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Measuring the child penalty early in a career

The role of education for different cohorts

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Measuring the child penalty early in a career

The role of education for different cohorts

There is a large literature on the existence of a child penalty on labour incomes for mothers after the birth of a child, whereas there is little discernible effect on fathers'incomes. Some studies even find that fathers benefit from a premium. Using an event study approach, we measure the penalty due to the birth of a first child for cohorts of young adults after leaving the educational system in France. We measure the child penalty in terms of monthly earnings, the employment rate, working hours, hourly earnings, and other labour market outcomes. We assess the role plaid the level of education for different cohorts leaving full-time education in 1998, 2004 and 2010. We find evidence of a significant child penalty for mothers: 22% in monthly earnings overall, rising to 37% for those with secondary education level. For the 2010 cohort, we observe the same level of absolute child penalties for mothers, whereas relatively to fathers, the penalty has narrowed. This is mainly due to a decrease in monthly earnings, and more precisely in employment rate of fathers before and after the birth of the child in the aftermath of the 2008 crisis. (code JEL: J08; J16; J13)

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Table of contents

1 Introduction

Most high-income countries have experienced major increases in female participation in the labour market throughout the past century, but remaining gender inequalities persist in both wages and employment (Olivetti and Petrongolo, 2016). One of the main sources of the gender gap in labour market outcomes is related to childbearing and the sexual division of labour within couples. A large literature has identified this phenomenon which has come to be known as the child penalty, family pay gap or motherhood penalty. This observation is of interest for the design family and social policies to achieve gender equality.

Some studies compared wages of women with children, mostly the hourly wage, with those of childless women to identify a motherhood pay gap or a family pay gap. A significant motherhood penalty has been found in many countries (Budig and England, 2001 ; Juhn and McCue, 2017 ; Staff and Mortimer, 2012 ; Waldfogel, 1997, 1998). There is no evidence that men suffer from such a penalty; their wages are either unaffected or even increase following the birth of a child (Lundberg and Rose, 2000). More recently, an event study approach has been used in order to identify the causal impact of children on the situation of both parents in the labour market (Kleven, Landais and Søgaard, 2019). A counter-factual scenario is obtained using statistical regularities in the outcome variable which are identifiable prior to the birth. The key assumption underlying the event approach is that the time path of the outcome of interest would, in the absence of the event (here the birth of the child) have been similar on average to what it had been before the event. Using this design, Kleven *et al.* (2019) present evidence of child penalties in earnings for mothers in six countries which range from 21% in Denmark to 61% in Germany – whereas earning of fathers are not affected. They argue that these differences in child penalties are due to countries' attitudes towards working mothers and gender norms. Other labour market outcomes such as participation and hours of work are also impacted in years following the birth of the first child in Denmark (Kleven, Landais and Søgaard, 2019). Sieppi and Pehkonen (2019) find that women encounter large, short and long-term child penalties in gross labour earnings in Finland due to lower labour force participation. For Spain, in the year after the first child is born, mothers' annual earnings drop by 11% while men's earnings remain unaffected (De Quinto, Hospido and Sanz, 2021). In Russia, the child penalty in earnings is mainly due to lower employment rate of mother after the birth, and no child penalty is observed in terms of working hours or hourly wage rates of mothers (Lebedinski, Perugini and Vladisavljević, 2020). In France, Meurs and Pora (2020) using administrative data 2005-2015 find that whereas the birth of a first child does not affect fathers' total earnings, it induces a penalty for mothers in terms of wages of around 30% over the five years following a birth. They also show that the penalty is much greater for those on low wages than at the top of the distribution. Other recent papers show that long-run child penalties are identical for adoptive and biological mothers, suggesting that gender norms are key to explaining this gap between mothers and fathers (Kleven, Landais and Søgaard, 2021 ; Rosenbaum, 2021). Child

penalties can affect not only mothers but also grandmothers who experience a decrease in their wage after having a first grandchild (Gørtz, Sander and Sevilla, n.d.). Finally, very few studies measure the child penalty during the early part of the career, although Staff and Mortimer (2012) who show on US data that the residual pay gap between mothers and other women is explained by differences in education and experience.

We examine the early career child penalty using the three cohorts of the French generation surveys, « Enquêtes génération » produced by the *Centre des Etudes et de la Recherche sur l'Education et les Qualifications* (CEREQ). We quantify the child penalty in terms of monthly earnings, employment rate, working hours, hourly earnings, and other outcomes using an event study approach. The Generation surveys provide detailed information on individuals for the seven years after leaving full-time education for the cohorts leaving in the years 1998, 2004 and 2010. We are therefore able to analyse the nature of the child penalty before and after the great recession of 2008. While our data concern only the early part of a career, we find evidence of a significant child penalty for mothers: 23% in monthly earnings overall, rising to 35% for those with secondary education only.

The paper contributes to the literature with four ways. First our estimates show that a large child penalty for young mothers exists across different cohorts for France, despite generous work-life balance policies. We find that fathers do not experience any significant variations of their labour outcomes after the birth of their first child. Second, we assess the role of education and show that the effect of childbirth on earnings and employment rate is significantly smaller for mothers with a higher education level. This heterogeneity is absent from almost all other studies on child penalty (an exception is De Quinto, Hospido and Sanz (2021)). Thirdly, we estimate how child penalty changes across cohorts which are subject to different institutional arrangements and labour market conditions, notably after the crisis of 2008. The paper is organised as follows: in section 2, we describe the data set and present the French context; in section 3, we estimate the overall child penalty both in absolute and relative terms; in section 4, we assess the role of educational level on the child penalty for different labour market outcomes and we add the cohort dimension to the analysis. We show that the size of the child penalty is highly sensitive to both the level of education of mothers and the cohort the parents belong to. We present some concluding remarks in the final section.

2 Data and the French context

2.1 The French Generation surveys

The data are taken from the Generation surveys run by the CEREQ for the 1998, 2004 and 2010 cohorts. In our analysis, a cohort is defined by the year in which individuals leave full-time education (e.g. 1998, 2004 or 2010) and not by the year of their birth. From this, it follows that individuals in a same cohort have different ages depending on the length of their studies. Respondents are interviewed on three occasions after having left the educational system: at three, five and seven years. At each interview, they are asked to provide information about their current activities and changes in personal characteristics. In addition, they are asked to fill-in a month-by-month calendar of events in their life, both personal and professional. This will include various forms of labour and geographic mobility, changes in marital status and having children. This calendar enables the date of birth of the first child to be identified. Based on this information, the periods before and after the birth of the first child (which the event in our study) are divided into twelve-month intervals using the date of birth as the reference. Averages of the outcome variables are calculated for each of these intervals. This provides a better picture than values for calendar years, as is often the case in child penalty studies (Kleven et al., 2019). We compare the dynamics of various labour market outcomes (labour income, participation, hours of work and hourly wages) before and after the event in order to evaluate the impact of the birth on mothers' and fathers' situations. The data form a balanced panel and population weights (provided by the CEREQ) are used in all statistical analyses.

The original survey data are organised as a sequence of *episodes*, which are defined as a spell spent in a given labour market state (unemployed, inactive, employed). For each spell in a given status, the respondent is asked to provide full details of nature of the job (sector, contract type, position etc.) and the wage and hours of work at the beginning of the spell. This latter information is also provided either when the spell of employment ends or for ongoing spells, at the time of interview. Individuals are asked how much they earn per month net of social security contributions. The earnings variable is deflated by a regional price index firstly because the respondents are in the sample for a period of seven years, and secondly because we are studying three separate cohorts covering nearly twenty years.

Weekly hours of work, *h,* are declared with the same frequency as monthly earnings, *M*, and in the questionnaire are given in ranges. The midpoint of the interval is used in the event study and are used to calculate an hourly wage, *w*, as follow:

$$w = \frac{M \times 12}{h \times 52}$$

2.2 The institutional and socio-economic context

In France, there are several features of the labour market affecting decision on fertility and labour supply. Most young people are hired on fixed term contracts and have a sequence of such positions before obtaining a secure job (Bazen and Maman Waziri, 2019). For an individual leaving in 2010 with only secondary education level (up to and including *baccalauréat*), the average time before obtaining a permanent employment contract is 4.3 years. For someone with higher education (such as university or similar), it is half of this (2.3 years). Less than half of those with secondary education only obtain a permanent employment contract after seven years in the labour market. Youth unemployment is high in France: in 2020, 7.5% of people aged between 15 and 24 years were unemployed compared to an average of 6.9% for the Euro zone (Eurostat). The average time to obtaining initial employment of any kind is over a year for less qualified school leavers in 2010.

The cohorts studied experienced very different labour market conditions. Women experience more difficulties than men when entering in the labour market , including those with higher education. They are more often in part-time employment and unemployment (figure 2.2). The situation of individuals with secondary education only has worsened for the most recent cohort (2010 compared to 1998): after seven years into their working lives less than half (45%) of young men with low education background have a permanent job in the 2010 cohort compared to two thirds for those entering the labour force in 1998 (figure 2.1). The situation of men from the 2010 cohort with secondary education is comparable to that of women with the same level of education. For those women, the proportion obtain a permanent contract after seven years was 46% in 1998 and 54% in 2010. The situation of men with higher education level is stable from one cohort to another: seven years after having left the educational system around 75% of them have a full-time permanent contract (Bazen, Joutard and Périvier, 2022).

Table 2.1 summarises the main demographic and labour characteristics of the three cohorts. Among the 1998 cohort, more than half of women in the survey had at least one child in the seven years after leaving full-time education, and the proportion is slightly higher for those with some higher education (3 percentage points). For the 2010 cohort, less than 50% had children in both education groups and the difference by education level also increased (to percentage 9 points). For men, parenthood early in a career is less common for those with secondary education only (21% for the 1998 and 15% for the 2010 cohort). Men with higher education were more likely to have at least one child during their first seven years in the labour force (35% and 29% for the respective cohorts).

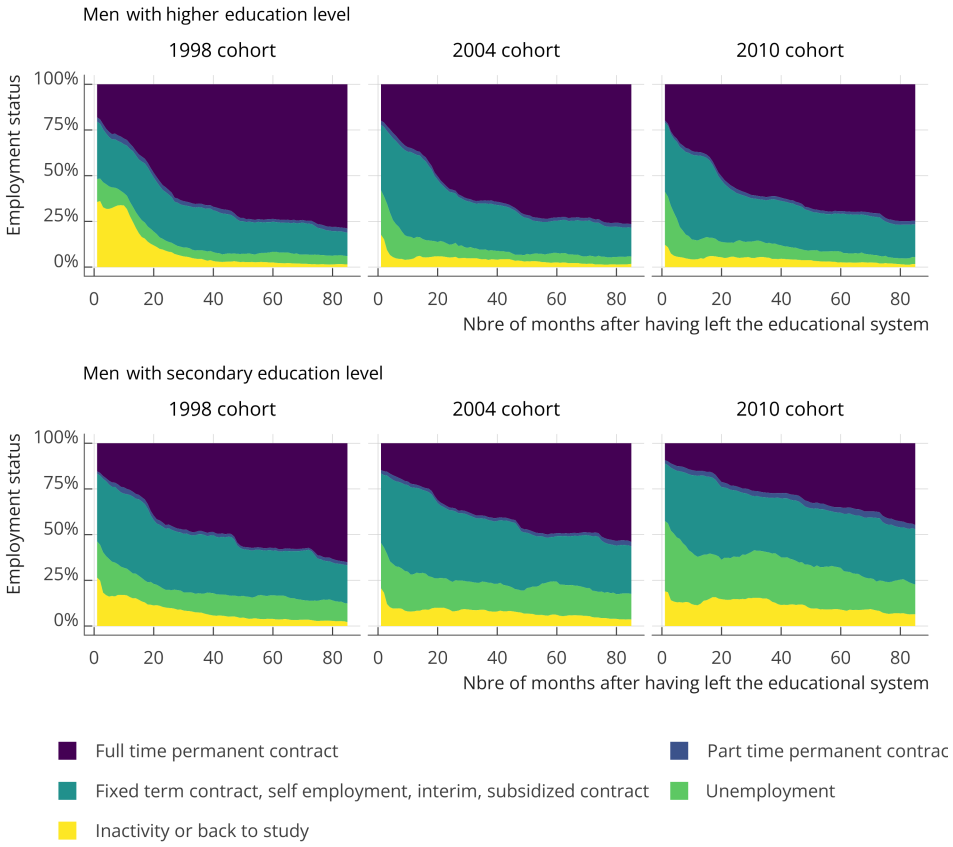
Work-life balance policies are also key when analysing fertility decisions and labour supply. The absence of legal protection, such as a paid maternity leave, would leave mothers exposed to a higher motherhood pay gap (Waldfogel, 1998). In France, paid maternity leave lasts sixteen weeks of which eight are mandatory, with a minimum of six weeks to be taken after the birth, for a first or second child. Extensions of the maternity leave are possible for health reasons and nearly two thirds of mothers benefited from this possibility (Villaume and Legendre, 2014). Eligibility for paid maternity leave requires claimants to have contributed to the social security system prior to taking the leave and depends on employment status. Paid paternity leave of 11 days is available, with the same conditions

Table 2.1: Descriptive statistics on the three cohorts

	Women		Men	
	Higher	Secondary	Higher	Secondary
At least one child (in %):				
1998 cohort	53.5	50.5	35.0	21.0
2004 cohort	54.5	50.0	36.0	21.0
2010 cohort	47.5	38.5	29.0	15.5
Having a first child while studying (in %):				
1998 cohort	3.6	2.1	3.3	0.7
2004 cohort	3.2	2.6	2.0	1.6
2010 cohort	5.1	2.2	2.2	1.2
Median period to first child (months):				
1998 cohort	50	47	54.5	59.5
2004 cohort	52	50.5	55.5	58.5
2010 cohort	51	47.5	53.5	56.5
Parental leave for the first child (in %):				
1998 cohort	15.0	20.0	7.5	14.5
2004 cohort	22.5	30.5	14.0	17.0
2010 cohort	22.5	34.0	4.0	11.5
Resignation due to the first child (in %):				
1998 cohort	7.0	10.0	2.5	3.0
2004 cohort	6.0	9.5	3.0	4.0
2010 cohort	6.0	9.0	2.5	6.0
Professional mobility due to the first child (in %):				
1998 cohort	11.0	8.0	4.0	3.0
2004 cohort	9.5	6.5	3.5	2.5
2010 cohort	9.5	8.0	4.0	5.5
Number of observations:				
1998 cohort	4937	2905	3790	4305
2004 cohort	3633	2512	2454	3116
2010 cohort	2620	1632	2540	1998

Source: Enquêtes Génération, 1998, 2004, 2010, Cereq.

Fig. 2.1: Evolution of male employment status after leaving the educational sytem



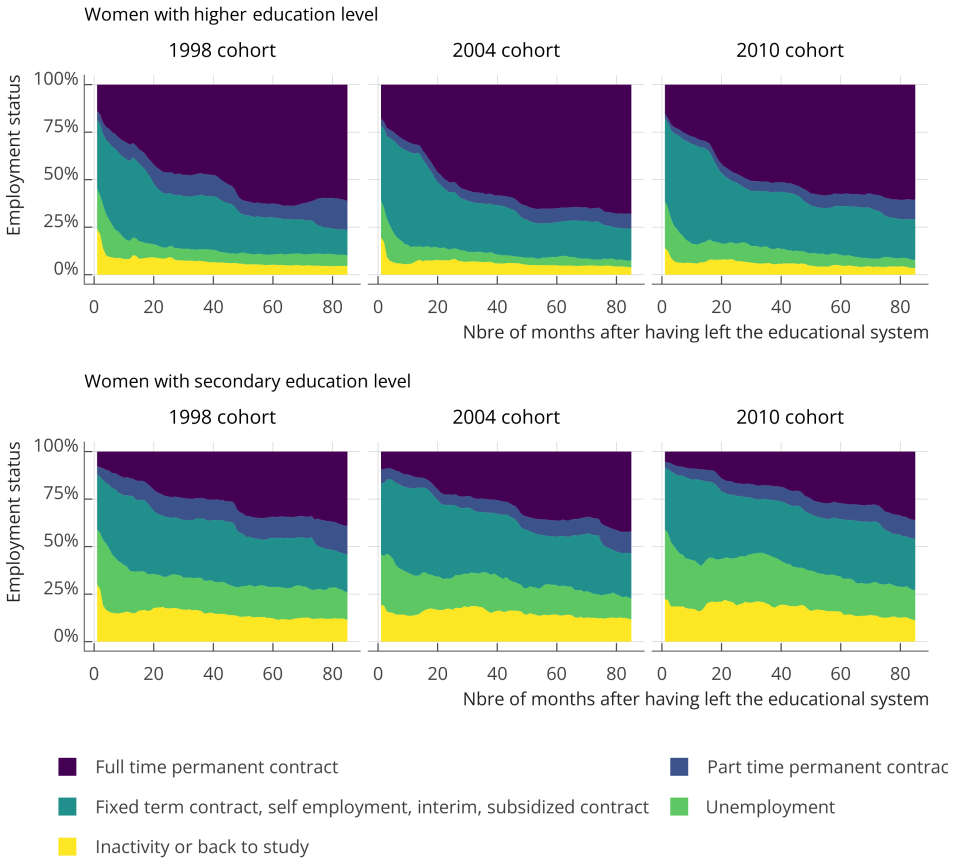
Source: Enquêtes génération, Cereq

of entitlement as maternity leave[1].

Besides these two leave entitlements, parents can also take unpaid leave, depending on previous job tenure and benefit from a job guarantee for one year, which can be extended for a further two years. For the first child, parents can receive a parental leave allowance, that amounts to around one third of the minimum wage, with a maximum duration of 6 months for both parents for a child born before 2015 and 6 months per parents for a child born after 2015. The duration of the leave is higher for two or more children. The compensation is a lump-sum payment that amounts to around one third of the minimum wage. More than 97% of the beneficiaries of this scheme are mothers, despite the incentives for fathers to take advantage of the leave entitlement introduced in 2015 (Périvier and Verdugo, 2024). Only around 30% of mothers take paid parental leave for a first child, which is much lower than in Scandinavian countries. Half of children under three are cared for in official childcare facilities. The cost is partly subsidized through tax credits and allowances. Almost all children from the age of three

[1]The duration of leave has been increased by 28 days for children born after the July 1st, 2021, this new legislation does not concern the cohort studied in this paper.

Fig. 2.2: Evolution of female employment status after leaving the educational sytem



Source: Enquêtes génération, Cereq

are enrolled in pre-elementary schools and municipalities provide childcare services before and after school hours. Therefore, it is during the child's first three years that the most significant impact on mothers' careers is likely to occur.

3 Estimating the child penalty early in career

3.1 The event study design

Following Kleven, Landais and Søgaard (2019), we use an event study approach around the birth of the first child. We denote by e the event time which is indexed relative to the year of the first born child $e = 0$. The survey provides a longitudinal follow-up of the first seven years spent in the labour market for different cohorts of a representative sample of young people who left the education system at the same time but with different levels of qualification. Therefore, we can track and represent their employment status over the time elapsed since leaving the education system, denoted t.

We estimate separately for men and women, who become parents during the seven-year observation window available in the survey, models of the following form:

$$y_{itce} = \sum_{(j=-4)}^{3} \alpha_j I[j = e] + \sum_{cohort} m_{cohort} I[cohort = c] + h(t) + \beta X_{it} + \varepsilon_{itce}$$

The outcome is denoted by y_{itce} for father or for mother i having left education system t years ago, from cohort c and with event time e. We observe data for a maximum of four years before and three years after the birth of the child (j). We add dummies to take account of the cohorts (1998, 2004 or 2010). This specification is preferred to the usual one where year dummies are included in order to have comparable models across cohorts. Since women typically have their first child earlier than men, it is important to control for age, education, and experience in order to accurately determine what can be attributed to the child penalty versus what is due to the gender gap in experience[1]. To control for the potential experience in the labour market, we add $h(t)$, a second-order polynomial function of t the number of months since leaving full-time education system. The data set allows additional controls to be included, denoted X_{it}, such as diploma level, marital status, age and the local unemployment rate. The local unemployment rate is obtained from the published quarterly unemployment rate for the department where the individuals is currently domiciled. The child penalty refers to the relative change in outcomes due to having a child, compared to the pre-birth trajectory. This is expressed as the event time coefficient, α_e, relative to the counter-factual outcome, y_{itc}^{CF}, which is the predicted labour market outcome at event time j in absence of a child. The counter-factual is thus calculated based on individuals who are not yet parents. The identification of short run effects of parenthood relies only on a smoothness assumption of the paths of outcomes in the no-child case. Furthermore, it is crucial that the event (childbirth) is not determined by any of the outcomes (conditionally on a set of observable determinants). The graphs presented in the following section confirm

[1] We also add a dummy variable to control for the cases where there are twins.

this hypothesis: they systematically show that prior to the birth of a child (more precisely before the pregnancy) a flat trend of the outcome is systematically observed and there is no significant difference from zero. The parallel pre-trends in outcomes for men and women after controlling for experience and the business cycle are observed. We also undertake an identification check proposed by Kleven, Landais and Søgaard (2019) based on placebo test in a difference-in-differences event study design. We assign a placebo birth event those individuals who had no children in seven years after leaving the education system based on the observed distribution of time before having the first child among those who do have children during the observation period (see the appendix).

For each gender, the child penalty is calculated from the estimated coefficients in two ways:

The first is the gross penalty for parents in each year after the birth, that is calculated using the estimates α_e , $e > 0$, of as a proportion of the estimated counter-factual outcome (y_{itc}^{CF}):

$$P_e^{gross} = \frac{\hat{\alpha}_e}{E[\hat{y}_{itc}^{CF}|e]} \qquad \text{with e>0}$$

$$\hat{y}_{itc}^{CF} = \hat{m}_c + \hat{h}(t) + X_{it}\hat{\beta}$$

The average value of P_e^{gross} is then determined over the three years after the birth to obtain the overall gross penalty.

The second is the child penalty for females relative to males as a proportion of the same counter-factual outcome and aggregated in the same way:

$$P_e^{relative} = \frac{\hat{\alpha}_e^{male} - \hat{\alpha}_e^{female}}{E[\hat{y}_{ijtc}^{CF,female}|e]} \qquad \text{with e>0}$$

3.2 The gross and relative child penalty for mothers

In view of the availability in childcare and parental leave provisions, the child penalty is likely to be incurred mainly in the three years following the birth. This penalty is mainly, though not solely, the consequence of the withdrawal of mothers from employment following the birth. In the twelve months after the birth, the employment rate of mothers is significantly reduced, and this decrease narrows in the subsequent years. Following other event studies of the child penalty, we first examine the effects of having a first child on labour income (defined here as monthly earnings from work). We then assess the employment outcome which is measured as the proportion of months in which the individual is in work within a given interval. Around the birth, statutory maternity leave will obviously be a factor. To remove this mechanical effect on participation and labour income, these latter averages are calculated for the first six months of the twelve-month spell prior to the birth and the second six months of the interval following the birth. The effects of the birth of a child on hourly earnings, hours of work and employment status are estimated only for persons who were employed in a given twelve-month interval.

Table 3.1: Gross child penalties for mothers and child penalties relative to fathers

	Gross	Relative
Monthly earnings	18%	22%
Employment rate	18.5%	19%
Weekly working hours	3.2%	2.6%
Hourly earnings	1.6%	4%

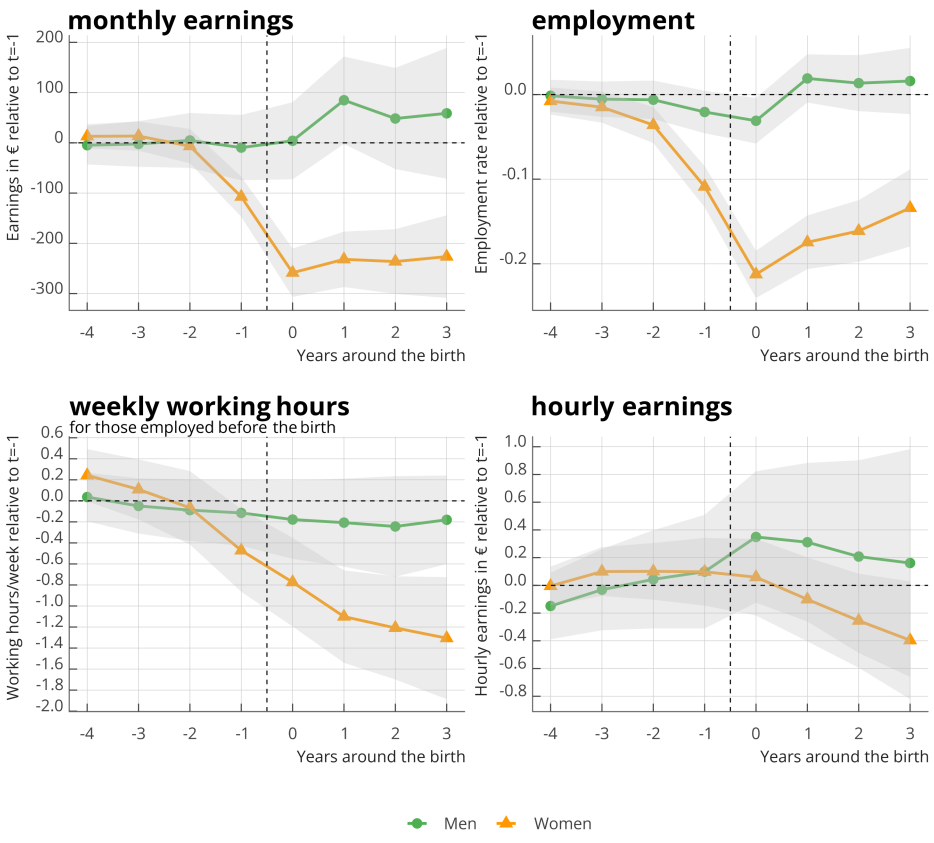
Note: for the overall period after the birth observed.
Source: Enquêtes génération, Cereq.

The parallel pre-trends in outcomes provides robust basis for using men as a control group for women (figure 3.1). In the years prior to the birth of the first child there is no significant difference between the trends of the variable for future mothers and fathers. More specifically, a common and uniform trend for both groups is observed up to pregnancy, i.e., the first year before birth: the effect seems to begin as early as pregnancy itself. The effects on monthly earnings are estimated for all men and women (who become parents), and so include some individuals with zero earnings. In gross terms the effect is negative for mothers and not significantly different from zero for fathers over the four years after the birth. Mothers experience a decrease in their monthly earnings due to the birth of the child whereas fathers' earnings are not affected. The placebo estimates confirm the robustness of our results (see figure 6.1 in the appendix).

The gross child penalty in monthly earnings averages about 18% over the observed years following the birth of a child. This is primarily due to the decrease in mothers' employment rate, with a penalty due to the birth by 18.5%. This results in an overall earnings loss of approximately 11,450 euros. The relative child penalties in monthly earnings is 22%, which implies a substantial increase in the gender gap in earnings due to the birth of the first child. These results are lower than those found for France by Meurs and Pora (2020), with a relative child penalty of 30% in earnings. This suggests that the relative penalty is stronger when the birth is in the middle of the career instead of the early career. The relative child penalty in term of employment rate is 19 percentage points. In terms of hourly earnings for those in work the relative child penalty is around 4% but is not significant at conventional levels. There is a small statistically significant reduction in hours of mothers who are in work (2.6% relative to fathers).

Fig. 3.1: Effect of the first child on ...

All cohorts, all levels of education



Source: Enquêtes génération, Cereq

4 Child penalty by education level and by cohort

4.1 The role of education

Considering the differences in human capital investments and their consequences on the cost opportunity of career interruptions, it is likely that the child penalty differs by education level. Taking a year or more out of the labour market to raise a child will be more costly for women with a high level of education at the beginning of their career and may involve a more rapid return to work after the birth than women in a less career-oriented occupation. This reflects not only career choices for the most educated, but also the cost of childcare, even though it is highly subsidised in France.

Mothers with higher education experience a gross child penalty in monthly earnings estimated at only 6% although relative to fathers it amounts to 16% (table 3). These penalties are significantly smaller compared to less qualified mothers, who face a 37.5% reduction in monthly earnings relative to fathers, primarily due to a decrease of their employment rate. Indeed, the relative penalty in employment for low educated mothers is closed to 33% (table 3). These figures are the average for the observed years following the birth of the child. Taken year by year, the gross penalty in monthly earnings for highly educated mothers falls from 9% in the first year (41% for less qualified) to 5% (44% respectively) four years after. For both categories, the gross penalty in terms of employment rate narrows progressively. The persistence of the earnings penalty for low-educated mothers can be primarily attributed to reductions in both their working hours and hourly earnings (figure 4.1). The overall loss over the observed years following the birth of the child is almost 10 times higher for low-educated mothers compared to high-educated mothers, with losses of 23,480 euros against 2,480 euros, respectively. For the least qualified women, it appears that the impact can be traced back to

Table 4.1: Gross childpenalties for mothers and relative childpenalties compared to fathers, by level of education

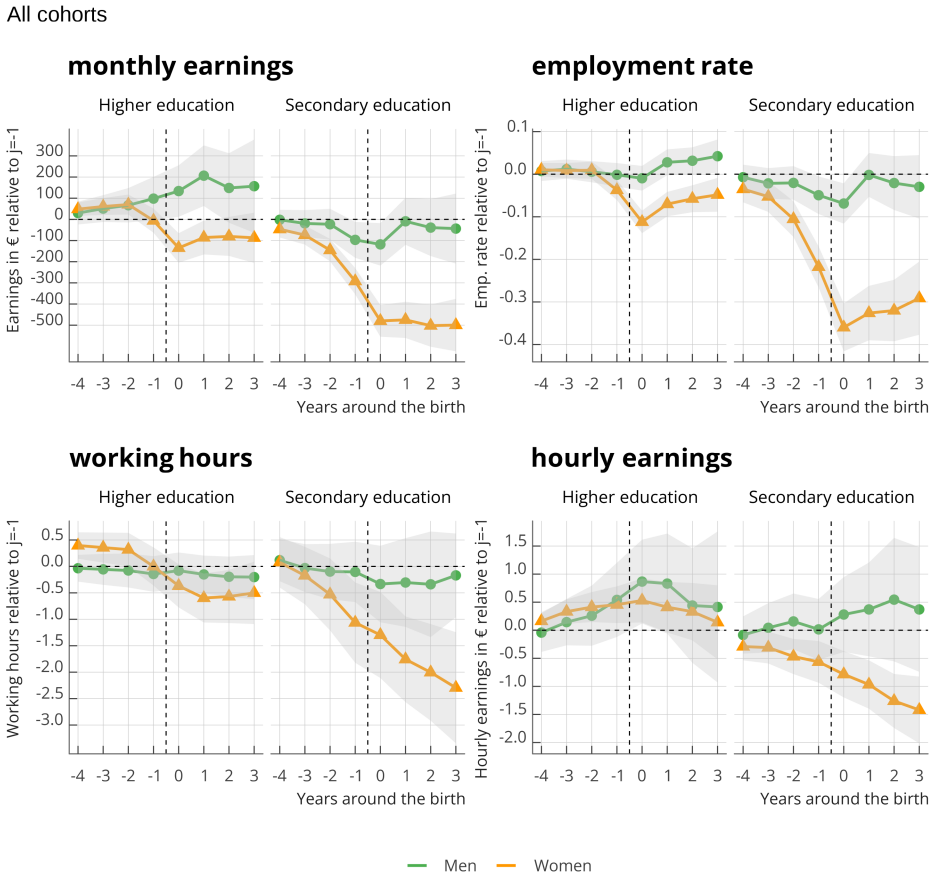
	Higher education		Secondary education	
	Gross	Relative	Gross	Relative
Monthly earnings	6%	16%	42%	37.5%
Employment rate	8%	10%	36%	33%
Weekly working hours	1.5%	1%	5.5%	4.5%
Hourly earnings	-3.5%	1.5%	11.5%	15.5%

Note: for the overall period after the birth observed.
Source: Enquêtes génération, Cereq.

the year prior to pregnancy, i.e., to the second point before birth, as if the anticipation of childbirth were greater for this group (and therefore the condition of identification - the absence of anticipation effects - must be weakened, by authorising anticipation for two periods prior to birth.). This is particularly evident in the graphs related to monthly earnings and employment.

In terms of hours of work and hourly earnings for those in work there are no significant child penalties for more educated mothers either in gross or relative terms. In contrast, although less qualified mothers experience a gross hourly earnings penalty of 8% in the first year rising to 14% after the years following the birth. Relative to fathers the figures are 11% and 18%, respectively. There is also a 5% relative penalty in hours worked.

Fig. 4.1: Effect of the first child, by level of education on...



Source: Enquêtes génération, Cereq

Besides the child penalties in terms of earnings, employment and working hours, the birth of the child may have further consequences in terms of career progression and mobility. For instance, Kleven, Landais and Søgaard (2019) measure the change in mobility between sectors, occupations, and firms for Denmark. Lucifora, Meurs and Vilar (n.d.) examine how motherhood affects prospects in the

internal market of a large multinational firm. For couples, having a first child might lead to lower occupational or sectoral mobility particularly if this involves geographic mobility. These issues may be particularly relevant given that the individuals being studied are in the first seven years of their working lives. Extended parental leave and the likelihood of having additional children may involve further child penalties in terms of a lower probability to be promoted or accessing to supervisor position. This could also explain the mechanisms underlying the differences in child penalties by education level. Our dataset contains various pieces of information about the professional life that we explore in relation with child penalty (figure 4.2). Participation in a training program increases for both high educated mothers and fathers (though it is not significant for fathers), whereas it is stable for low educated parents. Employers might invest more in the training of their educated workers, in particular in their female high educated employees to catch up after maternity leave. In contrast, training is not offered more frequently to the least educated women when they return to work after their maternity leave. Regarding the probability of being promoted, there is no significant difference for high educated mothers compared either to the pre-maternity period or to fathers[1]. However, less educated mothers are less likely to be promoted after the birth whereas low educated fathers are more likely to be promoted: this implies a significant relative penalty for being promoted for the least educated mothers in the first few years after birth. These effects are significant at the 10% level three years after the birth. Not all first-time mothers return to employment or return to work with the same employer. Those who change employer do not in general change sector of economic activity. Figure 4.2 suggests there is significantly less job-changing between sectors after maternity than either prior to childbirth or compared to fathers, especially among the more educated.

Figure 4.2 indicates that high educated mothers are more likely to move into supervisory positions from the second and subsequent years after childbirth than their male counterpart as we observe an increase in the share of women who declare moving into a supervisory position[2]. Nevertheless, this trend is not promotion per se, and it is not necessarily associated with an increase in wages or bonuses. In contrast, low educated mothers experience a child penalty in terms of moving to a supervisory role relative to their male counterpart, though not significant. This effect is statistically significant from the second year after the birth compared to the period prior to becoming a father.

4.2 Child penalty among different cohorts by education level

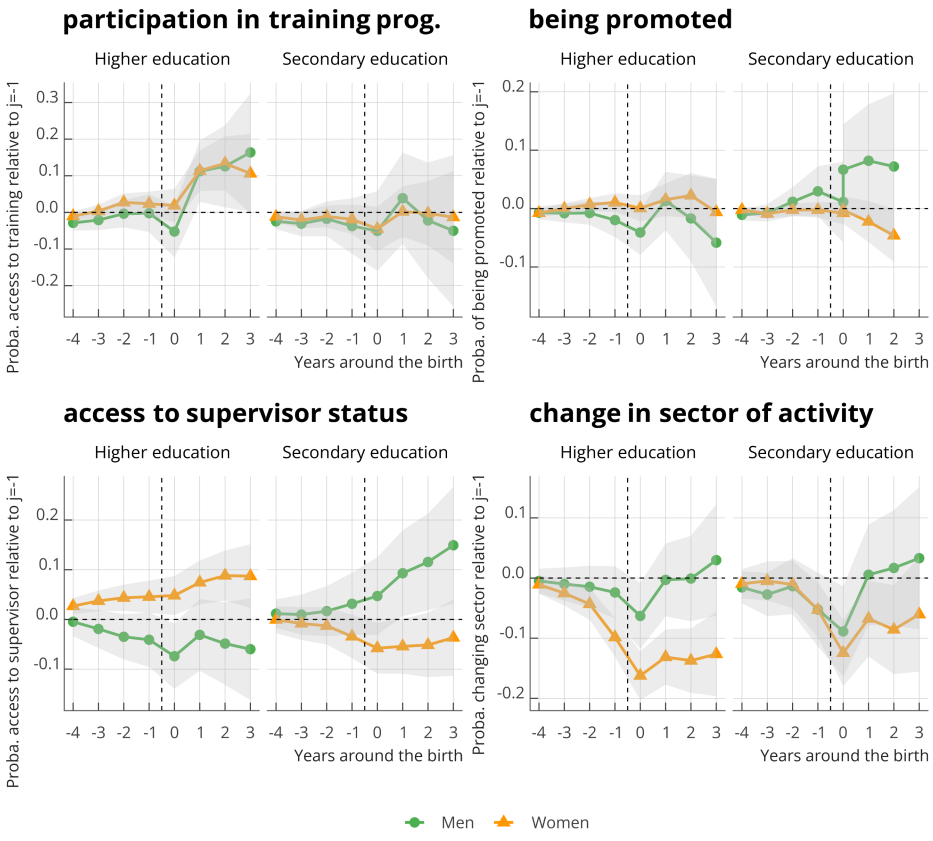
The level of education is key to the size of the child penalties in relative or absolute terms. Women with a low education background experience the largest child penalty both in absolute terms and relative to men. In addition to the level of education, we introduce the cohort dimension in the analysis. Labour supply decisions and employment opportunities after the birth of the first child depend on the economic context. This matters particularly for young people entering the labour market after studying, as they have no experience and are usually more affected by unemployment than other workers.

We first examine the cohort effect on the child penalty in different labour market outcomes, for people with a secondary level of education. Women who left the educational system in 1998 face a large

[1] Respondents are asked whether they have changed position in the occupational hierarchy and if so to which grade.
[2] Respondents are asked for how many persons they supervise.

Fig. 4.2: Effect of the first child, by level of education, on other outcomes such as ...

All cohorts

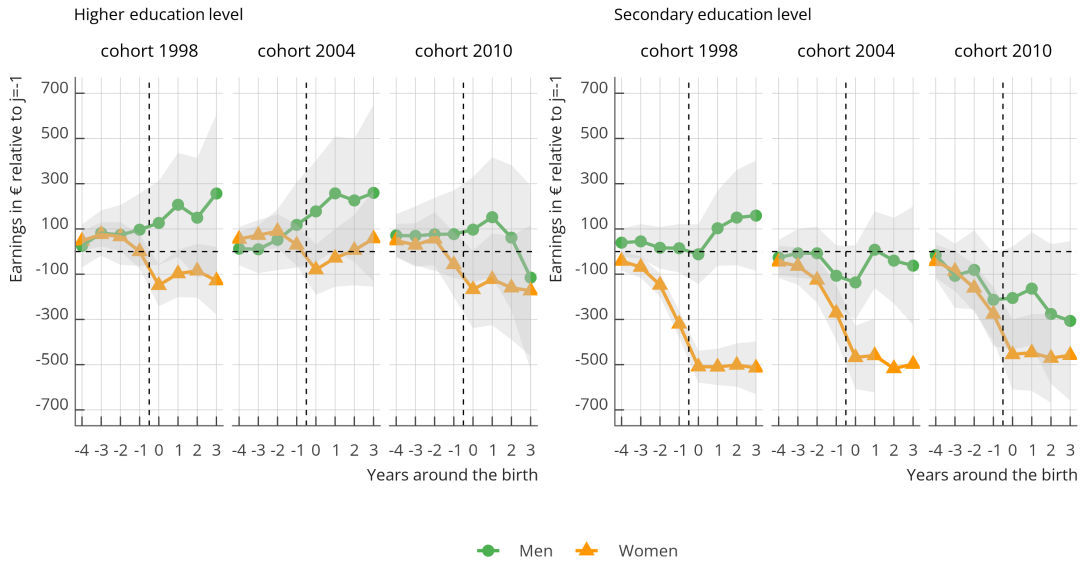


Source: Enquêtes génération, Cereq

monthly earnings child penalty whereas their male counterparts experience no significant change after the birth of their first child (figure 4.3). This penalty is mainly due to a decrease in the employment rate of less educated women after the birth, and to a lesser extent a reduction in their working hours (figure 4.4 and -figure 4.5). For men in the same cohort, there are no significant effects on these outcomes, except the number hours they work, which increase after the birth of the first child. This suggests that the role of male breadwinner is particularly relevant for less educated men. They increase their earnings by working more to maintain the living standard of their family, in order to compensate for the cost associated with having a child and the possible decrease in labour supply of their partner.

For the 2010 cohort, we observe the same level of absolute child penalties for less educated mothers, whereas the relative penalty has narrowed relatively to the previous cohorts. It is due to a decrease in the monthly earnings and employment rate of fathers before and after the birth of the child. This may be a consequence of the deterioration of the labour market prospects for the less qualified after

Fig. 4.3: Effect of the first child on monthly earnings, by level of education and cohorts

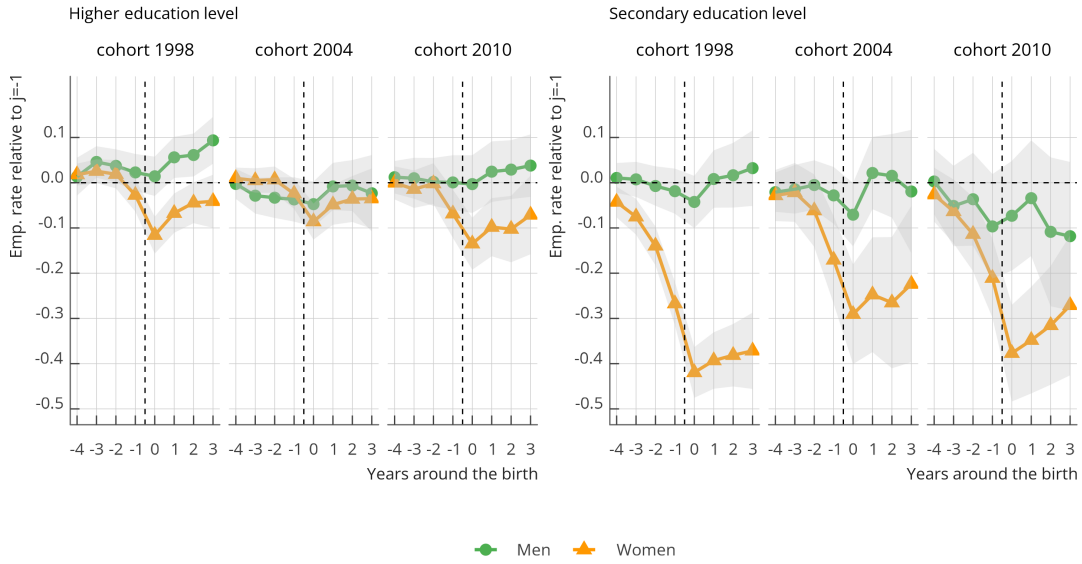


Source: Enquêtes génération, Cereq

2010 in the aftermath of the great recession that has disproportionately affected unskilled young males, in particular compared to more educated men (Périvier, 2018). The estimates for the 2004 cohorts show a slight decrease in the child penalties, due to a smaller decrease in employment rate of mothers compared to the 1998 cohort. In early 2000, the implementation of a law reducing the standard working week from 39 to 35 hours might explain part of the decrease of working hours for both fathers and mothers including prior to the birth of the child observed in figure 4.5. The detailed cohort-based analysis highlights the tendency for pregnancy to have an earlier impact on the least qualified young women. Consequently, the common and uniform pre-trend for both groups is generally validated only at the first two observations.

High educated women who left the educational system in 1998 experience a significant absolute child penalty in terms of their employment rate (figure 4.4). The relative child penalty is also significant, as the male employment rate increases significantly after the birth. The child penalty in employment rate does not lead to a significant child penalty in their monthly earnings relative to men (figure 4.3) , but their income decreases after the birth of the child for the 1998 cohort. This absolute child penalty is no longer significant for 2004 and 2010 cohorts. Whereas the employment rate of educated fathers increased after the birth for the 1998 cohort, it is stable for the more recent ones. This change in fathers' labour supply can be explained at least in part by a decline in the male breadwinner model during the period studied. Due to homogamy, educated men often have a high educated partner who is committed to her career. They also have more resources to externalize childcare and have more interest to do so.

Fig. 4.4: Effect of the first child on employment rate, by level of education and cohorts



Source: Enquêtes génération, Cereq

Fig. 4.5: Effect of the first child on working hours, by level of education and cohorts

Source: Enquêtes génération, Cereq

5 Concluding remarks

This paper examines the child penalty in the early career and highlights the effect of education taking into different cohorts. One of the key results is that for mothers at the beginning of their working lives, the overall figures (all education levels) of the child penalty in monthly earnings (22%) are lower than those found for most countries, including France for mothers of all ages and education levels. Only in Denmark would the child penalty appear to be lower (21%). The degree of comparability of the estimates needs to be qualified since our estimates refer to the effects at the beginning of an individual's working life and over a relatively short time interval following the birth. However, an important finding is that there is only a limited gross child penalty in monthly earnings for mothers with a higher education level, although relative to fathers it is larger at 16%. This is mainly the consequence of a shorter career interruption than is the case for less qualified mothers for whom there is a substantial earnings penalty in both gross and relative terms (more than 37%).

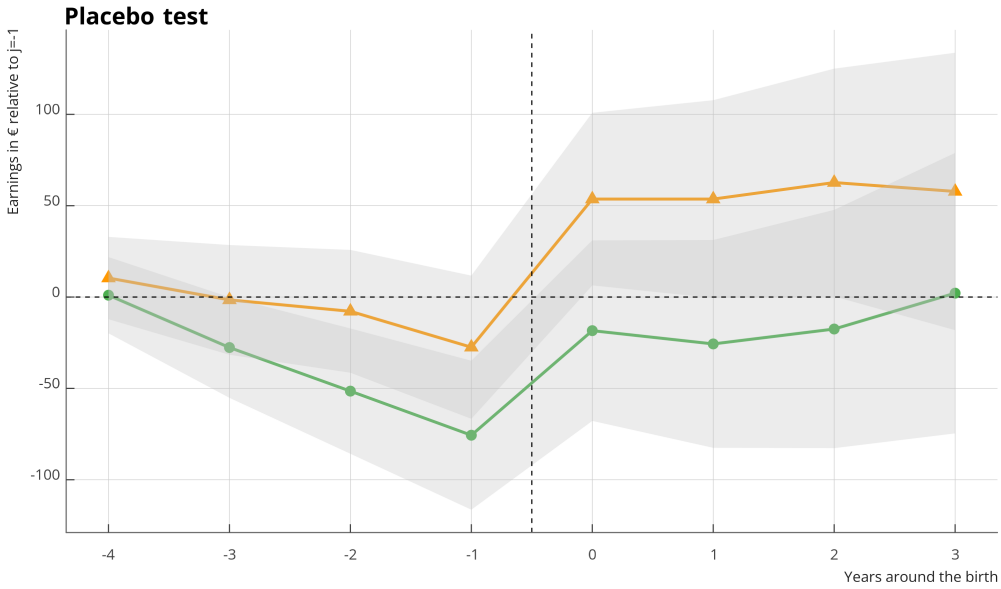
The results also show that mothers with a low education background experience a large absolute penalty regardless of their cohort. The relative child penalties are smaller for the 2010 cohorts due to the deterioration of the labour market for men with a low education level following the great recession. These penalties are not only found for monthly earnings and employment, but are also in hourly earnings, hours of work, occupational mobility, and promotion prospects. The category that is spared from any type of penalty is men with higher education, for whom the birth of a child either has no effect or leads to a marginal improvement of their professional position. These penalties exist in a country which has more wide-ranging provisions for working parents in terms of childcare for under 3 and near universal, free nursery education from the age of 3 onward. A child penalty of any kind may be the result of the choice of childcare made by the mother and shaped by gender norms.

From a policy standpoint, the issue is whether those who would like to return quickly to the workplace are discouraged from doing so by the lack of affordable childcare or the cost for parents with a disadvantaged background. Collective childcare provision such as creches is highly subsidized through public financial support and increasing the number of places could contribute to a narrowing the child penalty for mothers. Shorter parental leave with more generous compensation could also lead to a reduction in period spent out of the labour market for low educated mothers and a decrease in the child penalty they face. The existence of a relative, though not an absolute, child penalty for more educated mothers suggests that gender norms continue to shape behaviour, even though females are increasingly more highly qualified than males.

6 Appendix

To check the robustness of the results, we undertake the placebo test proposed by Kleven, Landais and Søgaard (2019). Using the mean and variance for parents in the sample, we artificially attribute a birth to those individuals who do not have children during the observation period. This is done by randomly drawing a birth date from a truncated normal distribution using the sample estimates of the parameters. We then estimate the effect of having a child on the principal outcome variables using only these individuals.

Fig. 6.1: Placebo test: effect of the first child on monthly earnings



The placebo estimates of the effect on monthly earnings are not significantly different from zero and suggest if anything an earnings gain for females (see figure 6.1). The estimates for employment and hourly earnings also statistically insignificant and if anything, also suggest a negative effect of children for males. Compared to the significant results obtained for actual parents, these results confirm that our findings are robust.

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