

## Children and the gender earnings gap

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*The arrival of children creates a large and persistent increase in the gender earnings gap. Women's earnings are reduced by an average of 55 per cent in the first 5 years of parenthood. The gap in earnings – termed the 'motherhood penalty' – remains significant a decade into parenthood. We find the motherhood penalty is due to a combination of lower participation rates and reduced working hours and, to a lesser extent, a reduced hourly wage. We show the decline in women's earnings is similar regardless of their household breadwinner status, implying that relative earnings prior to children have little influence over the intrahousehold allocation of paid work following children. Along with broader gender norms, workplace settings may also explain the penalty, with greater access to flexible working conditions increasing the likelihood a woman remains employed after having children. Addressing Australia's persistent motherhood penalty and boosting women's labour force participation after having children could help support improved productivity growth.*

### The gender earnings gap and productivity

Despite a considerable reduction in gender inequality over recent decades, there remains a significant gender earnings gap in Australia, as in other advanced economies. A gender earnings gap presents a challenge for aggregate output and productivity – it typically represents significant untapped potential in the labour market.

Greater female labour force participation could boost aggregate output and productivity through several channels. Women represent an under-utilised labour cohort. This is especially important in a tight labour market where labour supply is a constraint. In the long run, removing barriers to women's participation also allows better matching between jobs and those best able to perform them. The improved allocation of talent that occurs when women are no longer restricted to certain kinds of work can substantially lift productivity growth (Hsieh et al. 2019). There are also potential

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productivity gains from diversifying the workforce within firms and sectors (Criscuolo et al. 2021; Ostry et al. 2018).

This article explores the role of children in labour market participation and earnings for women. We estimate the motherhood penalty by examining the differential impact of children on men’s and women’s earnings in Australia in the years following the arrival of their first child.

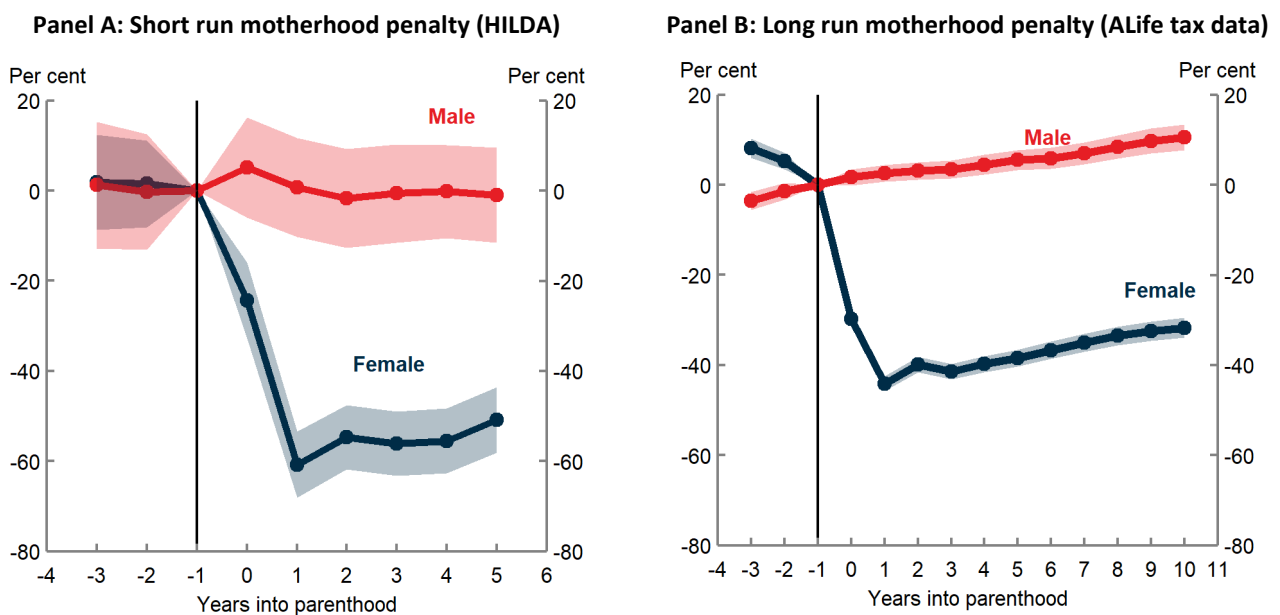
## The motherhood penalty

We follow Kleven et al. (2019b) and run an ‘event study’ which examines how earnings evolve for men and women in the lead-up to and in the years immediately after the arrival of their first child. We use the Household, Income and Labour Dynamics in Australia (HILDA) survey to analyse the impact of children up to 5 years after the arrival of the first child and extend our analysis up to 10 years using administrative tax data from the Australian Taxation Office (ATO) (Carter et al. 2021). A full discussion of the data and empirical framework can be found in a forthcoming Working Paper (Bahar et al. forthcoming).

Men’s and women’s earnings follow similar paths until parenthood, at which point their earnings begin to diverge. The arrival of children reduces women’s earnings by an average of 55 per cent across the first 5 years of parenthood (Figure 1 Panel A). Men’s earnings are unaffected by entry into parenthood. Moreover, the motherhood penalty remains persistent for at least a decade into parenthood, though there is a slight recovery in the later years (Figure 1 Panel B).

Our results will include effects not only from the first child, but any additional children born during the observation window. We find that the motherhood penalty for women who have only one child is smaller than the penalty estimated for multiple children but remains persistent. Importantly, for women with one child, there is no significant recovery in earnings at year 5 when children generally start school.

**Figure 1: Impact of children on earnings, by sex**

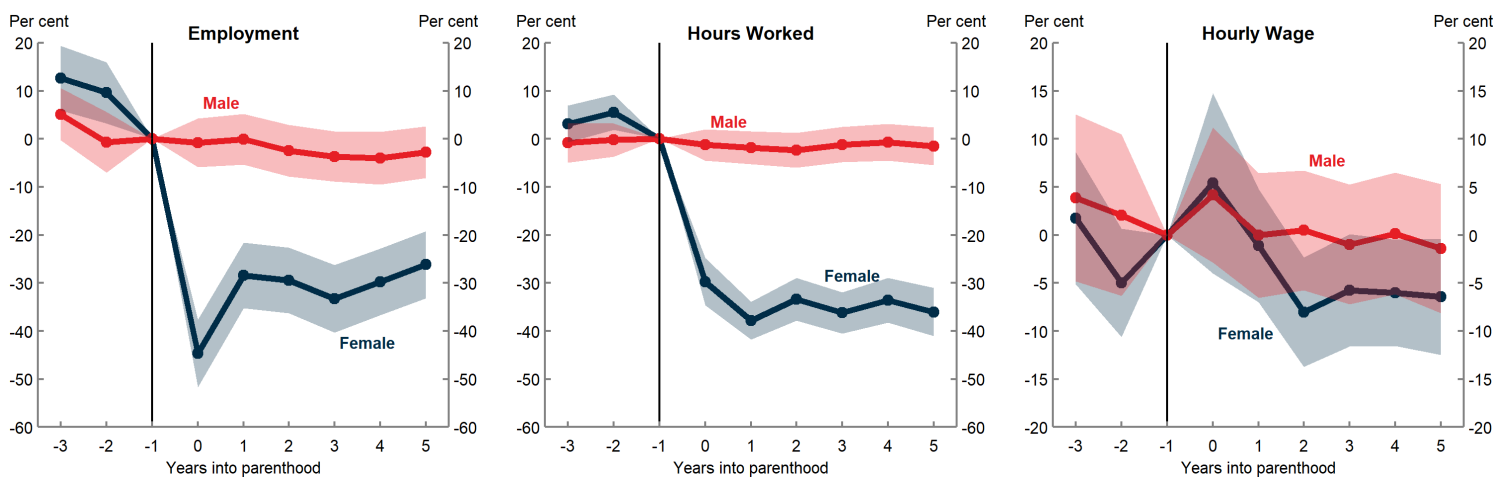


Notes: Motherhood penalty estimated after running an event study of the form specified in Kleven et al. (2019b). Estimated magnitudes across panels will differ due to different data sources. Shaded area shows 95% confidence intervals, based on robust standard errors. Source: Treasury analysis of HILDA Release 19.0 (Panel A) and ALife 2019 (Panel B).

## Drivers of the penalty

The motherhood penalty can come from 3 margins – employment, hours of work, and the hourly wage rate. All 3 margins contribute, with particularly large effects for employment and hours of work (Figure 2). There is a sharp drop in the probability of employment of about 45 per cent in the year the first child arrives, with only modest recovery after 5 years. For women who remain employed, hours worked falls by about 35 per cent across the first 5 years and does not significantly recover over this period. There is also some evidence that for women who remain employed, their hourly wages are about 5 per cent lower than if they had not had children, though the estimates are imprecise and only just significantly different from zero.

Figure 2: Drivers of the motherhood penalty

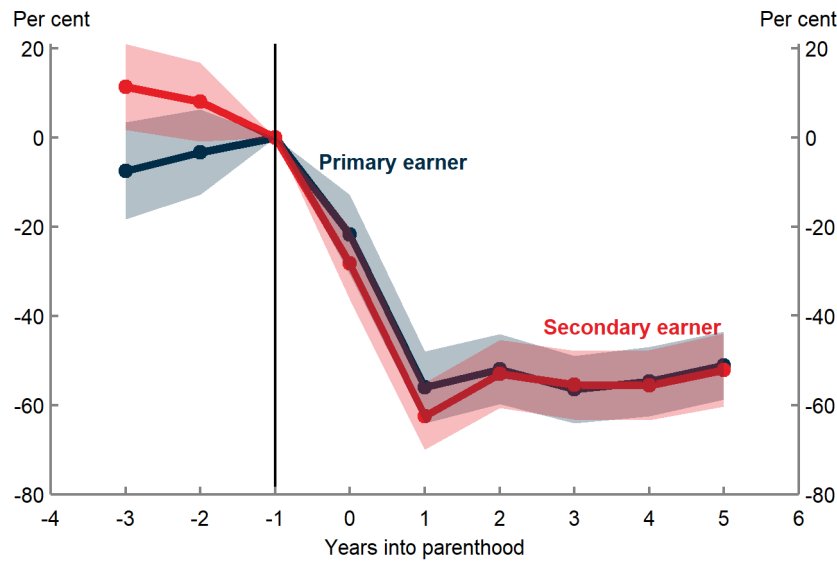


Notes: Effects on participation are estimated unconditional on employment status, while the effect on hours and wages are conditional on participation. Shaded area shows 95% confidence intervals, based on robust standard errors.  
Source: Treasury analysis of HILDA Release 19.0.

## Potential explanations of the penalty

### Household allocations of work and care

One potential explanation for the motherhood penalty is that couples make choices about allocations of household work and care based on relative earnings. We find the same penalty regardless of a woman’s breadwinner status before children (Figure 3). This is the case even for women who significantly out-earn their partner. Furthermore, highly educated women experience a larger penalty, despite the higher opportunity cost of reducing their participation – suggesting again that choices around work and care are not always responding purely to financial considerations.

**Figure 3: Motherhood penalty, by breadwinner status**

Notes: Chart shows effects for women only. Breadwinner status defined in year before children. Similar results are observed if breadwinner status is based on the 3 years before children, and hence less subject to idiosyncratic shocks. Shaded area shows 95% confidence intervals, based on robust standard errors.

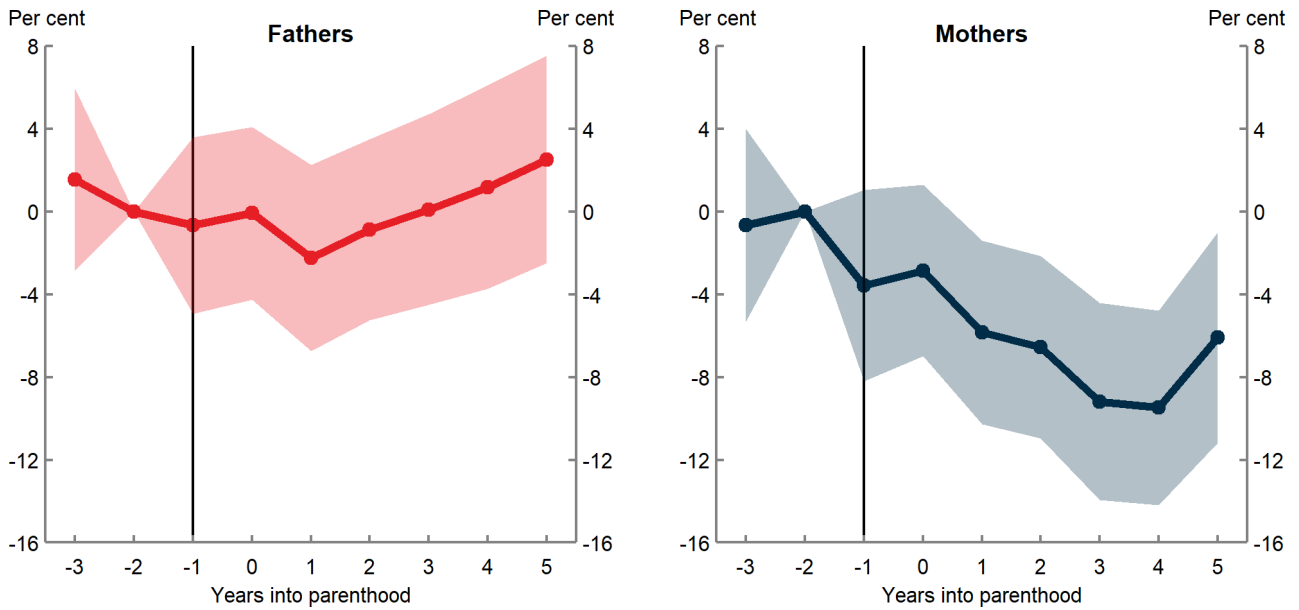
Source: Treasury analysis of HILDA Release 19.0.

## Preferences

While not necessarily financially optimal, couples may be making choices consistent with their preferences. As an exploratory analysis of the preferences of parents, we study questions in HILDA around parents' satisfaction with their employment opportunities and work-family life.

Following children, mothers experience a decrease in satisfaction with their employment opportunities, in line with their worsening employment outcomes (Figure 4). Women's satisfaction with their employment opportunities begins to fall the year prior to children and becomes significant one year after, indicating women may anticipate reduced work opportunities prior to parenthood. However, their satisfaction troughs later than their employment outcomes, implying that the longer-term impacts of children may be unanticipated and that there are significant challenges in re-engaging in the labour market. This is consistent with recent research suggesting that women, particularly highly educated women, underestimate the challenges they will face in combining work and family (Kuziemko et al. 2018). In contrast, men's satisfaction with their employment opportunities does not change significantly over time.

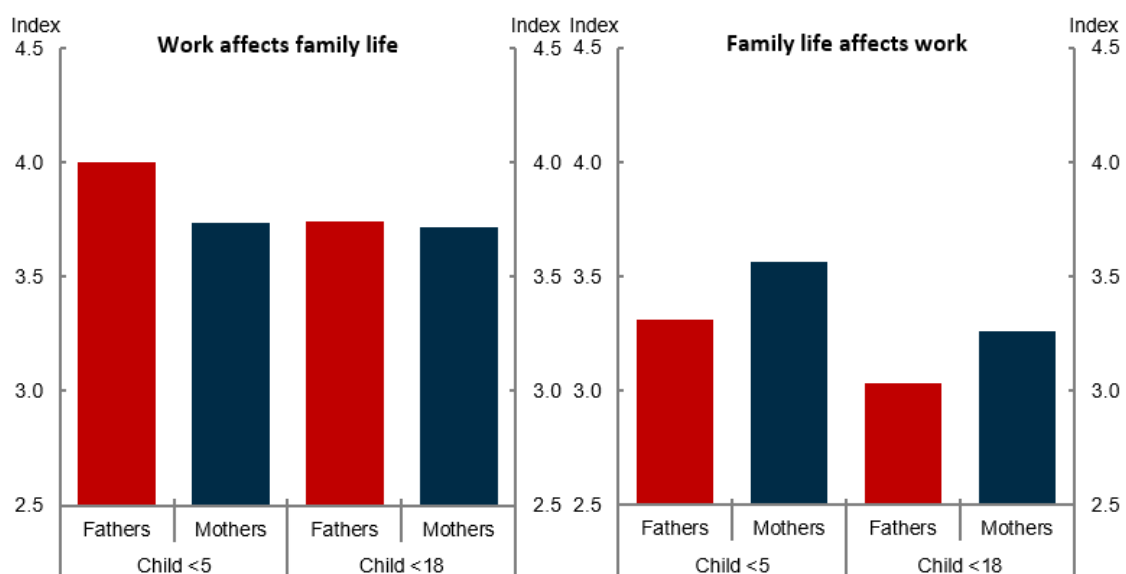
**Figure 4: Impact of children on parent’s satisfaction with their employment opportunities**



Notes: Includes parents who are observed 3 years before and 5 years after the birth of their first child. Shaded area shows 95% confidence intervals, based on robust standard errors. The base year is t=-2, to allow for anticipatory effects. Question asks respondents their satisfaction with their employment opportunities on a 0-10 scale.  
 Source: Treasury analysis of HILDA Release 19.0.

We also construct 2 indexes to measure the work-family balance of parents. We find that fathers with young children are more likely than mothers to report that their work affects their family life. Mothers are more likely than fathers to report the opposing imbalance, regardless of the age of their youngest child, that their family life impacts their work (Figure 5). While parental preferences around work and care are difficult to measure, these results together provide suggestive evidence that preferences are not the only factor driving the motherhood penalty. Parents appear unsatisfied in ways that suggest a more equal allocation of paid and unpaid work could be beneficial, lifting the employment opportunities for women and improving work-life balance for both genders.

**Figure 5: Work-family balance indexes, by sex and child age**



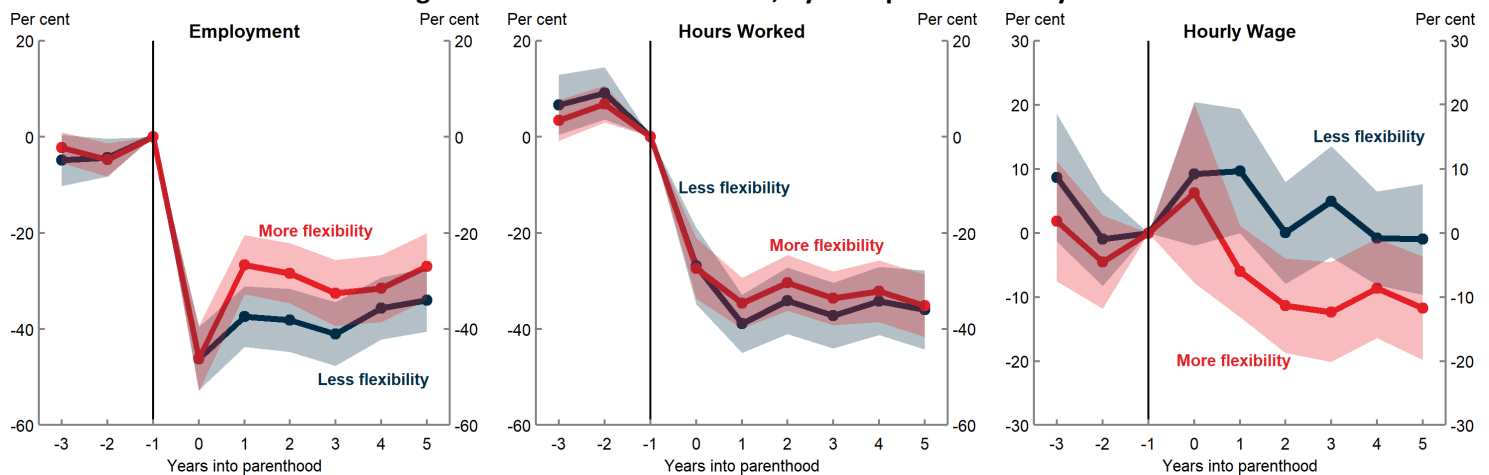
Notes: Sample only includes parents who are currently employed. Indexes constructed using a combination of questions in HILDA that asks respondents about their work-family balance. Differences are statistically significant in cases mentioned in text.  
 Source: Treasury analysis of HILDA Release 19.0.

## Workplace flexibility

A potentially important mechanism for the motherhood penalty is how workplace settings around flexible working differ across occupations. Flexible work may make it easier for some parents to adjust their labour supply responses after having children, while coming with its own costs. To assess the availability of flexible work, we use a question in HILDA that asks respondents whether flexible start or finish times are available as an entitlement in their workplace.

Women who had greater access to flexible conditions before having children are more likely to remain employed after having children. Conversely, for women who remain employed, the hourly wage penalty is larger for women in more flexible occupations, potentially reflecting foregone promotion opportunities (Figure 6). These results suggest a role for workplace settings, particularly around the availability of flexibility, in potentially mitigating the motherhood penalty in employment and hours worked, but potentially at the cost of hourly wages. Similar findings in Kleven et al. (2019b) point to parenthood disproportionately leading women to be more likely to be in a flexible workplace but less likely to be in management. Workplace flexibility is only half the story then. Goldin (2014) argues that disproportionate rewards for long and particular hours in some sectors result in larger gender pay gaps that could be ameliorated with more considered job design. This would benefit women, but also men, seeking greater flexibility at work.

**Figure 6: Outcomes for women, by workplace flexibility**



Notes: Chart shows effects for women only. Effects on participation are estimated unconditional on employment status, while the effect on hours and wages are conditional on participation. More flexibility defined as average occupational flexibility above median in year before children.

Source: Treasury analysis of HILDA Release 19.0.

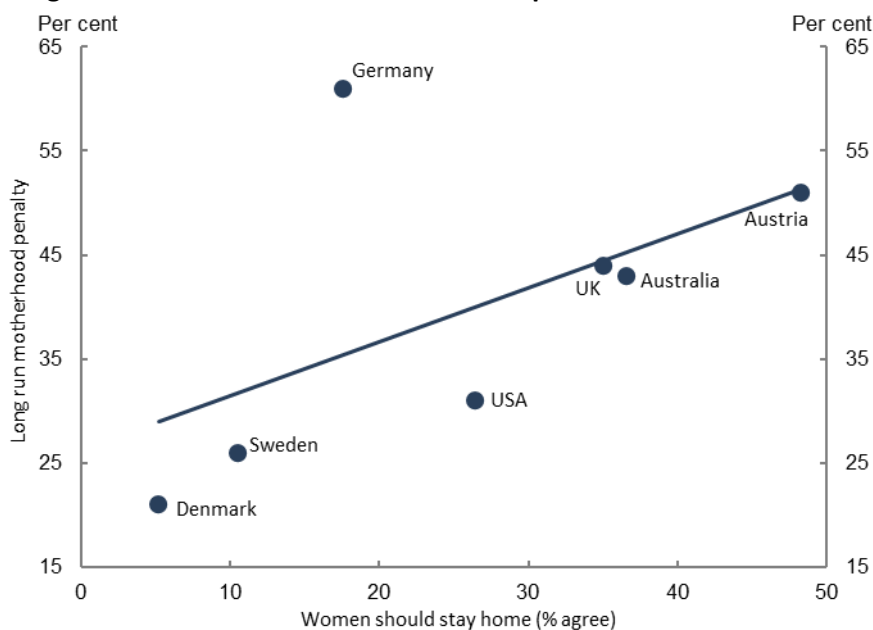
## Gender norms

Our estimated long-run motherhood penalty (43 per cent) is similar to the United Kingdom (44 per cent), larger in magnitude than estimates for Denmark (21 per cent), Sweden (26 per cent) and the US (31 per cent), but smaller than estimates for Germany (61 per cent) and Austria (51 per cent) (Kleven et al. 2019a). These cross-country differences may be driven by differences in gender norms, as well as institutional and policy settings across countries.

Using a cross-country survey, we show that countries with more conservative gender norms have worse long-run penalties (Figure 7). Australia displays both conservative norms about men's and women's roles, and a high motherhood penalty relative to other countries surveyed. This suggests underlying gender norms likely reinforce the penalty. Recent research shows the motherhood

penalty can also vary greatly within countries (the US), in ways that suggest a strong role for social norms (Kleven 2022).

**Figure 7: Gender norms and motherhood penalties across countries**



Notes: Chart plots share of respondents who state that women should stay at home when either their child is under school age or their youngest child is in school against each country's long-run (that is, 10-year average) child penalty, fitting a linear line through these observations.

Source: Kleven et al. (2019a), Treasury analysis of International Social Survey Programme 2012 and long run child penalty for Australia from Chart 1b.

In contrast to the importance of gender norms, the link between policies and the motherhood penalty is less clear-cut. For example, Kleven et al. (2020) find 'enormous' expansions in parental leave and child care in Austria had little impact on the penalty and again emphasise the importance of norms. As they note, however, the interaction between policy and norms is complex, and may result in large policy changes having little impact but also small policy changes triggering a tipping point. Such tipping points have been seen before, with Pan (2015) highlighting tipping points in the desegregation (by gender) of occupations over time. Changing social and workplace attitudes, together with a supportive policy environment, also has the potential to make substantial inroads into Australia's sizeable motherhood penalty.

## Conclusion

Our results highlight the significant impact of children on the long-run labour market outcomes of women. Women's earnings more than halve after the arrival of children and remain lower for at least a decade. Participation and hours worked are the primary drivers of the penalty. While flexible workplaces ameliorate some of these effects, they are associated with more sizeable gender hourly wage gaps.

Australia's motherhood penalty has important implications for both gender equality and aggregate productivity. On average, Australian women are now more educated than Australian men – with 37 per cent of women attaining a bachelor's degree or above in 2020, compared to only 29 per cent of men (Australian Bureau of Statistics 2020). Improving the utilisation of women's skills would increase the returns on investments made in women's human capital. Neither men nor women seem

satisfied with their balance between family and work following parenthood, in ways suggesting gains from a more equal allocation of responsibilities. Barriers to this likely exist within social norms, and workplace norms and policies, as well as government policy settings. Tackling these barriers will nonetheless be a necessary precursor to further gains in female labour force participation, the allocation of talent across paid and unpaid work, and improved diversity in the workplace.



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