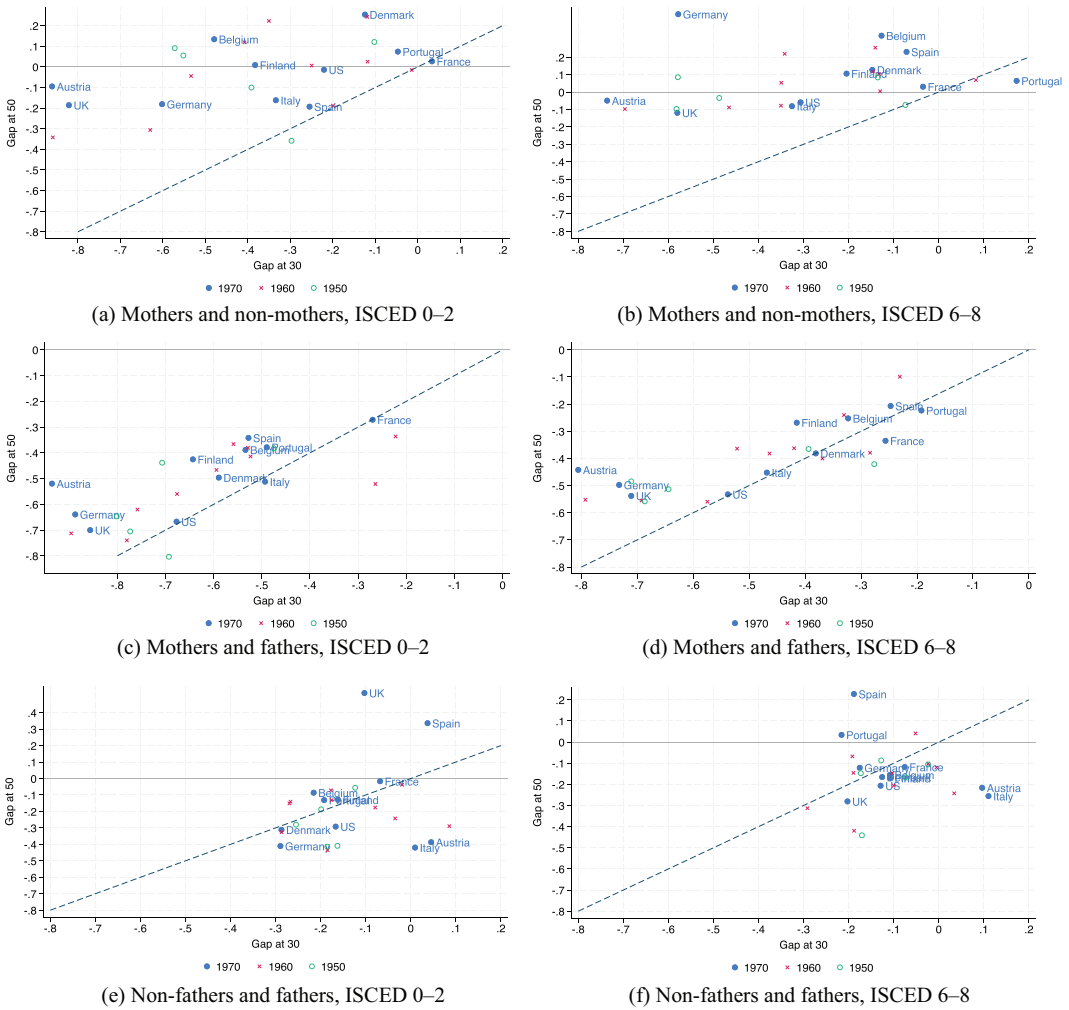


FIGURE 5 Earnings gaps by education. *Note:* Gaps in earnings between mothers and non-mothers in the top panels, mothers and fathers in the middle panels, and non-fathers and fathers in the bottom panels, for low-educated individuals (ISCED 0–2) in the left panels and for highly educated individuals (ISCED 6–8) in the right panels. 12 countries. [Colour figure can be viewed at wileyonlinelibrary.com]

and to estimate ordinary least-squares (OLS) models regressing the outcome gap Y_{ij50} in country i , cohort j at age 50 on the corresponding outcome gap Y_{ij30} in country i , cohort j at age 30 and a set of cohort dummies γ_j :

$$Y_{ij50} = \alpha + \beta Y_{ij30} + \gamma_j + \epsilon_{ij}.$$

We are interested in the slope coefficient β , where β close to one indicates persistence in child-related gaps over the life cycle, while β close to zero indicates that outcomes in countries with large gaps at age 30 converge over the life cycle towards those with smaller gaps.⁷

⁷ Tables A.3 and A.4 in the online Appendix contain data on outcome gaps between mothers versus non-mothers and those mothers versus fathers, respectively.

TABLE 1 Gender gaps over the life cycle.

	Employment			Part-time		Earnings		
	Mothers Non-mothers	Mothers Fathers	Fathers Non-fathers	Mothers Non-mothers	Mothers Fathers	Mothers Non-mothers	Mothers Fathers	Fathers Non-fathers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Age 30 to age 40								
Panel A.1								
Cohort 1970	0.49 (0.18)	0.34 (0.19)	0.92 (0.31)	0.56 (0.13)	0.76 (0.11)	0.56 (0.13)	0.51 (0.12)	0.63 (0.43)
N countries	14	14	14	14	14	12	12	12
Panel A.2								
Cohort FE	0.41 (0.08)	0.39 (0.09)	0.78 (0.16)	0.56 (0.07)	0.79 (0.05)	0.58 (0.07)	0.63 (0.06)	0.78 (0.25)
N cohorts	49	49	49	48	48	40	40	40
Panel b. Age 30 to age 50								
Panel B.1								
Cohort 1970	0.30 (0.16)	0.24 (0.17)	0.06 (0.26)	0.20 (0.08)	0.56 (0.10)	0.19 (0.16)	0.47 (0.13)	0.42 (0.39)
N countries	15	15	15	15	15	13	13	13
Panel B.2								
Cohort FE	0.25 (0.07)	0.32 (0.09)	0.52 (0.16)	0.24 (0.05)	0.61 (0.06)	0.19 (0.09)	0.47 (0.09)	0.56 (0.26)
N cohorts	40	40	40	39	39	31	31	31
Panel C. Education groups								
Panel C.1								
ISCED 0–2	0.27 (0.12)	0.48 (0.15)	0.24 (0.22)	0.31 (0.07)	0.73 (0.05)	0.30 (0.13)	0.55 (0.11)	0.36 (0.42)
Panel C.2								
ISCED 3–5	–0.03 (0.07)	0.24 (0.08)	1.11 (0.24)	0.30 (0.05)	0.66 (0.07)	0.10 (0.12)	0.42 (0.13)	–0.20 (0.26)
Panel C.3								
ISCED 6–8	0.09 (0.08)	0.02 (0.06)	0.87 (0.23)	0.22 (0.09)	0.58 (0.07)	0.15 (0.12)	0.52 (0.08)	–0.04 (0.29)
N cohorts	34	34	34	32	32	27	27	27

Note: This table shows coefficients from regressing the outcome gap at age 50 (or 40) on the outcome gap at age 30 for different variables. Columns 1, 4 and 6 present gaps between mothers and non-mothers, columns 2, 5 and 7 present gaps between mothers and fathers, and columns 3 and 8 present gaps between fathers and non-fathers. Samples in Panels A.1 and B.1 include observations for the 1970s cohort; the remaining panels include observations from all available cohorts and regressions are specified with cohort fixed effects. Standard errors are in parentheses.

Panel A of Table 1 shows regression results for the comparison of child-related gaps between age 30 and age 40 for the 1970 cohort in Panel A.1. These estimates are robust to the inclusion of cohort fixed effects in the specification with all five-year cohorts in Panel A.2. Slope coefficients smaller than one indicate some convergence, slightly more so for employment and for the comparison between mothers and non-mothers than for the part-time shares and earnings and for the comparisons between mothers

and fathers. Employment and earnings gaps are more persistent with higher coefficient estimates between age 30 and 40 when we compare non-fathers and fathers; see columns 3 and 8. The finding that countries with high initial maternity gap in employment catch up over the first ten years to low-gap countries is in line with the results for Europe in Kleven et al. (2023). What we are interested in is whether this convergence continues and closes the gap by the time the children have grown up.

Panel B of Table 1 presents comparisons of child-related gaps between age 30 and 50. In Panel B.1, we show the slope coefficients for the 1970s cohort corresponding to the scatter plots in Figures 1–3. The smaller estimated coefficients confirm the visual impression that by age 50 motherhood and parental gaps are closing in employment rates. The gaps are also closing in part-time employment shares and earnings when we compare mothers with non-mothers. But larger gaps at age 50 remain if we compare mothers with fathers or if we compare non-fathers with fathers.

Note that, as expected, the coefficient estimates in Panel B are smaller than those in Panel A, which indicates that child-related gaps further decline once children no longer require a lot of care. Panel B.2 shows the specification that also includes observations from other birth cohorts and controls for cohort fixed effects. These results suggest that convergence patterns are very similar across the cohorts we observe in our time frame. There is no indication that motherhood gaps over the life cycle close faster for more recent cohorts.

Panel C of Table 1 shows slope coefficients by education groups in the specification with all cohorts and cohort fixed effects. Here we see a clear pattern of heterogeneity in convergence by education. The group with the least convergence is lowest educated mothers (ISCED 0–2). Low-educated mothers appear to face long-run penalties and have a hard time catching up to low-educated non-mothers and especially to fathers, even once their children grow older. However, the highest convergence we see is for highly educated mothers. In comparison with non-mothers, gaps in employment and part-time work seem to have vanished by age 50 when their children no longer require a lot of care. But highly educated mothers still face difficulties catching up with highly educated fathers in earnings, which may be explained by different career trajectories. The persistent gap in part-time employment shares between mothers and fathers suggests working time as a driver for persistent earnings gaps. In terms of highly educated mothers, our findings are in line with Goldin et al. (2024) who document closing motherhood gaps by age 50 for college graduates in the US, especially in comparison with non-mothers but less so in comparison with fathers.

5 | CONCLUSIONS

In this paper, we investigate long-run impacts of child-related gaps that open with childbirth on gender inequality over the life cycle. Instead of using a data-demanding event study approach that centres around the birth of the first child, we propose simple stylised measures of child-related gender gaps over the parents' life cycle that can be applied in a cross-country setting with aggregated cell-level data from a large number of countries, age groups and cohorts.

Our analysis compiles data from 17 countries that allow us to follow synthetic cohorts over the life cycle and to distinguish between women and men with and without children. We compute motherhood penalties between mothers and non-mothers, parental gaps between mothers and fathers and fatherhood gaps between non-fathers and fathers to approximate the impact of children on labour market careers and to investigate convergence over the life cycle. Our evidence shows that mothers return to the labour market once their children grow older and require less care. Motherhood and parental gaps in employment rates tend to be largest around age 30 when children are young but they converge across countries to low levels. Earnings gaps between mothers and non-mothers also close by age 50 especially among highly educated women. Earnings gaps between mothers and fathers, however, are highly persistent and not even highly educated mothers manage to catch up with fathers in terms of earnings. A driver of the persistence in the parental gaps in earnings is part-time employment.

It appears that mothers remain in part-time jobs even once children grow older. A second explanation is the paternity premia. We find evidence that, in some countries, gaps between non-fathers' and fathers' earnings increase over the life cycle.

Our work demonstrates the advantages and limits of aggregate data from repeated cross-sections in studying maternity penalties and the gender gap. In contrast to work based on detailed individual-level panel data, we are able to apply our approach to a wider set of countries and multiple cohorts. The construction of synthetic cohorts allows us to trace an important part of the life cycle. But the main limitations are selection into maternity and observability of children in household data. Two pieces of evidence allow us to validate our results relative to approaches based on more detailed data. First, our findings are in line with Kleven et al. (2023) in showing that countries with a high initial maternity gap in employment catch up over the first ten years after childbirth to lower-gap countries. Second, our findings for highly educated mothers confirm the findings of Goldin et al. (2024), who document closing motherhood gaps by age 50 for college graduates in the US, more so in comparison with non-mothers than in comparison with fathers.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study will be made available on the Deaton Review Country Studies project website (<https://ifs.org.uk/inequality/country-studies/>).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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