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The Impact of Paid Parental Leave on Labour Supply and Employment Outcomes

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ABSTRACT

The Impact of Paid Parental Leave on Labour Supply and Employment Outcomes*

The introduction of the Australian Paid Parental Leave scheme in 2011 provides a rare opportunity to estimate the labour supply and employment impacts of publicly-funded paid leave on mothers in the first year post-partum. The almost universal coverage of the scheme coupled with detailed survey data collected specifically for this purpose means that eligibility for paid leave under the scheme can be plausibly taken as exogenous following a standard propensity score matching exercise. In line with much of the existing literature, we find a positive impact on leave taking in the first half year and on the probability of eventually returning to work in the first year. The paper provides new evidence of a positive impact on continuing in the same job and under the same conditions. Further new evidence shows that disadvantaged mothers – low income, less educated, without access to employer-funded leave – respond most to the scheme.

JEL Classification: J13, J18, J22

Keywords: labour supply, parental leave, mothers, duration analysis, propensity score matching

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NON-TECHNICAL SUMMARY

Up to 2011, there was no universal paid parental leave in Australia. Only 56.8 per cent of employed women aged 20 to 45 in Australia had access to paid parental leave provided by their employer. Overall, more advantaged women were more likely to have access to paid parental leave than less advantaged women.

The introduction of the Australian Paid Parental Leave (PPL) scheme in 2011 provides a rare opportunity to estimate the labour supply and employment impacts of publicly-funded paid leave on mothers in the first year post-partum. This is of particular interest now with prospective presidential candidates in the US, the only developed country not to have a universal paid parental leave scheme, debating its introduction.

We find that post-PPL mothers initially return to work more slowly, but that the return to work speeds up later so that they catch up by the middle of the first year, and by the end of one year more post-PPL mothers than pre-PPL mothers have returned to work. The paper provides new evidence of a positive impact on continuing in the same job and under the same conditions.

Further new evidence shows that the mothers' characteristics matter for the impact of the scheme. We find that labour market impacts of the PPL scheme are stronger for lower-educated than for higher-educated women. In addition, we find that impacts are stronger for low-income women, for those not eligible for employer-provided paid leave, for self-employed women and for women on casual contracts.

1. Introduction

Most developed countries, but not the US, provide new mothers with access to universal paid maternity leave. Australia is a recent addition to the group of countries which do so, having introduced an (almost) universal publicly-funded paid parental leave (PPL) scheme in January 2011. This provides us with a rare opportunity to estimate the labour supply and employment impacts of paid parental leave on mothers in the first year following the birth of a child. Given *ex ante* ambiguity about the labour market impact of paid parental leave schemes on mothers (e.g. see Schönberg and Ludsteck, 2014), such evidence is critical if policy makers are to make informed decisions in this space. It is also timely with calls for the introduction of paid parental leave in the US taking centre stage in the 2016 presidential election.[1]

The literature to date has faced a number of challenges in trying to estimate the impacts of parental leave schemes on leave-taking and other labour market outcomes. First and foremost is the challenge of finding sources of exogenous variation in entitlement to parental leave, given that in many countries paid parental leave is universal and has been in place for many years. Second is the external validity challenge; parental leave schemes display considerable variation across countries – in coverage, duration, balance between paid/unpaid, take-up, generosity, and wider social and institutional contexts. Third, data requirements are demanding, encompassing sufficiently large sample sizes, tracking of individuals throughout the period of interest, explicit observation of eligibility for leave, and ideally a rich set of individual and contextual characteristics, and labour supply and employment outcomes.

This paper makes two important contributions to the literature. First, the Australian reform is unique amongst recent reforms in other advanced economies, particularly in Europe, in that it introduced paid parental leave of a relatively short duration at a moderate payment rate. Other papers that exploit far-reaching reforms as a source of exogenous variation evaluate recent European reforms that typically extended or shortened an existing leave policy that covered several years after birth and often provided high payments. Lalive *et al.* (2011) base their analysis on an Austrian reform, which involved extending paid leave and job protection from twelve months to 24 months and then reducing it back to 18 months. Similarly, Schönberg and Ludsteck (2014) examine a series of five reforms in Germany which involved different

[1] Hillary Clinton Jumps at the Chance to Defend Paid Leave Laws (Huffington Post, 13th October 2015). Bernie Sanders: Every Woman Should Get 12 Weeks Paid Maternity Leave not 2 Weeks Unpaid (The Independent, 8th January 2016).

length of leave between 6 and 24 months after a 14-week period of mandatory leave at the full last salary. If the effects of changes in leave length or generosity are not linear, effects are not generalisable to other contexts with less extensive or no universal leave provisions. The evaluation of the Australian reform thus provides much more useful information on what policy makers should expect when introducing a short, universal leave scheme at a basic payment rate in an economy currently without such a scheme, such as the US.

Second, by drawing on rich data collected specifically for this purpose, this paper can examine the impacts on several labour market outcomes of interest, allowing for heterogeneous impacts across a wide range of mothers' characteristics, such as income and education level, partnering status, type of employment pre-birth, and eligibility for *employer-provided* paid leave. Furthermore, the almost universal coverage of the scheme coupled with detailed survey data collected specifically for this purpose means that eligibility for paid leave under the scheme can be plausibly taken as exogenous following a standard propensity score matching exercise. Thus this paper adds to the handful of existing studies internationally that have a credible identification strategy.

Many earlier papers on the labour supply impacts of parental leave schemes cannot necessarily be interpreted as causal because they rely on cross-sectional variation in leave entitlement which is unlikely to be exogenous (e.g. Waldfogel *et al.*, 1999; Rønsen and Sundström, 2002; Berger and Waldfogel, 2004). Recently, however, a handful of papers with quasi-experimental identification strategies have emerged. Rossin-Slater *et al.* (2013), and Baum and Ruhm (2013) examine the California Paid Family Leave scheme introduced in 2004 which offers six weeks of paid leave to mothers, with almost universal eligibility among private sector workers, at a replacement rate of 55% up to a ceiling based on the state's average weekly wage. Both papers adopt a difference-in-differences approach exploiting information on other states in the US, while Rossin-Slater *et al.* (2013) also use other demographic groups for the counterfactual. Both find large positive impacts on the duration of leave, on hours worked upon return to work, and tentatively on wages, while Baum and Ruhm (2013) also find a positive impact on the probability of eventual return to work.[2]

[2] While typically used by mothers, the California Paid Family Leave is in principal gender-neutral. Bartel *et al.* (2015) examine the scheme's impact on fathers' leave-taking and find it to have a significant, but small positive effect. If paid leave is available, the probability of fathers taking parental leave in the first year after a child is born increases from around 0.6 per cent to around 0.9 per cent.

Few studies in this recent generation of the literature examine how impacts vary across different groups of mothers. One exception is a French study by Joseph *et al.* (2013) which distinguishes the effects of a short period (up to six months) of paid leave for low and high educated mothers. The study finds larger positive impacts on the probability of being employed after one year, 1.5 year and two years for low educated mothers. Another exception is Rossin-Slater *et al.* (2013) who also find stronger impacts for less advantaged – less educated, unmarried, non-white – mothers. From this and findings regarding *unpaid* leave which favour more advantaged women (Han *et al.*, 2009), Rossin-Slater *et al.* (2013) hint at a more general conclusion that extensions to unpaid (paid) leave entitlements may impact more strongly on advantaged (disadvantaged) mothers, respectively. They argue that advantaged mothers are more likely to be eligible for unpaid leave under such policies – they have in mind the US Family and Medical Leave Act for which this is likely to be the case – and that advantaged mothers are more likely to be able to afford unpaid time off work.[3] This is a crucial point for policy makers to consider when thinking about the design of parental leave schemes. However, given identification issues in Han *et al.* (2009), data limitations in Rossin-Slater *et al.* (2013)[4], citation of only one further study (Carneiro *et al.*, 2010) in support of their argument, and questions over the extent to which results for one particular reform in one particular context can be generalised across reforms and across countries, new evidence on heterogeneous impacts is clearly needed.

This paper presents the first estimates of the impacts of a major, very recently introduced, paid parental leave policy in Australia. It uses a strong identification strategy exploiting this far-reaching recent policy reform introducing universal paid parental leave at a moderate payment rate.

Our estimates of the average impact of the scheme – the average treatment effect on the treated (ATT) – on outcomes previously considered in the literature including (i) the duration until the mother returns to work after birth, and (ii) the probability of returning to the same employer and the same job conditions, are broadly in line with the existing literature. We find that mothers eligible for the PPL scheme initially delay return to work. The rate of return to work then increases and overtakes that of PPL-ineligible mothers around six months after childbirth. We also find positive impacts on the probability of returning to work within a year

[3] Selective eligibility for employer-provided paid parental leave is also likely to be an issue here, although neither Rossin-Slater *et al.* (2013) nor Han *et al.* (2009) discuss this.
[4] See Baum and Ruhm (2013) on this point.

and on returning to the pre-birth job or at least to the pre-birth employer. Turning to our impacts of estimates for mothers with different characteristics, consistent with Rossin-Slater *et al.* (2013), we find that labour market impacts of the PPL scheme are stronger for lower-educated than for higher-educated women. In addition, we find that impacts are stronger for low-income women, for those *not* eligible for *employer-provided* paid leave, for self-employed women and for women on casual contracts. This provides additional support for Rossin-Slater *et al.*'s hypothesis that paid leave schemes are more likely to affect disadvantaged groups of women.

The remainder of this paper is set out as follows. Section 2 provides some background to the policy change and its (Australian and wider international) context. Section 3 describes our data and compares mothers before and after the introduction of PPL in terms of their socio-demographic characteristics and the characteristics of jobs held before birth. Section 4 sets out our approach to estimation. Section 5 presents and discusses the results and Section 6 concludes.

2. Background

The PPL scheme, introduced on 1 January 2011, aims to extend mothers' time away from paid work following a birth – among other things for maternal and child health reasons – while promoting their attachment to their employer and increasing lifetime attachment to the labour force. Prior to 2011 there was no publicly-funded paid parental leave scheme in Australia, although mothers had a job-guarantee right to unpaid leave for up to one year if they had worked for their employer for at least 12 months prior to the birth, and some employers offered their own employer-funded paid leave schemes. PPL pays the primary carer of a newborn child – usually the mother – up to 18 weeks at a flat rate corresponding to the Australian National Minimum Wage.[5] The payments, which can be received on top of any employer-funded parental leave payments and are taxable, may be claimed at any time within the first 12 months following the birth, but must be taken in one continuous period.[6] Eligibility for the scheme is almost universal: mothers are required to have worked for at least 330 hours and for at least ten months (with gaps of less than eight weeks between

[5] This was equal to A$656.90 (~US$480) per week at the time of writing.
[6] In the May 2015 Federal Budget, the Government proposed to change this so that government-funded PPL can only be accessed if there is no employer-provided paid leave. If the employer-provided paid leave is less than the government-funded PPL, there is eligibility for a partial payment.

consecutive working days counting towards the ten months) over the 13 month period prior to the expected date of birth, with an individual adjusted taxable income of A$150,000 or less in the financial year before the birth; and to be a permanent resident or citizen in Australia. Once a mother returns to work she becomes ineligible, although any remaining payment may be transferable to an eligible partner if they become the primary carer. Although publicly funded, PPL is provided through employers in the majority of cases, and there are further associated measures designed to encourage mothers and employers to keep in touch during the leave period and to support activities that will facilitate the mother's return to work. For more detail on the PPL scheme see Martin *et al.* (2015). By 30 June 2014, almost half a million families had received PPL payments, with the vast majority receiving the payment for the full 18 weeks (Martin *et al.*, 2015). Women are well aware of this new payment; only a small proportion in our post-PPL survey had never heard of PPL (0.9 per cent) (also see Martin *et al.*, 2014).

The introduction of PPL follows several decades of rapid growth in women's participation in paid employment and education in Australia. The overall female labour force participation rate has increased from 34 per cent in 1961 to 59 per cent in 2011 (Australian Bureau of Statistics (ABS) 2011a), primarily through increased employment of mothers. Between 1991 and 2011, the proportion of mothers in families with children under 18 who were employed rose from 55 per cent to 65 per cent (Baxter 2013). Women are now more likely to attain post-school qualifications than men, with 41 per cent of women aged 25 to 29 years having university degrees in 2011, compared to 30 per cent of men (ABS 2012).

Despite this growth, Australia has amongst the lowest levels of labour force participation in the Organisation for Economic Cooperation and Development (OECD) countries for women of prime childbearing age. In 2013, the labour force participation rate of women aged 25 to 34 years in Australia was 74.4 per cent, similar to that of the US (73.5 per cent) and the UK (77.6 per cent), but well behind Canada (81.5 per cent), France (81.7 per cent), Germany (79.7 per cent), the Netherlands (85.2 per cent), Spain (86.0 per cent) and Sweden (84.0 per cent).[7] In general, the countries with higher maternal participation rates tend to be those where parents have access to well-developed paid parental leave schemes complemented with extensive, affordable childcare (e.g. Jaumotte, 2003). Kalb and Thoresen (2010) specifically compare Australia before paid parental leave was introduced with Norway, finding a 20

[7] Source: https://stats.oecd.org/Index.aspx?DataSetCode=ALFS_SUMTAB. Accessed May 22, 2015.

percentage point gap in labour force participation of women with children aged one to four, but no gap for women without children. Of course the apparent cross-country association between access to paid parental leave and maternal participation rates does not necessarily imply a causal relationship from one to the other. That is where detailed micro data either side of a major reform – in this case the introduction of PPL – comes in particularly useful.

At the time of introduction of PPL, 56.8 per cent of employed women aged 20 to 45 in Australia had access to paid parental leave provided by their employer.[8] However, this was not distributed evenly across all women, but concentrated amongst those with fixed-term or permanent work (around 72 per cent compared to 19.1 per cent in casual work), those on above-median wages (71.3 per cent compared to 37.8 per cent for those on below-median wages), those in full-time employment (65.7 per cent compared to 41.2 per cent in part-time work), those with higher education (77.5 per cent for those with a university degree compared to 39.8 per cent for those with Year 11 or less), and those in professional occupations (76.5 per cent compared to 32.9 per cent for labourers). Overall, more advantaged women were more likely to have access to paid parental leave than less advantaged women.

3. Data and descriptive statistics

This paper exploits two surveys specifically designed for the evaluation of Australia's PPL. The first survey collects data after the policy was announced but before it took effect; data was collected for a cohort of mothers who had given birth *before* the announcement. About one year later, data was collected for a second cohort of mothers who had given birth well after the policy was introduced.

The timeline of introduction of policy and data collection was as follows:

October/November 2009	First cohort of mothers gives birth
March 2010	Policy is announced to take effect at the beginning of the following year
July 2010	Survey design begins
October/November 2010	First cohort of mothers is interviewed
January 2011	Policy takes effect
October/November 2011	Second cohort of mothers gives birth
April/May 2012	Second cohort of mothers is interviewed (Wave 1)
October/November 2012	Second cohort of mothers is interviewed (Wave 2)

[8] As calculated from wave 9 in the Household Income and Labour Dynamics in Australia (HILDA) data.

The first survey with information on mothers before PPL was introduced is named the Baseline Mothers Survey (BaMS) which surveyed a sample of mothers who gave birth in October or November 2009. Survey participants were selected so that all mothers fulfilled the criteria for eligibility and thus would have been eligible for PPL had it existed at the time. Interviews were held around one year after birth. The second survey with information on mothers after PPL was introduced is the longitudinal Family and Work Cohort Study (FaWCS) which surveyed a sample of mothers who gave birth in October or November 2011. Only women who were eligible for PPL were included in the survey. The FaWCS survey was conducted in two waves: wave 1 when the babies were about six months old and wave 2 when the babies were about 12 months old. The surveys were designed to collect the same information on comparable women.

In practice the group of surveyed mothers entitled to PPL (post-PPL) and the group of non-entitled mothers (pre-PPL) are similar along many observed dimensions – as we would expect given eligibility is determined solely by the timing of birth within a fairly narrow window – but differ in some others (see Table 1). Some differences reflect the different implementation of the pre and post-PPL surveys. Specifically, post-PPL mothers were interviewed when their child was on average 13 months old, compared to 14 months in the cohort prior to introduction of PPL. As a result, almost one in five mothers in the post-PPL cohort was interviewed before her child's first birthday, while this was the case for only one in a hundred mothers in the pre-PPL cohort. Post-PPL mothers (and their partners) are also about eight months younger on average at the time of their first interview, implying that they were about two months younger at the time of birth;[9] they are three percentage points less likely to be born in Australia and four percentage points more likely to speak a language other than English at home; the baby they gave birth to is slightly more likely to be their first child; their partners are slightly more likely to have a tertiary education, but a slightly lower occupational prestige.[10] There are also differences in the age of the youngest other child living in the household.

[9] The data records age at the time of the (first) interview. Pre-PPL mothers are interviewed around one year after giving birth, while the first interview for post-PPL mothers takes place around six months after the birth. If mothers in both cohorts marry partners of the same age and give birth at the same age, we would thus expect post-PPL mothers and their partners to be around six months younger on average due to the survey design.

[10] The Australian Socioeconomic Index 2006 (AUSEI06) assigns a 'status score' to each occupation coded according to the Australian and New Zealand Standard Classification of Occupations (ANZSCO). The scale is a continuous measure that ranges from 0 to 100.

Table 1 Socioeconomic characteristics before and after the introduction of PPL

	pre-PPL	post-PPL	p-value	
Age of child at time of interview				
in days	420.77	382.42	0.000	***
is less than 365 days old	0.01	0.18	0.000	***
Mother's age	32.24	31.57	0.000	***
Highest Education Qualification				
Did not complete high school	0.09	0.10	0.107	
Completed high school	0.17	0.18	0.281	
TAFE or Trade Certificate or Diploma	0.25	0.23	0.156	
Tertiary	0.49	0.49	0.577	
Born in Australia	0.80	0.77	0.000	***
Born in Australia, UK or New Zealand	0.87	0.84	0.000	***
Aboriginal or Torres Strait Islander	0.02	0.02	0.295	
Speaks language other than English at home	0.14	0.18	0.000	***
Number of other children in household				
0	0.51	0.54	0.007	**
1	0.34	0.32	0.341	
2	0.12	0.10	0.012	*
3 or more	0.04	0.03	0.486	
Age of youngest other child in the household				
0-1 year	0.06	0.01	0.000	***
2	0.11	0.28	0.000	***
3	0.32	0.28	0.011	*
4	0.19	0.15	0.004	**
5	0.09	0.08	0.423	
6	0.06	0.04	0.042	*
7 or more years	0.16	0.14	0.220	
Had a partner at time of birth	0.95	0.96	0.574	
If yes, partner characteristics:				
Partner's Age	34.66	33.95	0.000	***
Partner's Highest Education Qualification				***
Did not complete high school	0.14	0.14	0.994	
Completed high school	0.18	0.19	0.491	
TAFE or Trade Certificate or Diploma	0.34	0.30	0.004	**
Tertiary	0.34	0.37	0.025	*
Partner was working at time of birth	0.95	0.96	0.112	
Partner's weekly work hours	45.84	46.07	0.463	
Partner's annual pay, nominal values in A$	75853	75125	0.746	
Partner's annual pay, in 2012 A$	82046	76781	0.029	
Partner's occupational Prestige (AUSEI06)	52.16	50.92	0.063	°
# of non-missing observations	2587	4201		

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations, weighted results.

Notes: Number of observations denotes the highest number of non-missing observations for any of the variables in the table, and can be smaller for some variables due to item non-response or if not applicable. ***, **, * and ° denote that the mean for post-PPL mothers and the mean for pre-PPL mothers are significantly different at the 0.1%-level 1%-level, 5%-level and 10%-level.

There are also some differences in the types of jobs the mothers held before birth (see Table 2). Compared to pre-PPL mothers, post-PPL mothers were slightly more likely to work in the private sector; were more likely to work in medium-sized firms (21-100 employees) rather than large firms (>100 employees); were more likely to report receiving support from their employer during pregnancy; worked slightly longer hours but for lower annual earnings (the latter not quite statistically significant); with a slightly different distribution across industries, but no difference in the proportion working in female-dominated industries.[11]

Table 2 Pre-birth job characteristics before and after the introduction of PPL

	All mothers			
	Pre-PPL	Post-PPL	p-value	
Sector				
Private, for profit	0.62	0.65	0.008	**
Private, not for profit	0.08	0.08	0.716	
Government business/enterprise	0.06	0.05	0.120	
Government	0.24	0.21	0.017	*
Firm size				***
0-20	0.22	0.22	0.966	
21-100	0.13	0.16	0.001	**
>100	0.65	0.62	0.019	*
Was employee	0.96	0.98	0.013	*
If employee:				
Had problems with employer during pregnancy	0.15	0.13	0.186	
Received support from employer during pregnancy	0.61	0.57	0.003	**
Contract type				
Permanent ongoing	0.81	0.81	0.646	
Fixed-term	0.06	0.07	0.332	
Casual	0.13	0.12	0.131	
Other	0.00	0.01	0.238	
Weekly work hours	33.50	34.12	0.048	*
Annual pay, nominal value in A$	55771	50780	0.211	
Annual pay, in 2012 A$	60325	51899	0.051	◦
Occupational Prestige (AUSEI06)	58.95	56.95	0.000	***

[11] We define an industry as female-dominated, if more than 50% of the employed persons in that industry are female regardless of full-time or part-time status. We used Table Builder Basic to retrieve that information from the 2011 Census (Australian Bureau of Statistics 2011b). Female-dominated industries are i) retail trade, ii) accommodation and food services, iii) financial and insurance services, iv) rental hiring and real estate services, v) administrative and support services, vi) education and training and vii) health care and social assistance.

	All mothers			
	Pre-PPL	Post-PPL	p-value	
Industry				
Female dominated industry	0.66	0.65	0.359	
Agriculture, Forestry and Fishing	0.02	0.01	0.027	*
Mining	0.01	0.01	0.189	
Manufacturing	0.03	0.03	0.353	
Electricity, Gas, Water and Waste Service	0.02	0.01	0.036	*
Construction	0.02	0.03	0.523	
Wholesale Trade	0.02	0.02	0.355	
Retail Trade	0.11	0.12	0.260	
Accommodation and Food Service	0.04	0.05	0.126	
Transport, Postal and Warehousing	0.02	0.02	0.784	
Information Media and Telecommunication	0.03	0.03	0.194	
Financial and Insurance Services	0.10	0.09	0.125	
Rental, Hiring and Real Estate Services	0.02	0.01	0.410	
Professional, Scientific and Technical	0.04	0.09	0.000	***
Administrative and Support Services	0.03	0.08	0.000	***
Public Administration and Safety	0.06	0.05	0.034	*
Education and Training	0.13	0.11	0.032	*
Health Care and Social Assistance	0.24	0.20	0.000	***
Arts and Recreation Services	0.03	0.02	0.019	*
Other services	0.03	0.03	0.575	
Other	0.00	0.01	0.000	***
# of observations	2587	4201		
# of non-missing observations	2582	4197		

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations, weighted results.

Notes: Number of non-missing observations denotes the highest number of non-missing observations for any of the variables in the table, and can be smaller for some variables due to item non-response or if not applicable. ***, **, * and ° denote that the mean for post-PPL mothers and the mean for pre-PPL mothers are significantly different at the 0.1%-level 1%-level, 5%-level and 10%-level.

Such compositional differences between the pre and post-PPL samples could themselves lead to differences in post-birth labour market outcomes. Under standard assumptions, however, the method set out in the following section allows us to separate the impact of PPL from the impact of these small compositional differences.

4. Methodology

This paper considers two sets of outcomes: first, the duration until mothers return to work, and second, employer and job characteristics upon return to work. Estimations follow

standard procedures for the outcomes in question as described in Section 4.1. The impact of PPL on these outcomes is estimated by comparing outcomes for mothers who gave birth before the introduction of PPL with outcomes for mothers who gave birth after introduction of PPL. There are slight differences between both groups in observable characteristics, and possibly in unobservable characteristics above and beyond the difference in eligibility for PPL. In order to deal with these differences, we apply propensity score matching under the standard assumption of conditional independence as described in Section 4.2. Nevertheless, some unobservable differences that potentially violate this assumption may be present. Potential implications for validity of our estimates, as well as the direction of potential biases, are discussed in Section 4.3.

4.1 Outcomes of interest

We analyse the impact of PPL on the duration until return to work using a survival analysis (event history) approach. Information from each mother is used up to the date of her interview, i.e. until the last day that we have information on her work status. We allow the hazard rate and, crucially, the PPL *impact on* the hazard rate to vary over time. We use two alternative hazard rate estimators. First is the non-parametric Kaplan-Meier (KM) estimator, which is computed separately for mothers who did and mothers who did not have access to PPL (we will apply weights from a matching procedure discussed below). Secondly, we estimate the hazard rate as a proportional Cox model. [12]

$$h_{t=x} = h_0(x) \cdot exp(\beta_1 \cdot PPL + \beta_2 \cdot PPL \cdot x)$$

where *PPL* is an indicator that takes the value one if a mother had access to PPL and zero otherwise. [13] The reform's desired impact is to encourage mothers to stay at home in the first few months after birth, but also to encourage their return to work later so that they catch up to (and possibly overtake) mothers who had no access to PPL. In the Cox model, this would correspond to a negative β_1 and positive β_2; in the Kaplan-Meier estimates, this corresponds to a survivor function for post-PPL mothers that is higher than that for pre-PPL mothers

[12] The main advantage of the Cox estimate over the KM estimate is that the former provides us with a hypothesis over the signs of two parameters that is easily testable and makes the effect of PPL easy to interpret. However, the KM-estimator is more flexible in how the impact of PPL is allowed to vary with the time that has passed since birth, as no functional form for the hazard rate is imposed.

[13] We also estimate a version of the model that includes an additional quadratic effect of PPL, and a version with only the constant impact of PPL, β_1.

immediately after the birth, but decreases faster at some later point until both functions eventually intersect.

For the analysis of employer and job characteristics upon return to work, we consider mothers who have returned to work by their child's first birthday, and assess the impact of PPL on whether these mothers return to the same employer and whether they return to the same conditions (working hours, annual pay etc.) as in their pre-birth job. Using our matching framework discussed in the following subsection, we can simply compare sample means for both of these outcomes for mothers with access to PPL, with the weighted sample means for the matched mothers without access to PPL.

Finally, the analyses described above are performed separately for different subgroups to gain insight into which mothers respond most or least strongly to the PPL scheme. This allows us to test Rossin-Slater *et al.*'s (2013) hypothesis that extensions to paid leave entitlements may impact more strongly on disadvantaged mothers. We expect mothers with low income, with lower education, without employer-provided leave, in casual employment, in self-employment, and finally single mothers to respond more strongly to the new policy.

4.2 Propensity score matching

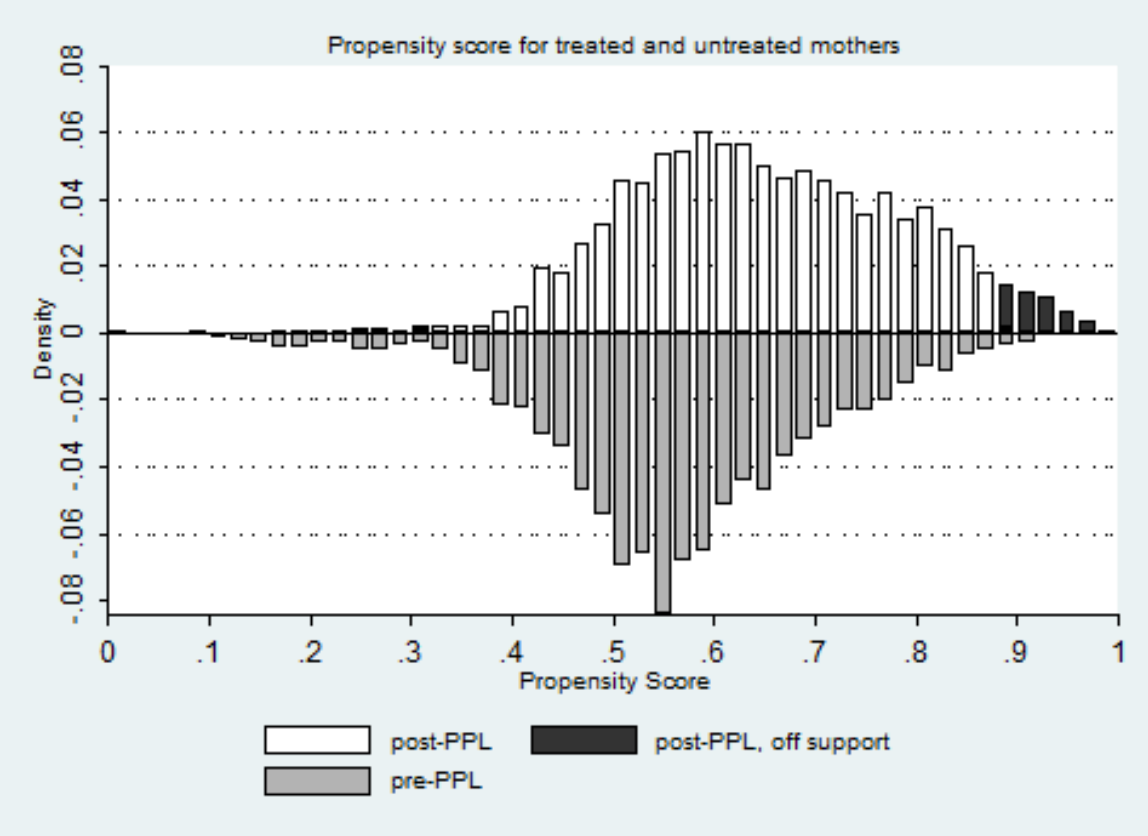
We use a propensity-score-matching approach to identify PPL impacts separately from compositional differences between post-PPL and pre-PPL mothers, under a standard conditional independence assumption (see Rosenbaum and Rubin, 1983). Specifically, we estimate a probit model for treatment status (access to PPL) regressed on all other relevant observed characteristics – those listed in Tables 1 and 2 – as explanatory variables.[14] Matching mothers who gave birth pre-PPL to mothers with comparable characteristics who gave birth post-PPL, and evaluating differences in both groups' labour market outcomes yields our estimate of the scheme's impact on the treated mothers' labour market outcomes (the ATT).[15]

[14] The only variables in Tables 1 and 2 that are not included in the matching is the child's age at time of the interview, and the indicator for female-dominated industry (since the finer measurement of industry is included in the matching). Income is included in 2012 $A only.

[15] The interpretation as 'average treatment effect' in this context holds only if we interpret *having access* to PPL as a treatment. However, if we interpret *taking* PPL as the treatment, introducing access to PPL in January 2011 is called the '*intention to treat'*, and the procedure described above yields the so-called '*intention-to-treat effect*' (ITT).

The distribution of propensity scores of having access to PPL by survey cohort is shown in Figure 1.[16] The distributions for both cohorts cover about the same range.[17] Only for propensity scores of 0.9 and higher are there a sizable number of treated individuals, but almost no untreated individuals who could be used as possible matching partners with similarly high propensity scores. These treated mothers are considered 'off support'. Thus, we exclude the 5% of treated individuals with the highest propensity scores from the analysis.[18] They are represented by the black bars; the white bars show the remainder of the sample of treated mothers who are 'on support' and can be used for the analysis.

Figure 1 Distribution of propensity scores



Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

[16] Figure 1 shows the distribution of propensity scores for the full set of mothers; this is the sample we use for the analysis of the duration of return to work. The analysis of the *job characteristics upon return* relies on the subset of mothers who have returned to work, and another subset of mothers is used for those who have returned and changed some of their job characteristics. Figures analogous to Figure 1 for these two subsets are shown in Appendix A.1.

[17] Note that any 'untreated individual' can be a matching partner for several different 'treated' individuals.

[18] However, a sensitivity analysis with the 'off support' mothers included does not change the results. They are presented in Appendix A2.

In order to match mothers with and without access to PPL, we apply kernel matching with a bandwidth (maximum acceptable difference between the treated individual's propensity score and her potential match's propensity score) of 0.1. We tested smaller and larger bandwidths. Increasing the bandwidth beyond 0.1 rapidly decreases the matching quality as measured by i) the joint correlation of socioeconomic characteristics with the treatment status (which should not be statistically different from zero after the matching) and ii) the average bias after matching (which should be as small as possible). On the other hand, decreasing the bandwidth to lower values does not increase the matching quality any further, but decreases the sample size. We thus chose 0.1 as the optimal kernel bandwidth.[19] Appendix A.2 contains further detail on the matching quality with different bandwidths, illustrating the reasoning for the choice of 0.1. Higher weights are assigned to close matches than to more distant matches.

After the matching procedure, only one statistically significant difference of two percentage points remains between pre-PPL and post-PPL mothers (i.e. working in 'Administrative Support and Services'). Appendix A.3 reports all matched characteristics for both groups of mothers in more detail.[20] Thus, the matching quality is very high; ensuring that the estimated impact of the PPL scheme on labour market outcomes is not biased by differences in *observable* characteristics. As with all such studies, the crucial assumption is of course that the matched samples do not differ in relevant *unobserved* characteristics.

4.3 Threats to identification from unobserved sources

In the absence of a control group, comparing labour market outcomes of pre-PPL mothers and post-PPL mothers could lead to a biased estimate of the effect of PPL, caused, for example, by changes in the economic environment over time or by selection processes into eligibility for PPL. We discuss three potential threats to the validity of the estimates. Assuming that the policy works as intended (i.e., it initially slows mothers' return to work down, then speeds it up), two of these potential biases imply that our analysis potentially

[19] Sensitivity tests with alternative approaches are carried out. Nearest neighbour matching with one, two and five neighbours, and radius caliper matching with caliper values of 0.1%, 1%, 5% and 10% are applied. All point estimates remain very similar. The results are presented in Appendix A2.

[20] For the full sample, the matching quality is shown in Table A.2. For the analysis of job characteristics upon return to work, the sample is restricted to include only those mothers who actually returned to work. The propensity score is re-estimated for the restricted sample and the same matching procedure is applied afterwards. The matching quality for the sub-sample of returned mothers is reported in Table A3 of Appendix A.3. Similarly, for the analysis by sub-groups, the matching procedure is applied after restricting the sample to the sub-group in question, which is equivalent to exact matching on the group indicator, combined with propensity score matching on all other characteristics.

understates one of those effects, while not affecting the other. That means that overall our estimates yield a lower bound of the policy's behavioural impact. A third potential bias would lead to a negative bias of the effect of PPL on mothers' hazard rates of return to work: the analysis would overstate the initial slow-down and understate the speeding up later on. However, if this bias is important at all, the latter effect should be more relevant than the former, again leading us to conclude that our estimates – while not necessarily unbiased – represent a lower bound for the policy's true behavioural impact. Moreover we can explore the importance of this bias and show whether it plays a role empirically.

The three potential threats are discussed in detail in sections 4.3.1 to 4.3.3 below.

4.3.1 Childcare costs

A potentially important contextual difference concerns childcare. Childcare prices were increasing by much more than inflation, over 17 per cent from December 2010 to December 2012 (ABS, 2013b). This may have had a dampening effect on women returning to work. We cannot rule out that this remains an important unobserved difference between the pre- and post-PPL samples, even after the matching procedure outlined before. It is plausible that high childcare costs decrease a mother's probability of returning to work, which would lead to post-PPL mothers' survivor function decreasing at a slower rate than that of pre-PPL mothers, even if PPL has no effect on mothers' return to work. If PPL works as intended - initially decreases, then increases mothers' probability of returning to work – our analysis might thus overstate the policy's initial slow-down-effect, and understate its effect on later returns. We would expect the latter bias to be more relevant than the former, assuming that labour supply is less responsive to childcare costs in the first few months after birth than it is later on in the longer term.

However, if this mechanism is important, we would expect to see differences across the pre-PPL cohort and post-PPL cohort when it comes to changes in the average job conditions upon return to work. For example, if some mothers in the post-PPL cohort do not return to work because of increased childcare costs, and this is not the case in the pre-PPL cohort, we would expect that those mothers in the post-PPL cohort who *do* return will accept a lower pay-cut than their pre-PPL counterparts did. While PPL provides incentives to retain the pre-birth job, the policy has no plausible direct impact on what pay to accept upon return. We can thus explore whether different childcare costs introduce a substantial bias to our estimates of the effect of PPL, by comparing differences in both cohorts' outcomes that should be affected by

a ‘childcare bias’, but not by PPL. We will test whether pre-PPL mothers and post-PPL mothers differ in absolute and relative pay-cut relative to their pre-birth job, or in their probability of accepting a decrease in occupational prestige or less favourable contract types.

4.3.2 Aftermath of the Global Financial Crisis

Another contextual difference for mothers of both cohorts may be caused by differences in the labour market situation. Compared to other countries, the Global Financial Crisis had a limited and short-lived effect on the labour market in Australia. Comparing ABS key statistics on the labour market situation around the time when the children in the two samples turned one year of age, suggests that the labour market situation is very similar in the two periods. Unemployment is only slightly higher in the pre-PPL period than in the post-PPL period (5.2 per cent vs. 5.0 per cent), while the employment rate amongst women aged 15-64 years was the same at 66.5 per cent (ABS, 2013a). Both cohorts also experienced a labour market with near identical earnings growth over the first year after they gave birth: ordinary full-time earnings increased by 4.6% from November 2009 to November 2010, and by 4.8% from November 2011 to November 2012 (ABS, 2015). Nonetheless, we cannot completely rule out that compared to post-PPL mothers, pre-PPL mothers had to decide regarding their return to work in a slightly less favourable labour market. If this is the case, it would have been particularly relevant in the first few months after birth when the Global Financial Crisis might still have had some effect. This could have slowed down the return to work immediately after birth for pre-PPL mothers relative to post-PPL mothers,. If PPL indeed works as intended and causes mothers to delay their return to work initially – before speeding it up later on – our analysis might thus slightly under-estimate such an initial slow-down: i.e., any estimated initial slow-down would represent a lower bound of the true effect.

4.3.3 Effects of PPL on labour supply before subsequent births

The introduction of PPL might increase mothers’ labour supply not only by strengthening ties with the employer, but also by giving an incentive to fulfil labour supply criteria in order to become eligible for PPL for future childbirth. After the announcement of PPL, this incentive was in place not only for post-PPL mothers, but also for pre-PPL mothers. Comparing the labour supply of both groups thus does not show the policy’s full effect. This potential bias could play a role from March 2010, i.e. when pre-PPL mothers’ babies were about five to six

months old.[21] If PPL works as intended and increases mother's labour supply a few months after birth, our analysis will thus yield a lower-bound of this effect.

5. Results

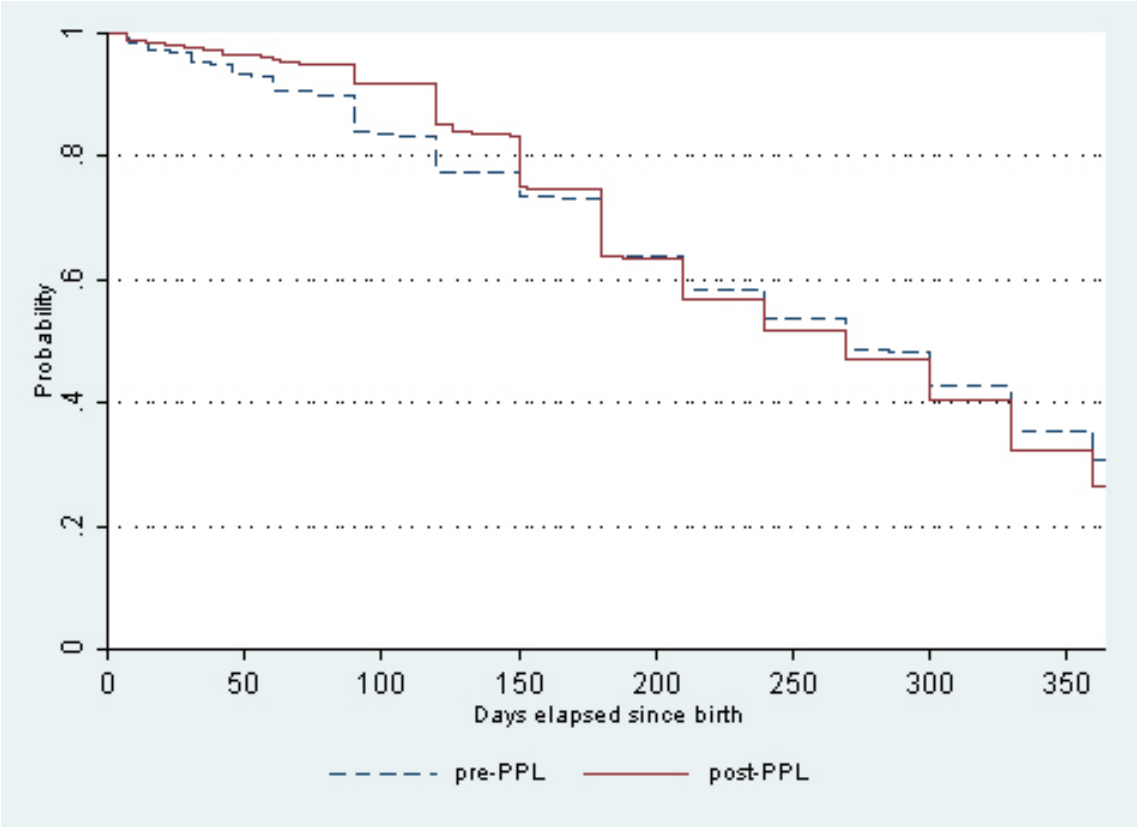
5.1 The impact of PPL on the duration until return to work after birth

The estimated KM survivor functions for not yet having returned to work are shown in Figure 2.[22] The solid (red) line represents the survivor function of mothers who had access to PPL; the dashed (blue) line is the survivor function for the sample of matching partners who did not. The statistical significance level of the gap between the two at different durations is shown in an accompanying table (Table 3). The divergence between the two lines in the first five to six months of the child's life shows how PPL initially delays the return to work, especially in the first three months. In the second three months the proportion of post-PPL mothers who have returned to work starts to catch up with the pre-PPL mothers. By six months the mothers with access to PPL have caught up, with just under 40% of both groups having returned (and just over 60% not yet returned). The number of extra leave days taken within this period is 7.2 days. Beyond six months, there is a slight tendency for mothers with access to PPL to be more likely to return to work. At the end of one year, an additional three days of extra leave has been taken within this period. Qualitatively speaking, this pattern of results is precisely the desired effect of the policy.

Of the 131,307 women who received PPL between January 2012 and December 2012, around 11,000 mothers, who otherwise would have returned to work already, were still at home up to four months after birth. This number drops in the second half of the year when post-PPL mothers begin to return to work more quickly, and it turns into an increase in the number of women who have returned to work at a specific point in time. After one year, our estimates imply that just over 5,400 mothers are back at work who would otherwise still be at home.

[21] This is because mothers can receive PPL for children born on 1 January 2011 at the earliest, and must have had some employment in the ten months before that, that is from 1 March 2010 onwards. The date from which employment histories could be relevant for future eligibility also coincides with the announcement of the policy.
[22] The survivor function based on estimation without applying the propensity score matching approach, showing a very similar pattern, is provided in Appendix A.4.

Figure 2 Survivor function of being out of work by access to PPL - Kaplan Meier estimate



Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Table 3 Survivor function of remaining out of work at selected durations from birth – Kaplan Meier estimate

	Treated	Untreated	Diff.	Std. Err. of Difference	
13 weeks	0.92	0.84	0.08	0.009	***
18 weeks	0.85	0.78	0.07	0.010	***
26 weeks	0.64	0.64	0.00	0.013	
39 weeks	0.47	0.48	-0.01	0.014	
52 weeks	0.27	0.31	-0.04	0.013	**
# observations	3,983	2,543			

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Notes: ***, ** and * denote gaps in survival rates that are statistically significant at the 0.1%-level, 1%-level and 5%-level respectively. Out of the total number of 6,788 observations (see Table 1 and Table 2), 229 observations (5% of treated mothers) were trimmed in the matching procedure. A further 33 observations were deleted because the recorded return date was on or prior to the first day at risk.

The KM result is echoed by our estimation of the semi-parametric Cox model as shown in Table 4.[23]

Table 4 Hazard rate of return to work –Proportional Cox model

	Effect of PPL is constant				
	Coeff.	Std. Err.	z-value	p-value	
Baseline effect of PPL	0.047	0.032	1.470	0.142	
Log-Likelihood	-37481.778				
	Effect of PPL changes over time (linear)				
	Coeff.	Std. Err.	z-value	p-value	
Baseline effect of PPL	-0.336	0.073	-4.570	0.000	***
interacted with days since birth	0.002	0.000	5.940	0.000	***
Log-Likelihood	-37461.907				
	Effect of PPL changes over time (quadratic)				
	Coeff.	Std. Err.	z-value	p-value	
Baseline effect of PPL	-0.931	0.127	-7.300	0.000	***
interacted with days since birth	0.010	0.001	7.100	0.000	***
interacted with days since birth (squared)	0.000	0.000	-5.970	0.000	***
Log-Likelihood	-37441.972				
# observations	6526				

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Notes: ***, **, * and ° denote whether the coefficients are significant at the 0.1%-level 1%-level, 5%-level and 10%-level. Standard errors are robust. See notes to Table 3 for a description of observations that were excluded from the sample.

We estimate three different specifications of the Cox model. Our preferred model as described in Section 4.2.2 includes a constant effect of PPL (which measures how the PPL scheme impacts on the hazard rate on the day of birth) and a linear effect (which measures how the impact of PPL changes as the new-born child ages), and best balances flexibility with ease of interpretation. The results show that the hazard rate of return to work on the first day of birth if the mother has access to PPL is only exp(-0.336)=71.49% of the corresponding (already very low) hazard rate if the mother does not have access to PPL. With every day that elapses after birth, however, the hazard rate for PPL mothers increases by 0.19% more each day than the hazard rate of mothers without access to PPL. When the baby is 180 days old the hazard rates of mothers in the two groups are equal ($0.7149 \times 1.0019^{180} = 1$), i.e. the mothers with access to PPL catch up those without access to PPL six months after birth. The coefficients of both the constant and the linear effect are both significant at the 0.1%-level.

[23] The equivalent estimates without matching are given in Appendix A.4.

The quadratic specification gives a similar pattern of results.[24] As suggested by the KM survivor functions, the introduction of PPL initially slows down the return to work, and then speeds it up.

These results are similar to those found for leave schemes in other Western countries in many earlier studies. For example, Baum (2003) found that entitlement for twelve weeks of (unpaid) maternity leave in the US increased the probability of a return to work within one year by three to four percentage points, but slowed down the return to work in the first two months after birth. Likewise, Berger and Waldfogel (2004) found a delay in return to work when US mothers have access to paid or unpaid leave, but the return-to-work rate increased after the maximum leave entitlement ends, with a positive net effect. Rønsen and Sundström (2002) found the same for paid leave entitlements in Sweden, Norway and Finland. The net effect (of the increased and decreased rate of return) is positive overall if the leave does not exceed seven months in Finland and just over one year in Sweden. Baum and Ruhm (2013) find a similar pattern of initially delayed return to work followed by catching up for the California Paid Family Leave scheme. For Australia, Hanel (2013) analysed employer-paid parental leave and found that women who are eligible for paid parental leave delay their return to work from the first to the second half of the first year after birth. Baxter (2009) presents similar results.

We next consider whether PPL impacts heterogeneously on the leave taking of mothers according to their socio-demographic and pre-birth job characteristics. Figure 3 presents KM survivor functions – as in Figure 2– estimated separately for different groups: mothers with high income and mothers with low income[25]; mothers with and without a tertiary qualification; mothers with and without employer-provided leave; mothers in casual employment and in permanent or other non-casual employment; employed versus self-employed mothers; and finally mothers with and without a partner at the time of birth. The corresponding coefficients from the linear Cox model are presented in Appendix A.5.

[24] The simplest model, restricting the impact of PPL to be duration-invariant, gives very different results, suggesting no significant impact because the initial negative and eventual positive impacts average out.
[25] High (low) income is defined as being in the upper (lower) tercile of the distribution, with the middle tercile omitted.

Figure 3 Survivor function of being out of work by access to PPL - Kaplan Meier estimate by subgroups

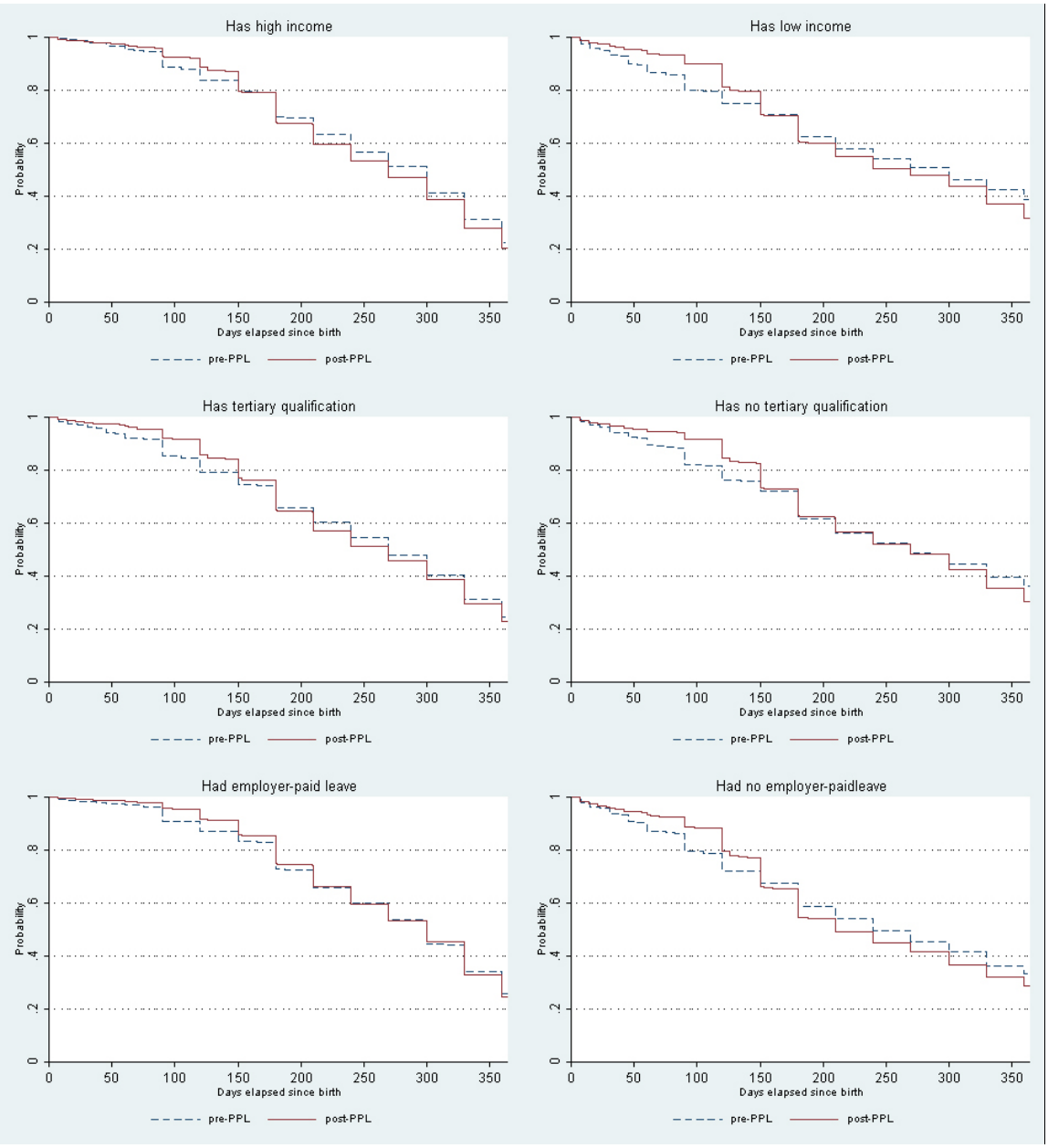
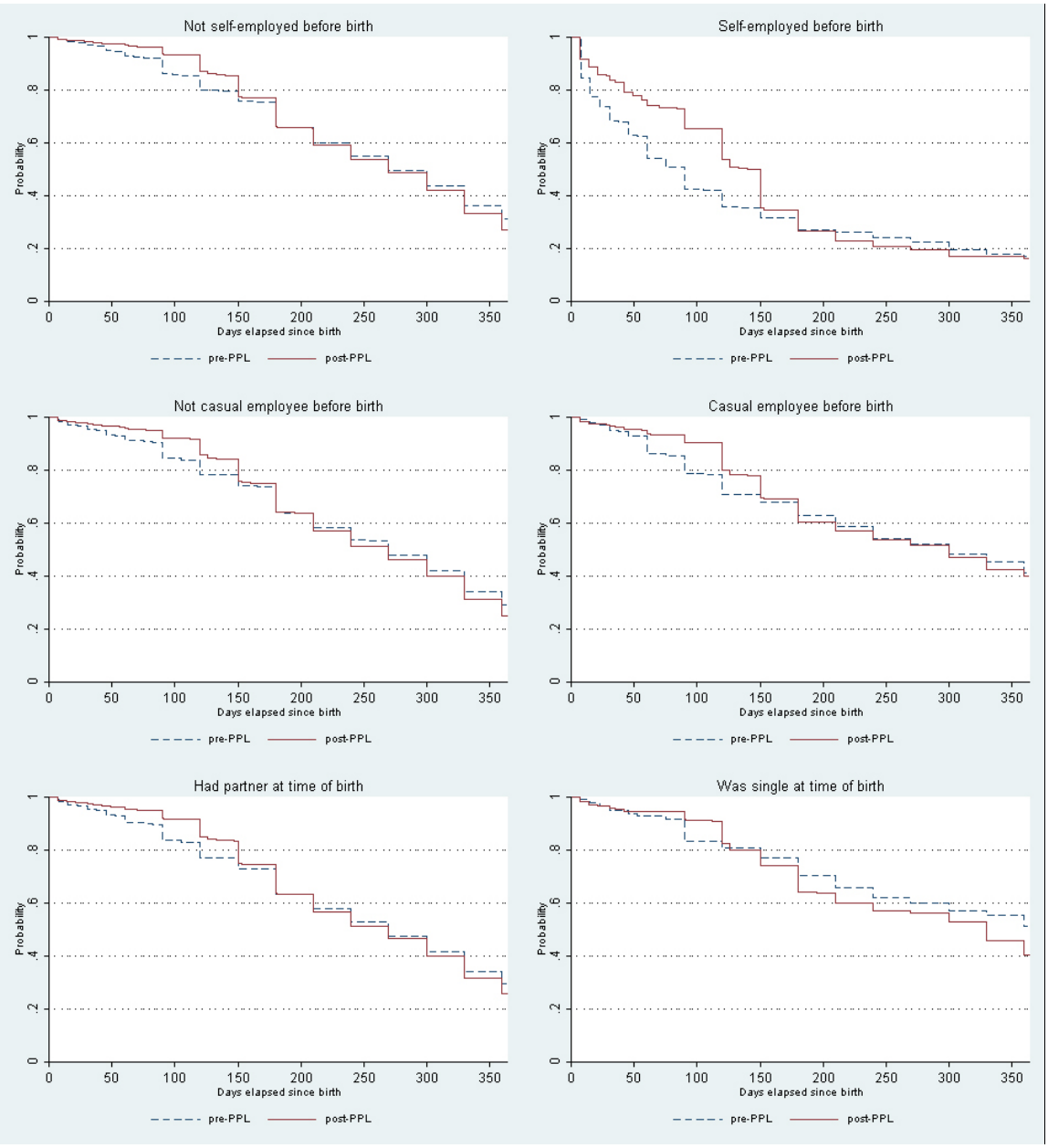


Figure 3 - continued



Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

This estimation by subgroup makes clear that the biggest behavioural response to PPL is to be found among relatively disadvantaged mothers, i.e. those with low income, those without tertiary qualifications, and those without employer-provided paid leave. This is in line with findings for France by Joseph *et al.* (2013) and for California by Rossin-Slater *et al.* (2013). It is also in line with Rossin-Slater *et al.*'s more general (unproved) hypothesis that paid leave schemes are more likely to affect disadvantaged groups of women. In the PPL case the

intuition is straightforward; a flat-rate payment of 18 weeks at minimum wage corresponds to a low wage replacement rate for high-income mothers (who are more likely to be educated to tertiary level) and vice versa, i.e. the reduction in opportunity costs for delaying return to work is larger for low-income mothers when they gain access to PPL than for high-income mothers. The same intuition applies to differential PPL impacts by access to *employer*-provided parental leave, which is in any case disproportionately offered to high-income mothers (e.g. Human Rights and Equal Opportunity Commission, 2002).[26] A lack of access to employer-provided leave may also partly explain the very substantial PPL impact on self-employed mothers, for whom both the initial negative impact and the positive 'catch-up' impact of PPL on the return to work hazard are particularly large. Mothers who were on a casual contract before the birth display a slightly larger response to the introduction of PPL compared to those on other forms of employment contract. However, the impact is not as clear and not as large as for some of the above-mentioned groups of mothers.

A somewhat different picture emerges for single mothers versus partnered mothers.[27] Since 95 per cent of all mothers had a partner at birth, the results for mothers with a partner are very similar to the results for the entire sample. For single mothers, however, the proportion not yet returned to work decreases substantially slower than for partnered mothers beyond six months, which might reflect problems with regard to obtaining childcare, other institutional factors (e.g. welfare eligibility), selection into single motherhood, or some combination of the above. Nevertheless, single mothers' response to the introduction of PPL is similar to that of partnered mothers, although the positive impact on eventual return to work appears larger in magnitude for single mothers (with the caveat that none of the effects are statistically significant given the small number of single mothers in the sample).

5.2 The impact of PPL on job characteristics after birth

One of the aims of the PPL scheme is to improve retention rates for mothers in their current (i.e. pre-birth) jobs, in part to ameliorate any loss in human capital experienced following the

[26] In order to see whether the main source of disadvantage in this context is mothers' low income or the lack of access to employer-paid leave, we repeated the analysis comparing four groups: low-income and high-income mothers, each with and without access to employer-paid leave. It appears that the initial slow-down in mother's return to work is driven primarily (although not exclusively) by low-income status (i.e. with PPL these women can now afford longer leave), while the increased return to work later on is primarily (but not exclusively) driven by a lack of access to employer-paid leave (i.e. with PPL there appears to be a stronger connection to the employer). The results are presented in Appendix A.5.

[27] Single mothers are defined here as those not living with a partner at the time they gave birth. Although a few of these mothers had partners (who they were not living with), the vast majority did not have a partner.

birth of a child. Employers were responsible for administering PPL payments partly to achieve better job continuity. Table 5 shows that PPL does have a positive impact on the same-job retention rate (same employer and position), with 77% of mothers with access to PPL who returned to work within 365 days after the baby's birth returning to the same job compared to 73% of mothers without access to PPL.[28] Not all studies cited earlier in this paper examine this particular outcome, but where they do so the evidence seems somewhat mixed. For paid leave, Baum and Ruhm (2013) find either no effect or a positive effect (of a roughly similar magnitude to our estimate) depending on the extent to which the sample is restricted to mothers who work for more weeks during pregnancy. Lalive *et al.* (2011) find either no impact or a small negative impact depending on the precise nature of the reform – covering both paid and unpaid leave – in question. Both Baum (2003) and Waldfogel *et al.* (1999) find positive impacts (broadly in line with the magnitude of our estimate) for *unpaid* leave. Returning to our own estimates, the effect is even stronger for a return to the same job and *job conditions*, such as annual pay, weekly hours and leave rights.

We repeat this comparison for three of the sample splits from Figure 3: high/low income, with/without tertiary qualification, and with/without employer-provided parental leave. We omit the self-employed, partnered/single and casual/other splits given the smaller sample size once we condition on having returned to work. Like the impact of PPL on the duration of leave, the improvement in job retention rates in the pre-birth job is concentrated among mothers without a tertiary qualification, in mothers without access to employer-funded parental leave, and to a lesser extent among low-income mothers. There is less heterogeneity in the PPL impact on the probability of not only returning to the same job, but also to the same conditions. For this outcome it is only access to employer-provided parental leave that differentiates PPL impacts, with those not eligible for employer-provided leave displaying the larger PPL impacts.

[28] In order to account for the differences in timing of the interview between pre-PPL and post-PPL mothers and the very common return to work at age 1 of the child, mothers who were interviewed less than 365 days after the baby was born are treated as censored and not used for this part of the analysis.

Table 5 The impact of PPL on returning to same job and same conditions

	Treated	Control: Matched	z-value	
Returned to same job	0.78	0.73	2.78	**
Returned to same conditions (pay, salary etc.)	0.33	0.28	3.22	**
Returned to same job				
High Education	0.77	0.77	0.35	
Low Education	0.78	0.70	3.60	***
High Income	0.77	0.74	1.42	
Low Income	0.78	0.73	1.89	°
Has employer-paid leave	0.79	0.80	-0.38	
Does not have employer-paid leave	0.76	0.70	3.26	**
Returned to same conditions (pay, salary etc.)				
High Education	0.32	0.27	2.40	*
Low Education	0.34	0.29	2.26	*
High Income	0.26	0.21	1.84	°
Low Income	0.40	0.35	1.67	°
Has employer-paid leave	0.33	0.29	1.38	
Does not have employer-paid leave	0.33	0.27	2.96	**
# observations	2,517	1,657		

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Notes: ***, **, * and ° denote that the mean (median) for post-PPL mothers and the mean (median) for pre-PPL mothers are significantly different at the 0.1%-level 1%-level, 5%-level and 10%-level. Standard errors are robust. From the total sample of 6,788 mothers, a return to work by the baby's first birthday had been recorded for 4,316 mothers. 5% of post-PPL mothers with the highest propensity score were trimmed (142 observations).

As discussed in Section 4.3.1., the scheme does have elements designed to maintain the pre-birth job, but it has no characteristics which seem likely to influence the type of job taken up after parental leave if the pre-birth job is *not* maintained. However, if pre-PPL mothers and post-PPL mothers differ in their behaviour not only because of access to PPL, but also because of changes to childcare costs over time, we would expect to see differences in the jobs they take up if they return. Specifically, post-PPL mothers should return to 'better' jobs than their pre-PPL counterparts on average, because they would be more likely to not return at all if the job is not good enough to justify high costs of alternative care provision. Table 6 shows job characteristics of post-birth jobs, relative to pre-birth jobs, for both cohorts of mothers. There is no clear pattern in the impact of PPL on job characteristics that mothers accept upon return to work: both groups face the same reduction in pay, weekly working hours and occupational prestige, and the same changes in contract type. This result strongly suggests that changes in childcare costs had at worst a minor impact on post-PPL mothers'

return behaviour. Any potential bias in our estimates from this source should be minor. Taking into account potential biases from differences in the labour market for both cohorts and any effects of the announcement of PPL on pre-PPL mothers, we can confidently interpret our results as a lower bound for the policy's true behavioural impact.

Table 6: The impact of PPL on job characteristics - mothers who return to work and have changed job conditions

	Treated	Control: Matched	z-value
Contract type			
Changed from permanent to non-permanent	0.21	0.21	-0.110
Changed from non-permanent to permanent	0.03	0.03	0.200
Change in average hours	-15.68	-14.95	-1.430
Change in median Annual Pay (2012 A$)	-18332.87	-17326.56	-0.850
Median relative change in Annual Pay (2012 A$)	-0.39	-0.37	-1.070
Change in average Occupational Prestige (0-100)	-0.51	-0.38	-0.350
# observations	1,558	1,054	

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Notes: ***, **, * and ° denote that the mean (median) for post-PPL mothers and the mean (median) for pre-PPL mothers are significantly different at the 0.1%-level 1%-level, 5%-level and 10%-level. Standard errors are robust. In the total sample of 6,788 mothers, a return to work by the baby's first birthday and a change of jobs or job conditions was recorded for 2,930 mothers. Observations with missing information on the dependent variable were dropped, ranging from zero to 237 dropped observations (for annual pay and contract type respectively). Finally, the 5% of post-PPL mothers with the highest propensity score were trimmed. The number of observations reported in the table refers to the smallest final sample size.

6. Conclusion

This paper presents the first quantitative evidence on the labour supply and employment impacts of the Australian national PPL scheme introduced in January 2011, making a significant contribution to the growing international body of evidence on the impacts of parental leave schemes. The contribution is important in three specific respects. First, the paper examines a reform that introduces a short leave period at moderate payment rates in a country that did not previously have a universal paid parental leave scheme. These effects are plausibly different from the effects measured when long leave entitlements of more than a year are further extended. Evaluation of the Australian reform is of particular interest for countries where no leave scheme currently exists and the introduction of one is being considered. Second, this paper is able to draw on rich data collected for the specific purpose of evaluating this policy which allows us to examine impacts on several labour market outcomes allowing for heterogeneous impacts across a wide range of mothers' characteristics.

Third, the paper adds to only a handful of existing studies internationally that have a credible identification strategy, which allows us to make plausible claims regarding causality under standard, and reasonable, assumptions.

We find that post-PPL mothers at first have a lower hazard rate for return to work than pre-PPL mothers, as they make use of the newly introduced paid leave that is now available to them. The hazard for post-PPL mothers then increases to overtake the counterfactual hazard. For example, some mothers who would have returned to work in months 1 to 3 in the absence of PPL now return in months 4 to 6. Depending on the exact statistical specification chosen, sometime between six and nine months, mothers with access to PPL are more likely to have returned to work than mothers without access to PPL. In this respect the impact of PPL appears in line with that found for earlier paid leave schemes elsewhere, such as the California Paid Family Leave scheme introduced in 2004 (Baum and Ruhm, 2013).

When we distinguish different subpopulations of women our results show clearly that low-income mothers, mothers without tertiary education, and mothers without access to employer-funded parental leave respond more strongly to the introduction of PPL than high-income mothers, tertiary educated mothers and those with access to employer-funded leave. Such heterogeneous impacts have rarely been investigated in the literature on the labour market impacts of parental leave to date. Notable exceptions include Rossin-Slater *et al.* (2013) and Joseph *et al.* (2013), although neither study examines variation in impacts by eligibility for *employer-funded* leave, which we show here to be an important element of the overall picture on heterogeneous effects. Related to this, we also break new ground by demonstrating big differences in the impact of PPL by self-employment status. Ultimately our estimates offer strong support, and evidence for a particular causal mechanism (i.e. reducing the opportunity cost of delaying the return to work), for Rossin-Slater *et al.*'s (2013) argument that paid leave schemes benefit disadvantaged groups of women more than other groups of women.

Among mothers who have returned to work by the time their child turns one year old, we show PPL has a significant positive impact on job continuity (keeping the pre-birth job at the pre-birth employer). This may be desirable from an efficiency point of view by limiting the loss of human capital. Existing evidence is somewhat mixed on this point, but our estimates are broadly in line with those of Baum and Ruhm (2013) when they widen the sample to include women who work fewer weeks during pregnancy. This positive job continuity impact

is strongest for women without a tertiary qualification, without access to employer-funded leave, and for those with low income. This suggests that Rossin-Slater *et al.*'s hypothesis on the impacts of paid leave vis-à-vis unpaid leave may extend to further outcomes of interest. We also find a positive impact on the probability of not only keeping one's pre-birth job, but also the same conditions. With the exception of access to employer-funded leave, this effect does not appear to vary much across different groups of mothers.

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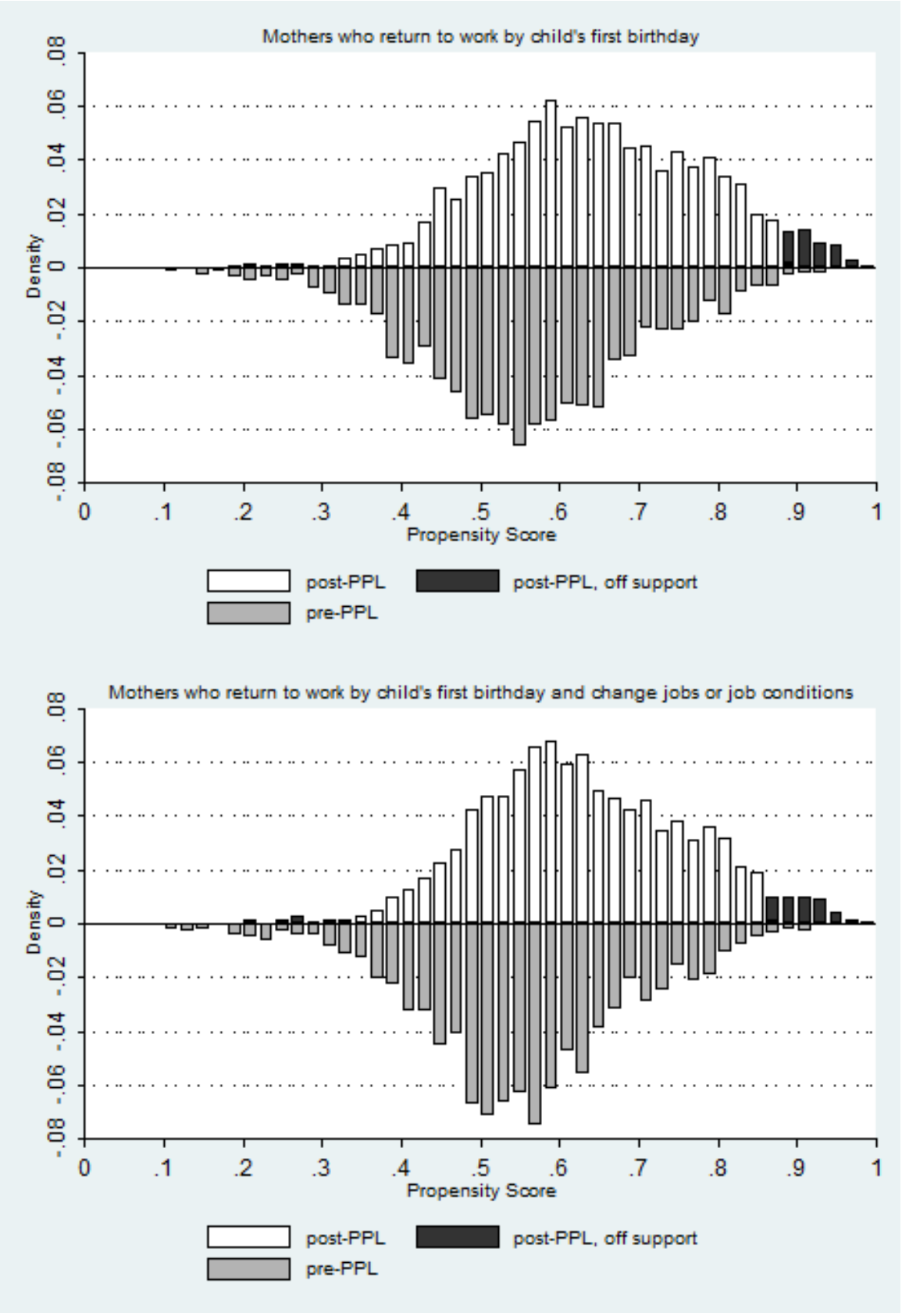
Appendix

This appendix presents additional details on the matching procedure together with additional results and sensitivity analysis.

A.1 Additional information on propensity scores

The analysis of the job conditions to which the mothers return, and the analysis of changes in job conditions between pre-birth and post-birth jobs if applicable, is based only on the subset of mothers who are observed to return to work. Propensity scores are re-estimated for these restricted samples. The distribution of propensity scores is shown in Figure A1. For both subsamples the 5% of treated individuals with the highest propensity scores are again excluded due to a lack of matching partners with similarly high scores.

Figure A1 Distribution of propensity scores - mothers who returned to work



Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

A.2 Additional information on matching algorithm

The analysis presented in this paper uses kernel matching. Untreated observations are used as matching partners for treated observations. These are weighted according to the difference between the treated mother's propensity score and that of her matching partner:

$$w_{ut} = \max\left\{0;\ 1 - \left(\frac{|\rho_u - \rho_t|}{h}\right)^2\right\}$$

where w_{ut} is the weight assigned to an untreated individual u as a matching partner to the treated individual t, ρ_u is u's propensity score and ρ_t is t's propensity score, and h is the bandwidth of the kernel estimator. Provided that the bandwidth is not too large so that the results are biased, we would prefer the bandwidth to be as large as possible so that standard errors are minimised.

We perform the matching procedure using a number of different bandwidths between 0.02 and 0.24. and compare the quality of the result. We use two measures of quality: first, we estimate a probit model with PPL as the dependent variable and all relevant explanatory variables on the already matched sample. The p-values for the F-Tests assessing the joint significance of all coefficients in such a model by bandwidth are shown graphically in Figure A2. A p-value close to 1 is desired. A second quality indicator is the average bias across characteristics per bandwidth. The bias for each characteristic is defined as in Rosenbaum and Rubin (1985):

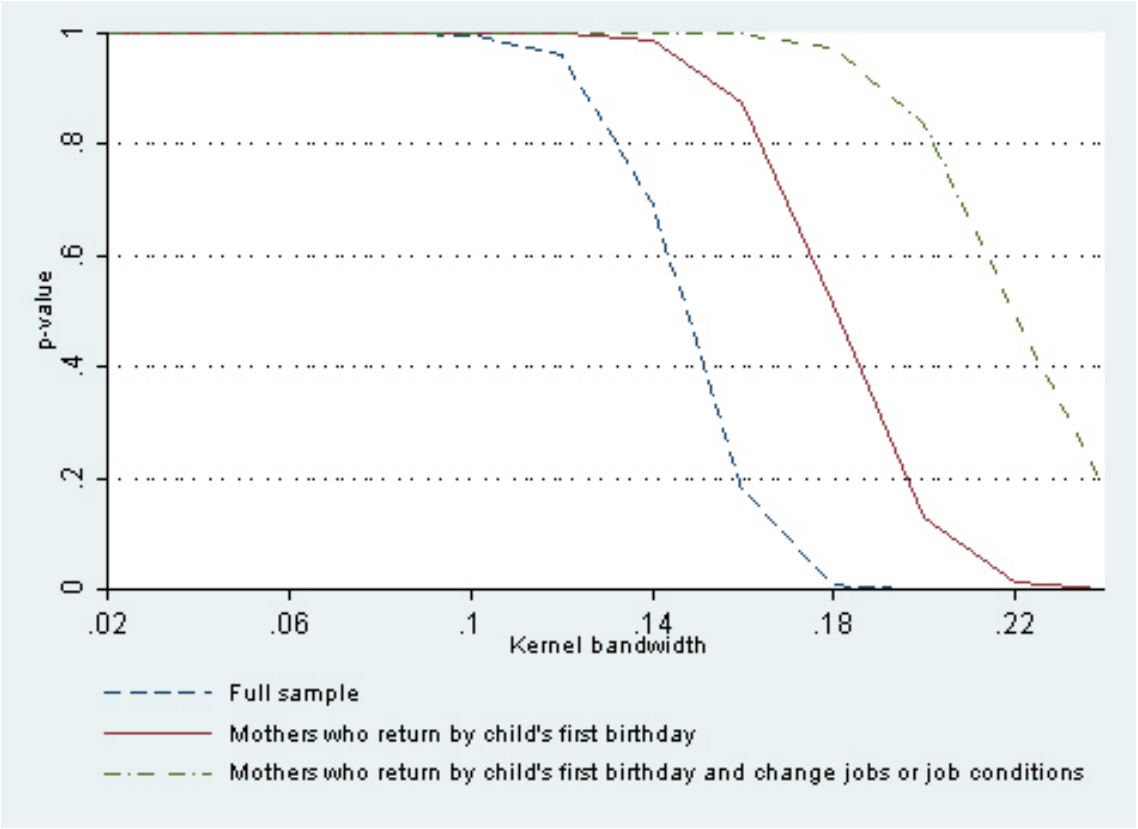
$$B(x) = \frac{\mu_t(x) - \mu_u(x)}{\sqrt{(V_t(x) + V_u(x))/2}},$$

with $\mu_t(x)$ and $\mu_u(x)$ being the mean of characteristic x in the treated sample and their untreated matching partners, and $V_t(x)$ and $V_u(x)$ the respective sample variances. Figure A3 shows the average of $B(x)$ over all characteristics x. Among all those bandwidths with low bias, we should pick the largest bandwidth. Both measures indicate that a bandwidth of 0.1 is the largest among those with acceptable quality in terms of bias. Therefore, all matching weights are calculated according to the formula: $w_{ut} = \max\left\{0;\ 1 - \left(\frac{|P_u - P_t|}{0.1}\right)^2\right\}$.

In addition to kernel matching, we have tested the robustness of the results when choosing different matching algorithms: Nearest neighbour matching with one, two and five neighbours, and radius caliper matching with caliper values of 0.1%, 1%, 5% and 10%. All

point estimates remain very similar, except for the matching algorithm with 5 neighbours. As mentioned in Section 4.2, we also checked that the results are robust to not trimming the 5 per cent of mothers with highest propensity scores. Table A1 presents a replication of the Kaplan-Meier results shown in Table 3, for different matching algorithms and for matching without trimming.

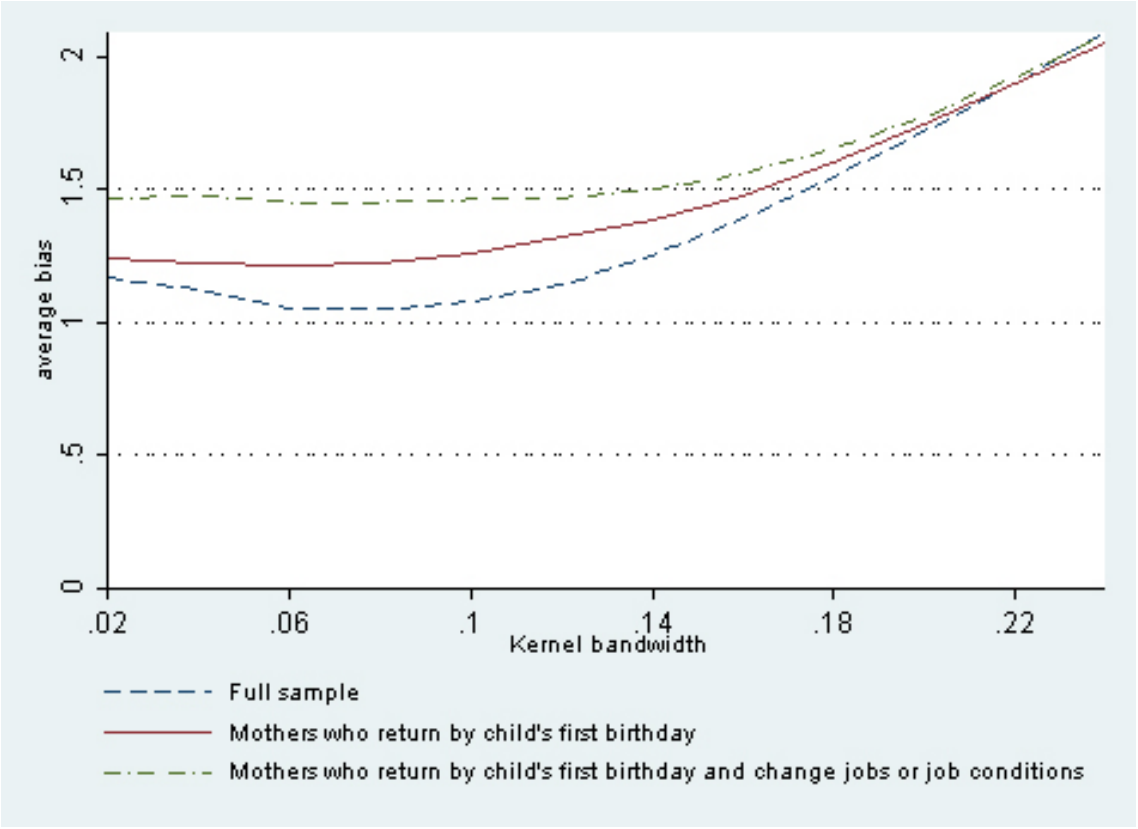
Figure A2 Joint correlation of matched characteristics with access to PPL, after matching



Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Notes: The figure shows the (p-value) for the hypothesis H_0: 'all correlations are jointly zero' to be correct. It is computed using a Likelihood-ratio test after estimation of a probit model with access to PPL as the dependent variable and all matching characteristics as explanatory variables – the estimation is performed *after* matching using a given bandwidth.

Figure A3 Standardised bias in matched characteristics after kernel matching - Mean bias over all characteristics



Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Note: The bias for characteristic x is calculated as $B(x) = \frac{\mu_t(x) - \mu_u(x)}{\sqrt{(V_t(x) + V_u(x))/2}}$, with $\mu_t(x)$ and $\mu_u(x)$ being the mean of characteristic x in the treated sample and their untreated matching partners, and $V_t(x)$ and $V_u(x)$ the respective sample variances. The figure shows the average $B(x)$ over all characteristics x.

Table A.1: Survivor function of being out of work at selected durations from birth – various matching algorithms

	Original			No trimming			Five Nearest Neighbours			Two Nearest Neighbours			One Nearest Neighbour		
	Diff.	S.E.(Diff.)		Diff.	S.E.(Diff.)		Diff.	S.E.(Diff.)		Diff.	S.E.(Diff.)		Diff.	S.E.(Diff.)	
13 weeks	0.081	0.009	***	0.082	0.010	***	0.084	0.013	***	0.088	0.013	***	0.103	0.013	***
18 weeks	0.075	0.011	***	0.077	0.012	***	0.076	0.015	***	0.082	0.015	***	0.098	0.015	***
26 weeks	0.001	0.013		0.005	0.013		0.005	0.016		0.013	0.017		0.026	0.016	
39 weeks	-0.015	0.014		-0.010	0.013		-0.009	0.015		0.001	0.018		0.001	0.016	
52 weeks	-0.042	0.013	**	-0.037	0.012	**	-0.037	0.013	**	-0.031	0.017	°	-0.030	0.016	°
# obs.	6526			6744			6674			6294			5768		

	Original			Caliper: 10%			Caliper: 5%			Caliper: 1%			Caliper: 0.1%		
	Diff.	S.E.(Diff.)		Diff.	S.E.(Diff.)		Diff.	S.E.(Diff.)		Diff.	S.E.(Diff.)		Diff.	S.E.(Diff.)	
13 weeks	0.081	0.009	***	0.081	0.010	***	0.083	0.010	***	0.083	0.010	***	0.090	0.011	***
18 weeks	0.075	0.011	***	0.075	0.011	***	0.078	0.012	***	0.078	0.012	***	0.083	0.013	***
26 weeks	0.001	0.013		0.002	0.012		0.007	0.014		0.008	0.014		0.010	0.014	
39 weeks	-0.015	0.014		-0.013	0.013		-0.009	0.014		-0.008	0.014		-0.006	0.014	
52 weeks	-0.042	0.013	**	-0.039	0.013	**	-0.036	0.014	*	-0.035	0.014	*	-0.033	0.014	*
# obs.	6526			6744			6743			6724			6486		

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.
Notes: ***, ** and * denote gaps in survival rates that are statistically significant at the 0.1%-level, 1%-level and 5%-level respectively.

A.3 Information on matching quality

Table A.2 shows characteristics of treated and untreated mothers after the matching, alongside the p-values for a series of means-comparison tests with the null hypothesis that both samples are identical in a given characteristic. Table A.3 presents the corresponding results restricted to mothers who have returned to work by the time their child is aged one year.

Table A2 Matching quality – full sample

	Treated	Untreated	t-test: p-value
Mother's age	31.51	31.43	0.464
Highest Education Qualification			
Did not complete high school	0.10	0.10	0.752
Completed high school	0.18	0.18	0.897
TAFE or Trade Certificate or Diploma	0.23	0.23	0.836
Tertiary	0.49	0.49	0.907
Born in Australia	0.77	0.78	0.738
Born in Australia, UK or New Zealand	0.84	0.84	0.785
Aboriginal or Torres Strait Islander	0.02	0.02	0.934
Speaks language other than English at home	0.17	0.17	0.974
Number of other children in household			
0	0.56	0.57	0.233
1	0.31	0.30	0.513
2	0.10	0.09	0.661
3 or more	0.03	0.03	0.770
Age of youngest other child in the household			
0-1 year	0.00	0.00	0.427
2	0.11	0.10	0.254
3	0.13	0.13	0.926
4	0.07	0.07	0.906
5	0.04	0.04	0.827
6	0.02	0.02	0.487
7 or more years	0.07	0.06	0.583
Had a partner at time of birth	0.95	0.94	0.410
If yes, partner characteristics:			
Partner's age	31.64	31.46	0.449
Partner's Highest Education Qualification			
Did not complete high school	0.13	0.13	0.924
Completed high school	0.18	0.18	0.811
TAFE or Trade Certificate or Diploma	0.29	0.28	0.729
Tertiary	0.34	0.34	0.826
Partner was working at time of birth	0.91	0.90	0.384
Partner's weekly work hours	41.01	40.59	0.306
Partner annual pay, in 2012 A$	53409.00	52468.00	0.538
Partner's occupational Prestige (AUSEI06)	45.23	45.29	0.927

	Treated	Untreated	t-test: p-value	
Sector				
Private, for profit	0.64	0.65	0.349	
Private, not for profit	0.08	0.08	0.990	
Government business/enterprise	0.05	0.05	0.964	
Government	0.21	0.20	0.209	
Firm size				
0-20	0.22	0.21	0.837	
21-100	0.15	0.15	0.914	
>100	0.62	0.63	0.938	
Had problems with employer during pregnancy	0.14	0.14	0.806	
Received support from employer during pregnancy	0.58	0.58	0.760	
Contract type				
Permanent ongoing	0.76	0.76	0.865	
Fixed-term	0.06	0.06	0.319	
Casual, other	0.12	0.12	0.638	
Weekly work hours	33.99	34.19	0.471	
Annual pay, in 2012 A$	44613.00	44246.00	0.675	
Occupational Prestige (AUSEI06)	55.88	55.98	0.839	
Industry				
Agriculture, Forestry and Fishing	0.01	0.01	0.304	
Mining	0.01	0.01	0.575	
Manufacturing	0.03	0.03	0.516	
Electricity, Gas, Water and Waste Service	0.01	0.01	0.490	
Construction	0.03	0.03	0.767	
Wholesale Trade	0.02	0.02	0.979	
Retail Trade	0.12	0.13	0.574	
Accommodation and Food Service	0.05	0.06	0.636	
Transport, Postal and Warehousing	0.02	0.02	0.983	
Information Media and Telecommunication	0.03	0.03	0.321	
Financial and Insurance Services	0.09	0.09	0.933	
Rental, Hiring and Real Estate Services	0.01	0.02	0.570	
Professional, Scientific and Technical	0.08	0.07	0.271	
Administrative and Support Services	0.07	0.05	0.005	**
Public Administration and Safety	0.05	0.05	0.878	
Education and Training	0.11	0.11	0.842	
Health Care and Social Assistance	0.20	0.22	0.231	
Arts and Recreation Services	0.02	0.02	0.892	
Other services	0.03	0.03	0.790	
Other	0.01	0.00	0.334	
# observations	3,989	2,570		

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Notes: ***, **, * and ° denote that the mean for post-PPL mothers and the mean for pre-PPL mothers are significantly different at the 0.1%-level 1%-level, 5%-level and 10%-level. Out of the total number of 6,788 observations (see Table 1 and Table 2), 229 observations (5% of treated mothers) were trimmed in the matching procedure.

Table A.3 Matching quality - mothers who returned to work

	Sample of Mothers who returned to work by age 1 of the child			Sample of Mothers who returned to work by age 1 of the child, and changed job conditions		
	Treated	Untreated	t-test: p-value	Treated	Untreated	t-test: p-value
Mother's age	31.54	31.46	0.581	31.51	31.37	0.372
Highest Education Qualification						
Did not complete high school	0.09	0.09	0.904	0.08	0.09	0.855
Completed high school	0.17	0.17	0.949	0.16	0.16	0.661
TAFE or Trade Certificate or Diploma	0.23	0.23	0.991	0.23	0.23	0.993
Tertiary	0.52	0.52	0.915	0.52	0.53	0.821
Born in Australia	0.77	0.78	0.728	0.79	0.79	0.905
Born in Australia, UK or New Zealand	0.85	0.85	0.831	0.86	0.86	0.886
Aboriginal or Torres Strait Islander	0.02	0.02	0.957	0.02	0.02	0.947
Speaks language other than English at home	0.17	0.17	0.946	0.15	0.15	0.891
Number of other children in household						
0	0.54	0.56	0.225	0.61	0.62	0.472
1	0.32	0.32	0.543	0.29	0.28	0.653
2	0.10	0.09	0.507	0.08	0.07	0.753
3 or more	0.03	0.03	0.836	0.03	0.03	0.950
Age of youngest other child in the household						
0-1 year	0.00	0.00	0.363	0.00	0.00	0.667
2	0.11	0.10	0.325	0.09	0.07	0.077
3	0.14	0.14	0.693	0.11	0.11	0.991
4	0.07	0.07	0.749	0.07	0.07	0.993
5	0.04	0.04	0.762	0.04	0.04	0.646
6	0.02	0.02	0.531	0.02	0.02	0.413
7 or more years	0.06	0.06	0.987	0.06	0.06	0.987
Had a partner at time of birth	0.96	0.96	0.687	0.96	0.96	0.904
If yes, partner characteristics:						
Partner's age	32.18	32.01	0.508	32.30	32.15	0.624
Partner's Highest Education Qualification						
Did not complete high school	0.13	0.13	0.828	0.13	0.13	0.765
Completed high school	0.18	0.18	0.835	0.18	0.19	0.740
TAFE or Trade Certificate or Diploma	0.30	0.29	0.762	0.30	0.29	0.541
Tertiary	0.33	0.34	0.831	0.34	0.34	0.824
Partner was working at time of birth	0.92	0.92	0.755	0.93	0.93	0.962
Partner's weekly work hours	41.30	40.95	0.476	41.77	41.65	0.832
Partner annual pay, in 2012 A$	53396.00	52306.00	0.553	55534.00	54196.00	0.545
Partner's occupational Prestige (AUSEI06)	45.41	45.81	0.620	46.45	46.91	0.636

	Sample of Mothers who returned to work by age 1 of the child			Sample of Mothers who returned to work by age 1 of the child, and changed job conditions		
	Treated	Untreated	t-test: p-value	Treated	Untreated	t-test: p-value
Sector						
Private, for profit	0.65	0.66	0.371	0.65	0.67	0.291
Private, not for profit	0.08	0.08	0.671	0.08	0.08	0.505
Government business/enterprise	0.05	0.05	0.556	0.05	0.05	0.472
Government	0.21	0.20	0.241	0.21	0.19	0.224
Firm size						
0-20	0.23	0.23	0.732	0.22	0.22	0.893
21-100	0.15	0.16	0.672	0.16	0.17	0.815
>100	0.61	0.61	0.970	0.61	0.61	0.772
Had problems with employer during pregnancy	0.12	0.12	0.870	0.14	0.14	0.796
Received support from employer during pregnancy	0.58	0.58	0.981	0.58	0.59	0.874
Contract type						
Permanent ongoing	0.76	0.76	0.911	0.78	0.77	0.724
Fixed-term	0.06	0.06	0.765	0.07	0.07	0.967
Casual, other	0.10	0.11	0.354	0.08	0.09	0.473
Weekly work hours	34.61	34.82	0.543	36.14	36.36	0.574
Annual pay, in 2012 A$	46799.00	46549.00	0.825	49691.00	49798.00	0.940
Occupational Prestige (AUSEI06)	57.47	57.57	0.887	58.23	57.81	0.591

	Sample of Mothers who returned to work by age 1 of the child				Sample of Mothers who returned to work by age 1 of the child, and changed job conditions			
	Treated	Untreated	t-test: p-value		Treated	Untreated	t-test: p-value	
Industry								
Agriculture, Forestry and Fishing	0.01	0.01	0.906		0.01	0.01	0.796	
Mining	0.01	0.01	0.817		0.01	0.01	0.737	
Manufacturing	0.03	0.03	0.399		0.03	0.04	0.545	
Electricity, Gas, Water and Waste Service	0.01	0.01	0.259		0.01	0.01	0.459	
Construction	0.03	0.03	0.794		0.03	0.03	0.581	
Wholesale Trade	0.02	0.02	0.900		0.02	0.02	0.996	
Retail Trade	0.11	0.11	0.784		0.11	0.11	0.621	
Accommodation and Food Service	0.05	0.05	0.596		0.05	0.05	0.785	
Transport, Postal and Warehousing	0.02	0.02	0.999		0.02	0.02	0.892	
Information Media and Telecommunication	0.03	0.03	0.463		0.03	0.03	0.584	
Financial and Insurance Services	0.09	0.09	0.854		0.09	0.09	0.823	
Rental, Hiring and Real Estate Services	0.01	0.02	0.476		0.01	0.02	0.613	
Professional, Scientific and Technical	0.09	0.08	0.182		0.09	0.08	0.138	
Administrative and Support Services	0.06	0.05	0.031	*	0.06	0.05	0.141	
Public Administration and Safety	0.05	0.05	0.891		0.05	0.05	0.575	
Education and Training	0.11	0.11	0.724		0.11	0.11	0.891	
Health Care and Social Assistance	0.22	0.23	0.349		0.22	0.23	0.483	
Arts and Recreation Services	0.02	0.02	0.960		0.02	0.02	0.925	
Other services	0.03	0.03	0.612		0.03	0.03	0.713	
Other	0.01	0.00	0.253		0.00	0.00	0.275	
Observations	2,517	1,657			1,762	1,168		

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Notes: ***, **, * and ° denote that the mean for post-PPL mothers and the mean for pre-PPL mothers are significantly different at the 0.1%-level 1%-level, 5%-level and 10%-level. Standard errors are robust. From the total sample of 6,788 mothers, a return to work by the baby's first birthday had been recorded for 4,316 mothers; a change of jobs or job conditions was recorded for 2,930 mothers. The 5% of post-PPL mothers with the highest propensity score were trimmed.

A.4 Additional results without matching

Here we present the additional results and sensitivity analysis referred to but omitted from the main text. Table A4 and Figure A4 give the Cox estimates and KM survivor function respectively, without matching.

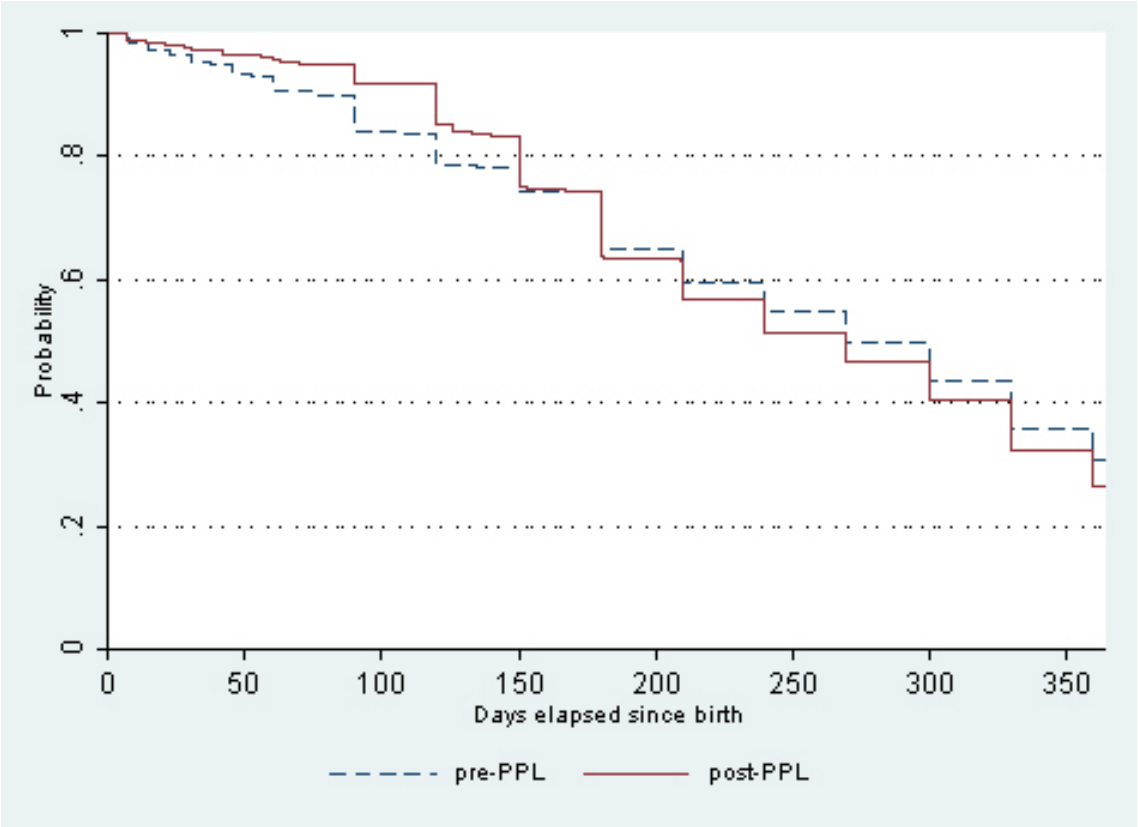
Table A.4: Hazard rate of return to work – Proportional Cox Model (without matching)

	Effect of PPL is constant				
	Coeff.	Std. Err.	z-value	p-value	
Baseline effect of PPL	0.068	0.030	2.250	0.025	*
Log-Likelihood	-38584.245				
	Effect of PPL changes over time (linear)				
	Coeff.	Std. Err.	z-value	p-value	
Baseline effect of PPL	-0.266	0.069	-3.850	0.000	***
interacted with days since birth	0.002	0.000	5.330	0.000	
Log-Likelihood	-38570.06				
	Effect of PPL changes over time (quadratic)				
	Coeff.	Std. Err.	z-value	p-value	
Baseline effect of PPL	-0.917	0.116	-7.890	0.000	***
interacted with days since birth	0.010	0.001	8.040	0.000	
interacted with days since birth (squared)	0.000	0.000	-6.950	0.000	***
Log-Likelihood	-38545.58				
# observations	6788				

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Notes: ***, **, * and ° denote whether the coefficients are significant at the 0.1%-level 1%-level, 5%-level and 10%-level. Standard errors are robust.

Figure A4 Survivor function of being out of work by access to PPL - Kaplan Meier estimate (without matching)



Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

A.5 Additional results on sub-groups

Table A5 gives the Cox estimates for the return to work hazard by subgroup. Figure A.5 shows the KM survivor function for the interaction of two sub-groups: mothers who do or do not have access to employer-paid parental leave, and mother who had a high or low income in the last pre-birth job.

Table A.5: Hazard rate of return to work – Proportional Cox Model by sub-groups

	Coeff.	Std. Err.	p-value		Coeff.	Std. Err.	p-value	
	With Tertiary Education (N=3345)				*No Tertiary Education (N=3432)*			
Baseline effect of PPL	-0.175	0.108	0.106		-0.503	0.102	0.000	***
interacted with days since birth	0.001	0.000	0.042	*	0.003	0.000	0.000	***
Log-Likelihood	-18238.994				-16097.968			
	High Income (N=1988)				*Low Income (N=2098)*			
Baseline effect of PPL	-0.025	0.148	0.866		-0.421	0.127	0.001	***
interacted with days since birth	0.000	0.001	0.524		0.003	0.001	0.000	***
Log-Likelihood	-10135.375				-9039.1395			
	Has employer-paid leave (N=2884)				*Has no employer-paid leave (N=3896)*			
Baseline effect of PPL	-0.250	0.144	0.083	°	-0.244	0.088	0.006	**
interacted with days since birth	0.001	0.001	0.062	°	0.002	0.000	0.000	***
Log-Likelihood	-14981.688				-19442.9			
	Casual employee before birth (N=759)				*Not casual employee before birth (N=6021)*			
Baseline effect of PPL	-0.365	0.209	0.081	°	-0.328	0.079	0.000	***
interacted with days since birth	0.002	0.001	0.046	*	0.002	0.000	0.000	***
Log-Likelihood	-2591.2279				-33398.696			
	Self-employed before birth (N=447)				*Not self-employed before birth (N=6333)*			
Baseline effect of PPL	-0.603	0.191	0.002	**	-0.358	0.081	0.000	***
interacted with days since birth	0.004	0.001	0.003	**	0.002	0.000	0.000	***
Log-Likelihood	-1894.7749				-34540.708			
	Partnered (N=6412)				*Single (N=368)*			
Baseline effect of PPL	-0.347	0.076	0.000	***	-0.174	0.304	0.567	
interacted with days since birth	0.002	0.000	0.000	***	0.002	0.001	0.136	
Log-Likelihood	-35721.267				-999.33787			

Source: Baseline Mothers Survey (BaMS) and Family and Work Cohort Study (FaWCS) wave 1 and wave 2, own calculations.

Notes: ***, **, * and ° denote whether the coefficients are significant at the 0.1%-level 1%-level, 5%-level and 10%-level. Standard errors are robust. The full sample of 6,788 observations is first split into the groups described above, while observations with missing information on the group indicator are dropped. Afterwards, the matching procedure is performed within each group, and the 5% of mothers in the post-PPL group with the highest propensity score are trimmed. The number of observations reported is the resulting sample size per group that is used for the estimation.

Figure A5 Survivor function of being out of work by access to PPL - Kaplan Meier estimate, interaction of access to employer-paid leave and pre-birth income