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The economic impact of taking short parental leave: Evaluation of a French reform

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HIGHLIGHTS

• Short parental leave: an incentive to stop working for mothers of a first child.
• Short parental leaves do not prejudice female labor market participation.
• Part-time option of parental leave mostly taken by highly educated women.
• For part-time paid leave takers, the reform decreases the post parental leave wages.

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ABSTRACT

There is a growing debate in Europe about whether parental leave should be short or long. The paper evaluates the impact of short parental leave on mothers' employment status and subsequent wages, with a special focus on the part-time parental leave option. It exploits a policy reform that took place in 2004 in France and increased the incentive to prolong the maternity leave after the first birth by six months paid parental leave. Data from the fourth round of the "Generation 98 survey" (CEREQ) and both difference-in-differences and propensity score matching approaches are used to estimate the effect of the reform. The results show that full-time short paid parental leave had almost no effect on labour market participation and wages of first mothers at the global level. However, for part-time paid leave takers, the reform increases the employment rate but decreases the subsequent wages. The wages remain lower two years after child birth, especially for the most educated, who mainly choose the part-time option.

1. Introduction

Parental leave was originally introduced in European countries to protect female employment by giving women the right to stop working temporarily and then return to a guaranteed job with the same employer, and by providing wage replacement to compensate wage loss. However, several studies have pointed out the negative impact of such leave on women's careers and earnings profiles, especially when leave periods are very long. Career interruptions for childbearing and child rearing are one of the key explanatory factors in women's lower earnings (Ruhm, 1998; Jaumotte, 2003; Meurs et al., 2011). Interruptions decrease work experience (Becker, 1964), depreciate human capital (Mincer and Polachek, 1974) and can even be interpreted by employers as a "signal" of women's lower commitment to their careers in countries with high variation across women in the duration of time out (Albrecht et al., 1999). In other words, parental leave does not remove the motherhood wage penalty, and may even increase it (Budig et al., 2011).

The labour market outcomes of taking parental leave are related to its length. A shorter interruption might mitigate the negative impact on women's careers. A recent OECD report (Doing Better for Families, 2011) recommends reforming parental leave by reducing the maximum length to one year and offering higher remuneration. This report makes the point that career interruptions that are too long penalize women's entire careers because they imply a lower probability of returning to work, flatter pay profiles, less advancement and lower pensions when women retire. There is no clear consensus on how long parental leave should last,

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but there is an emerging need to rekindle the debate on the length of parental leave. The experience of several recent parental leave reforms in Europe over recent decades has fuelled the ongoing debate.

France, alongside Germany, has the longest maximum duration of mandated parental leave among OECD countries. For a second or a third birth, parental leave can last 3 years. Several studies have evaluated the impact of these long periods of parental leave, a consequence of the reform introduced in 1994 which enabled parents to receive the "parental leave allowance" (*allocation parentale d'éducation*, APE), for three years after the birth of a second child (previously the APE was not paid out until after the birth of a third child). These studies showed that the 1994 reform encouraged a large number of mothers to interrupt their careers for up to three years after the birth of their second child (Lequien, 2012; Piketty, 2005) with a negative impact on their earnings (Lequien, 2012).

However, the most recent reform introduced a new benefit in 2004 – the *complément libre choix d'activité* (CLCA), or "supplementary work choice benefit" – which can be paid out from the birth of a first child for a maximum period of six months at a full or a reduced rate, i.e. women can work part-time and receive the benefit. Before 2004, mothers of one child were entitled to take parental leave for three years and could return to a guaranteed job with the same employer, but did not receive any compensation. The implementation of this reform, which was not initially expected by users (no anticipation bias), is likely to affect women labour force participation since the new allowance changed the opportunity cost of working after birth. By offering short paid leave from the first child, the reform might have provided an incentive for mothers to take parental leave. Has the reform encouraged mothers taking parental leave to remain in the labour force after the period of the CLCA benefit, or has it discouraged them from doing so?

The introduction of this short parental leave gives us a unique opportunity to test whether the introduction of a short-term paid leave has changed labour market behaviours and outcomes in a population with weak labour market participation elasticity. Before the reform, French first-time mothers generally did not stop working beyond the mandatory period of maternity leave that last two months after the birth. The aim of this study is first to evaluate the impact of this reform on after-birth return-to-work behaviour and earnings of one-child mothers. The identification strategy exploits the fact that some mothers are not eligible for the benefit, and creates a before–after control group. Second, we measure the economic consequences for takers of this kind of short parental leave. The originality of this approach lies in the fact that we can distinguish the full-time parental leave takers from part-time parental leave takers. We can thus evaluate the impact of part-time parental leave on employment performance, which has never been done before to our knowledge. More broadly, this article gives insight into the impact of taking short parental leave and contributes to a broader discussion of a general reform of the policy for compensating parental leave.

This evaluation is based on data from the fourth round of the Generation 98 survey conducted by Céreq in 2008 (Recotillet et al., 2011), which enables us to observe individual pathways over ten years of working-age life and to distinguish mothers of one child depending on whether the birth occurred before or after the reform.

First we present previous evidence on the impact of parental leave on female labour market outcomes. Then we outline the principles of the reform and the conditions for receiving the benefit to care for young children in France. Next we describe the data, the sample and the beneficiaries of the reform. Lastly, we discuss the method and the results of the estimate and the policy evaluation of the reform on mothers' earnings and labour force participation.

2. Previous evidence on the impact of parental leave on female labour market outcomes

Most studies dealing with the impact of female career interruptions after childbearing on their subsequent employment rate and wages reach almost the same conclusion. Child-related time out of the labour market has been found to be negatively associated with earnings (Phipps et al., 2001; Beblo and Wolf, 2002; Datta Gupta et al., 2006) and contribute to the gender wage differential (Hotchkiss and Pitts, 2007). In particular, the 'family gap' literature points at employment interruptions as a key factor behind the family pay gap (Harkness and Waldfolgel, 2003; Davies and Pierre, 2005; Meurs et al., 2011). However, career interruptions for motherhood are possibly very diverse in their nature and form. They might be mandatory or not, more or less long, and might be compensated or not by a public or an employer allowance.

Originally, research aimed at evaluating the effect of mandatory leave focused on short periods of leave. They assessed the impact of introducing maternity leave regulation in the United States, where only state-specific or firm-specific initiatives were in place. Studies have analysed the relationship between the 12 weeks unpaid maternity leave and the employment status or the wages of women in their childbearing years. Empirical evidence has shown a small effect of this maternity leave regulation on employment. Women who have access to maternity leave are more likely to return to their pre-birth employer (Waldfogel, 1998). The length of time a mother stays at home after a birth is related to the maternity leave coverage. Among women who were working before childbirth, those entitled to maternity leave are more likely to stop working for 12 weeks. After these 12 weeks, they resume working sooner than women not entitled to the leave (Berger and Waldfogel, 2004). Taking advantage of the geographical dispersion of leave legislation and using difference-in-difference-in-difference, Klerman and Leibowitz (1999) and Baum (2003) find no effect of this unpaid maternity leave on employment. This short leave also has a small impact on female income. Women with maternity leave coverage receive higher wages than women without it (Waldfogel, 1999) but much of the apparent positive "effect" of maternity leave coverage is attributable to unobserved heterogeneity, and not to a causal effect of maternity leave coverage (Hashimoto et al., 2004; Baum, 2003). Finally, these small and short-lived effects are related to the short length of this maternity leave, i.e. less than 3 months.

The effect of prolonged parental leave on employment and wages has mainly been explored in Europe where parental leave regulation is widespread. Few studies directly evaluate the effect of the length of parental leave, but variations in duration of parental leave over time or between countries allow assessing this effect. Hence, using variation in provision of parental leave in 16 European countries over the period 1969–1988 and difference-in-difference-in-difference (DDD) estimates, Ruhm (1998) shows that leave of moderate length has no effect on female earnings while lengthier paid entitlements are associated with substantial wage reductions. Using updated data and a larger sample of countries, Thévenon and Solaz (2012) examine long-term consequences of parental leave in 30 OECD countries from 1970 to 2010 and also find that extension of paid leave is associated with a negative effect on wages.

Using variation in provision of parental leave over time and across Canadian provinces, Baker and Milligan (2008) evaluate the impact of leave duration on female labour force participation. They find that time away from work is higher when leave is longer. Short mandates of 17–18 weeks have no effect on mothers' labour supply. Long mandates either of 29–52 weeks or 70 weeks increase the period mothers are away from work post-birth. Lalive and Zweimüller (2009) and Lalive et al. (2011) evaluate causal effects of changes in parental leave provision on return-to-work behaviour, using several consecutive changes of parental leave regulation in Austria. They show that parental leave rules have a strong effect on mothers' return to work behaviour. In particular, longer durations of parental leave, from one to two years, induce a significant delay in return to work and strongly reduce the probability of a return to work. On the other hand, the impact on women's earnings is small. Ejrnaes and Kunze (forthcoming) and Schönberg and Ludsteck (2007) evaluate the impact of expansion in leave coverage using exogenous variation in the length of parental leave generated by policy changes in Germany. They find that women interrupt their careers for longer periods when the length of leaves increases. Using several increases of the maximum duration of parental leave from 2 months to 3 years, they find a large negative effect on female wages, even for a short leave period, i.e. for the extension of leave from 2 to 6 months. The drop in wage after the return to work remains substantial, especially for unskilled women.

Conversely, Spiess and Wrohlich (2006) and Kluve and Tamm (2009) evaluate the impact of the recent shortening of parental leave in Germany. They exploit the natural experience of a shortening of parental leave from 24 to 12 months, comparing outcomes of parents whose children were born shortly before and after the law came into force. They show that there are incentives for women to reduce employment during the 12 months after childbearing, but that mothers are more likely to return to work in the second year after giving birth. Kluve and Tamm (2009) find no effect on household income on average, but highly educated mothers experience significantly smaller income reductions due to a shortening of the leave period. Piketty (2005) and Lequien (2012) have evaluated the previous 1994 French reform that extended parental leave provisions for the birth of a second child (it was only available from the third child before). It resulted in a decrease in labour market participation among mothers with a second child below 3 (Piketty, 2005) and had a negative impact on later wages, even 6 years after the birth of the second child (Lequien, 2012).

Evidence of the relationship between duration of parental leave and women's employment is convergent across these studies: the longer the leave, the lower female participation. Evidence is more mixed regarding the impact on wages: some studies find a negative effect of even small increases in parental leave length while others find a negative effect for large increase of this length. Finally, this literature does not help finding an optimal duration of parental leave. In our study we will evaluate whether a short parental leave of 6 months has a negative effect on female career outcomes.

Although part-time parental leave is a statutory right in many countries, no analysis of part-time parental leave is found in the literature, except in Lapuerta (2012) who analyses mothers' labour market transition after childbirth and differentiates status of part-time parental leave from that of part-time work. She analyses part-time factors that play on the decision to use part-time parental leave and shows that parental leave is mainly accessible to permanent workers who enjoy high protection in the workplace, who are in the middle of the wage distribution. As far as we know, the impact of part-time parental leave has not been assessed. We will evaluate the effect of taking part-time parental leave in France.

3. The parental leave reform of 2004

On 1 January 2004, the *prestation d'accueil du jeune enfant* (PAJE), or "early childhood benefit", superseded all previous benefits for the birth and rearing of young children. There are several components of the PAJE. One of these is the *complément libre choix d'activité* (PAJE-CLCA), a parental leave benefit for parents who choose to stop working (full CLCA) or to work less on a part-time basis (reduced CLCA) in order to look after a young child after maternity leave. The CLCA, paid out by the family allowance fund, starts at the first child, unlike its predecessor,[1] and is paid out for a maximum period of six months from the end of maternity leave,[2] paternity leave or adoption leave. For the second child and subsequent children, the period of payment of the parental leave benefit is the same as before 2004 and can be paid up to the child's third birthday.

Payment of the CLCA is subject to conditions of eligibility, primarily previous employment. These conditions vary for each child, and are fairly restrictive for the first child. To be eligible for the CLCA for a first child, mothers must have earned eight quarters towards a retirement pension in the two calendar years preceding the birth or adoption. Women do not necessarily have to have worked for all eight quarters immediately preceding the birth. Because it is based on the last two calendar years, the rule of eligibility creates some discrepancies for mothers according to the month of birth over a given year. For mothers who give birth at the beginning of the year, the period taken into account for eligibility covers the 24 months preceding the birth, while for women who give birth at the end of the year, the period taken into account for eligibility covers the 36th to 13th months preceding the birth, and thus the 12 months preceding the birth are not considered for eligibility.

A quarter is credited on the basis of earnings equivalent to 200 times the standard minimum hourly wage in a given year.[3] Four quarters are therefore credited on the basis of earnings equivalent to 800 times the minimum hourly wage, which is approximately 40% of the annual minimum wage.[4] A part-time job on the minimum wage therefore earns four quarters. Periods of maternity leave and sick leave are considered equivalent to work, but compensated periods of unemployment and training cannot be counted towards the CLCA for a first child. These conditions are fairly restrictive, since according to official data 32% of mothers of a first child are ineligible.

The CLCA is a fixed amount, is not means-tested and is the same for each child. In 2010 the full benefit, i.e. when the parent stops working, was €552[5] per month. The reduced benefit was €420 if the recipient worked less than 50% of the company's full-time hours, or €317 if the recipient worked between 50% and 80% of a full time load.[6] The reduced CLCA therefore does not necessarily imply a reduction in income if the benefit makes up for the shortfall in earnings due to the reduction in work time.

It should be noted that the CLCA, governed by social security law, is distinct from parental leave, which is governed by labour law. Any parent who has worked for a year for his or her current employer when a child is born (regardless of which child) has the right to stop working or to work part-time until the child's third birthday. After this period of leave, the beneficiary has a guaranteed right to return to work for the same employer, in the same or a similar position, for equivalent pay. Since the conditions of eligibility for the CLCA and parental leave differ, the two systems do not completely overlap. Some employees are eligible for parental leave but not for the CLCA and vice versa.

The new benefit was immediately popular with parents of one child. Some 37,000 families receive the CLCA for a first child each year (Table 1). These families make up almost one-third of all entries into the CLCA system. Almost all the beneficiaries are mothers (97.6%), and a majority of them (61%) receive the benefit for the maximum period; the average length of payment is 5.1 months.

4. Data and descriptive evidence

4.1. Data and sample

The Generation 98 survey is representative of the population who left the education system in 1998, whatever the educational level attended. This group was surveyed on four occasions—in 2001, 2003, 2005 and 2008. For our purposes, we used the sample of women surveyed and interviewed ten years after they left the education system i.e. in 2008,[7] having their first child between 2000 and 2008 and working before the birth (N = 2939).

[1] The allocation parentale d'éducation (APE), or "parental leave allowance" first available from the third birth and then extended to the second birth from 1994.

[2] For a first birth, maternity leave lasts 16 weeks, divided into prenatal leave of six weeks before the expected date of childbirth and postnatal leave of 10 weeks postpartum.

[3] The reference wage to accrue one quarter is fixed at €1438, which is the wage paid for 200 h worked at the minimum wage.

[4] It is not possible to credit more than four quarters per year.

[5] This amount includes the base benefit of the PAJE for those who are eligible.

[6] The two parents cannot both receive the full CLCA; but they can both receive a reduced CLCA.

[7] For a detailed description of the survey and its rounds, see http://www.cereq.fr/index.php/sous-themes/Enquetes-Generation-Sous-Themes/Generation-1998-Enquetes-2001-2003-2005-2008.

Table 1
Number of families with one child that receive the PAJE-CLCA in the whole of France at 31 December.
Source: CNAF data.

	2004	2005	2006	2007	2008	2009
Full benefit	19,948	21,616	24,990	22,151	22,086	21,352
Reduced benefit 1 (works between 50% and 80% of full-time hours)	8038	10,513	10,740	11,501	12,056	12,665
Reduced benefit 2 (works less than 50% of full-time hours)	3392	3519	3094	3099	3163	2918
Couples	80	117	104	111	145	125
Total	31,458	35,765	38,928	36,862	37,450	37,060

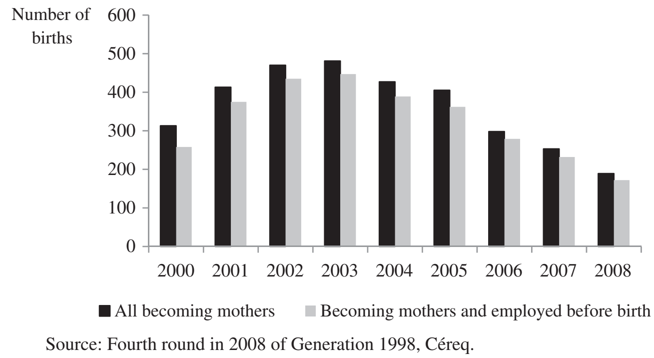


Fig. 1. Number of first births by year and working status of the mother.
Source: Fourth round in 2008 of Generation 1998, Céreq.

The data from the fourth round of the Generation 98 survey have at least two advantages for evaluating the 2004 reform. First, the observation periods of individual trajectories before and after the reform are of equal length. Second, unlike the administrative data of the family allowance fund (CNAF), which cover only the population of recipients, the individual data collected by Céreq on retrospective earnings for ten years in each job held enables an accurate definition of the population of mothers eligible for the CLCA. The data provide a month-to-month detailed description of the first ten years of the career since the end of education, with the characteristics at start and finish for each job held. Furthermore, there are several questions about family and births, which make it possible to measure the impact of having children on employment. The question of taking parental leave and switching to part-time work is raised for the first two births, but only for women who were employed before the birth. The data also indicate monthly earnings including bonuses (but net of social contributions) at the start and finish of each position for the same employer, and give information on social background and geographical mobility.

66% of the women interviewed in 2008 in the Generation 98 survey had had at least one child within ten years of finishing their education. The volume of births of first children increases until 2003 then begins to gradually decline (Fig. 1). The breakdown by year of the volume of births indicates that the structure of the data is suitable for our research question, since there is a similar volume of births before and after the 2004 reform. In the period between 2000 and 2008, 52% of mothers had had their first child before 2004. Of course, the timing of births is strongly linked to the age of the women interviewed in the survey and therefore also to their education level when they leave the education system.[8] But since low educated women have generally their first child later after the end of studies, the percentages of births before and after 2004 by level of education are quite similar in our sample. The 56% of higher education graduates have their first child in the pre-reform period, against 47% for women with no qualification or vocational certificate.

The majority of the respondents who became mothers in the 2000–2008 period were in the labour force before the birth of their child: 83% was employed in the period immediately preceding the birth. Their employment rate is therefore high, even if it varies over the period under review. The percentage in the labour force increases with time elapsed since the end of education. After 2004, 90% of respondents were employed before the birth of their first child, compared with 77% before 2004.

4.2. Eligibility and access to the CLCA through the Generation 98 survey

To apply the eligibility criterion meant reconstructing a timeline of the respondents' earnings. For women who remained in the same position for a long time, the intermediate round of interviews of the survey made it possible to refine the approximate earnings trajectory. It also made it possible to factor the number of hours worked into the calculation. Next, the number of quarters credited through pension contributions was determined on the basis of the minimum wage in each of the given years, the criterion explained in Inset 1: four quarters are credited on the basis of earnings equivalent to 800 times the minimum hourly wage. Eligibility could only be calculated from 2000 onwards so that the number of quarters observed was sufficient to calculate the number of quarters credited. The eligibility indicators are therefore only provided for the period from 2000 to 2008.

Since access to the CLCA is partly conditioned on previous employment, we observe more eligible women after 2004 than before, but the difference is weak among mothers who were employed prior to the birth. Among working mothers before childbearing, 83% of all new mothers were (or would have been) eligible for the CLCA over the whole 2000–2008 period, regardless of the year in which their child was born (Table 2). 85% of those who had their first child after 2004 were eligible against 81% of those who gave birth before 2004. These eligibility rates are closer when we restrict the observation window to the two years before and after 2004. Thus, on the period between 2002 and 2005, the eligibility of mothers who were employed prior to the birth is not affected by the amount of time that has elapsed since the end of their education.

However, the percentage of eligible mothers varies with education level, from 72% for mothers with no qualification to 89% for mothers with at least 3 years of higher education. The breakdown by education level also changes between the two periods (before and after 2004), particularly for mothers with no qualification, but narrows when looking at the restricted sample of women giving birth just before and just after the reform.

4.3. An increase in career interruptions after the reform

Before the 2004 reform, the percentage of women interrupting or reducing their working activity after their first child was relatively low: only 17% of mothers who were in the labour force before the birth. After the reform was introduced, whether eligible for the CLCA or not, 38% of mothers interrupted their careers either full-time or part-time. Among them, 60% opted for part-time leave when their first child was born after 2004.

By paying an income supplement to parents who interrupt their careers, the CLCA has evidently encouraged more new mothers to stop working completely or partly. By offering financial compensation – even if small – the reform lowers the opportunity cost of a career interruption. Since that cost is easier to bear for part-time career interruptions, we observe (Table 3) that these are more frequent (18%) than full-time interruptions (9%). The opportunity cost of completely stopping work is generally higher for the most educated new mothers, who also have access to higher occupations and earnings. For women with higher education, full-time interruptions are much less frequent (7%) and part-time interruptions are preferred.

[8] Women who graduated from higher education in 1998 surveyed in 2008 were aged 24 on average at the end of their studies, whereas those who left school with only secondary education or less were aged 20 on average.

Table 2
Percentage of women eligible for the CLCA by education level and year of birth.
Source: Fourth round in 2008 of Generation 1998, Céreq.

	Birth				
	Between 2000 and 2008	Between 2000 and 2003	Between 2004 and 2008	Between 2002 and 2003	Between 2004 and 2005
Education level					
No qualification or vocational certificate	0.722 (0.45)	0.665 (0.47)	0.771 (0.42)	0.752 (0.43)	0.783 (0.41)
Secondary (vocational or standard)	0.785 (0.41)	0.773 (0.42)	0.794 (0.40)	0.818 (0.31)	0.793 (0.41)
2 years of higher education	0.858 (0.35)	0.823 (0.38)	0.899 (0.30)	0.944 (0.23)	0.910 (0.28)
3 or more years of higher education	0.894 (0.31)	0.885 (0.38)	0.904 (0.29)	0.943 (0.23)	0.897 (0.30)
All mothers	0.827 (0.37)	0.805 (0.40)	0.850 (0.36)	0.889 (0.31)	0.885 (0.35)

Standard errors in brackets.
Scope: All mothers employed before the birth of their first child.

CLCA for a first child has changed the employment behaviour of all mothers, but in a different way according to socio-economic status. After 2004, full-time leaves are more frequent among women with low income (Fig. 2). On the other hand, percentages of women stopping work part-time after 2004 are much higher among mothers whose earnings fall in the average to very high range. This remarkable polarisation by income incites us to distinguish further these two types of parental leave.

The employment rates of mothers who interrupted their careers part-time remain very high after the birth of their first child (Table 4), since part-time is chosen as a tool to remain on the labour market. It also reflects the composition of that group, a majority of whom have higher education and earn average to very high incomes. Conversely, while their employment rate is among the highest, their average monthly earnings are lower than those of mothers who did not interrupt their careers. Could that be an impact of their career interruption, and consequently an induced effect of the reform, which has encouraged more mothers to remain part-time?

5. The estimation strategy

5.1. Intention to treat

First a difference-in-differences method is applied to evaluate the general labour market post-birth consequences of the reform on the whole population of new mothers. Short term parental leave is considered as the treatment for first-time mothers and the identification strategy is based on discrepancies in rights for parental leave allowance created by the 2004 reform. Eligible women for the benefit who gave birth before the reform[9] could not take a paid parental leave, whereas those who gave birth after the reform could. The non-eligible first mothers are used as control group, as they are not exposed to the treatment during either period. Our underlying assumption is that the difference between eligible and non-eligible mothers' outcomes would have remained the same in absence of the reform. The difference in outcomes, i.e. post-birth participation rates and wage rates, between eligible and non-eligible mothers is measured before and after the reform. The intention to treat estimator is estimated with the standard difference-in-differences following model, using before and after 2004 as a random interest covariate:

$$y_{it} = c + \alpha E_{it} + \beta T_{it} + \mu E_{it} \times T_{it} + \delta X_{it} + u_{it} \tag{1}$$

y_{it} represents the outcomes, i.e. the employment status or the wage received by working mothers 12, 18 and 24 months after the first child birth. Let E_{it} denote a dummy for the eligibility condition to the paid parental leave. α measures the differences between eligible and non-eligible mothers before 2004. T_{it} refers to a birth in 2004 or after and captures the potential time effects that would occur even in absence of the policy change. X_{it} denotes other control variables. The difference-in-differences estimator is measured by μ in Eq. (1) which corresponds to the following double differences:

$$\hat{\mu} = \left(\bar{y}^{E}_{=>2004} - \bar{y}^{E}_{<2004}\right) - \left(\bar{y}^{\bar{E}}_{=>2004} - \bar{y}^{\bar{E}}_{<2004}\right). \tag{2}$$

With $\bar{y}^{E}_{=>2004}$ the average outcome for eligible women after 2004, and $\bar{y}^{\bar{E}}_{<2004}$ the average outcome for non-eligible women before 2004.

This strategy is valid if several assumptions are met. A first assumption is that mothers did not time the birth of their child as a response to the change in benefit regulation. This assumption is valid since the reform was not anticipated at all. Furthermore the calculation of eligibility is very complex and most of women would not know if they were eligible or not.[10]

The second assumption is that non-eligible women who gave birth before and after the reform do not differ. This assumption might be more difficult to respect because of how our sample is built, i.e. women who gave birth before 2004 have less potential experience than women who gave birth after 2004. As previously seen in Table 2, however, the percentage of eligibility is more sensitive to educational level than to the period effect. To address these issues we first restricted the sample to a more homogeneous population: working mothers whose first birth occurs two years after or before the date of implementation of the reform, from 2002 to 2005. Descriptive statistics in Appendix 1 show that these two populations are quite similar. Secondly, we control by educational level (see below).

Finally, the DD strategy is valid if there is a common trend, i.e. eligible mothers and non-eligible mothers have similar wage trends before birth. The figure in Appendix 2 shows that the wage trends for eligible and ineligible mothers are almost parallel, confirming that this assumption holds. The employment rate two years and one year before birth is different for eligible and non-eligible mothers, which is partly linked to the conditions of eligibility (mothers must have earned eight quarters towards a retirement pension in the two calendar years preceding the birth). However, it is also remarkable that from one year before birth the trend in participation rate of non-eligible mothers is almost similar to those of eligible mothers. This convergence might be linked to the random discrepancies in eligibility status due to the child birth month as previously mentioned.

Results are then estimated for five types of specifications. First, no control variables are used (specification 1). Since the before–after comparison may be confounded by composition effects and the outcome of short term parental leave may affect composition effects, we include successively control variables, i.e. local unemployment rate (at the "departmental" level) (specification 2), a dummy variable indicating the birth of a second child[11] (specification 3), real experience (specification 4) and education level (specification 5).

[9] Thanks to the job history of the survey, we can estimate who would have been the eligible mothers before 2004 if the reform PAJE had been implemented and who would not have been eligible at all.

[10] In fact there are a lot of pregnant women who ask about their eligibility status on web forums.

[11] Around 10% of mothers have their second child (twins excluded) within two years of the first.

Table 3
Percentage of women opting for parental leave beyond maternity leave by education level.
Source: Fourth round in 2008 of Generation 1998, Céreq.

	Full-time leave	Part-time leave
No qualification or vocational certificate	0.148 (0.36)	0.178 (0.38)
Secondary (vocational or standard)	0.122 (0.33)	0.161 (0.37)
2 years of higher education	0.067 (0.25)	0.204 (0.40)
3 or more years of higher education	0.071 (0.26)	0.167 (0.37)
Total	0.094 (0.29)	0.181 (0.39)

Standard errors in brackets.
Scope: All mothers employed before the birth of their first child.

5.2. Average treatment on the treated

The second question raised is to what extent taking a short parental leave such as those allowed by the CLCA reform has changed the trajectories of parental leave takers. Studying this impact of the reform implies assessing the employment patterns of mothers who would have taken parental leave if the reform has been implemented earlier. As previously seen, observable characteristics are important determinants of the probability of taking a parental leave. Thus, matching analysis using propensity scores[12] is well suited for constructing a control group on the basis of observable criteria (see Heckman et al., 1997; Brodaty et al., 2007; Givord, 2010). The main hypothesis implies that assignment to the treatment is independent, conditioned on (only) these variables.

The principle of matching analysis is to compare outcomes of two comparable populations, one of which benefited from the reform and one "similar" control group which did not. Our identification strategy relies on comparing women who took parental leave after 2004 to mothers who would have taken it but did not because they gave birth before the reform took place. Under the hypothesis that these groups are "similar", any differences observed between these two groups are therefore attributable to the implementation of the reform. The impact of the reform is obtained by calculating the sample mean of the differences in labour force participation and earnings between the group of recipients of the CLCA and the counterfactual group. A first stage concentrates on all parental leave takers. In a second stage, to evaluate whether the full and reduced CLCA had different impacts on mothers' labour force participation and earnings, mothers who received the full parental leave allowance (who stopped working completely) and those who received the reduced form (who continued to work part-time) are matched. Finally, since eligibility and take up rate of the CLCA vary according to education level, we also performed separate estimations for less and more educated women.

In order to select comparable groups within our sample, we include as many pre-birth characteristics as possible in the propensity score (Lechner and Wunsch, 2013), i.e. the probability of taking the short parental leave. The conditional covariates summarize human capital, preference regarding family and work and pre-birth partnership status and place of residence. Several human capital indicators are used. People are matched on their education level (7 levels), their wage 12 months before the birth, plus two indicators of labour force trajectory before birth, i.e. the number of months in unemployment and the number of months out of labour force since the end of studies. Two indicators are included to select less career oriented women, i.e. a dummy for non-participation in the labour market of the respondent's mother and one subjective indicator related to family values, i.e. how family was important in life at the end of studies. Control of partnership status, i.e. living or not with a partner and variables related to the type of settlement place and place of residence (dummy for Paris and surrounding area[13]) are added. Lastly, to take into account business cycle, the local (at the department level[14]) unemployment rate the year preceding birth is included. Since the main criticism addressed to matching analysis is that they do not take into account unobservable characteristics (Dias et al., 2008), as a robustness check, we finally combine a difference-in-difference estimator with matching analysis (the differences in earnings 12 months before and after birth) as Guo and Fraser (2010) suggested.

Propensity score estimations are presented in Appendix 3. Figures in Appendix 4 show the smoothed densities of the propensity scores for both parental leave takers after 2004 and mothers before 2004. The common support is very good, whether all parental leave takers are taken, only part-time takers or only full-time takers. Then mothers who took the parental leave after the reform do not differ so much in terms of observable characteristics from mothers who had their first child before 2004. The distribution of part-time takers is right-delayed, meaning that part-time takers differ from other mothers in terms of observables, but the common support is still good. Only treated observations whose propensity score is lower than the maximum propensity score of the controls, i.e. almost the entire range, are used for the analysis. It is then easy to find in any three cases a match within common support among mothers before 2004, even for parental leave takers with highest propensity scores.

Three algorithms are used to choose the paired individual(s) with the closest propensity scores to those of the separate individuals: the k nearest neighbour (here two neighbours), all the neighbours within a defined distance called caliper matching (here we took 0.01 as a distance) and a kernel estimator.[15] Bootstrap method resampling with 200 iterations was used for the latter. Since results are very similar whatever the method, we will present and comment only results based on a kernel estimates (others results are available upon request).

The balancing tests, that check the quality of the match, are satisfied for each method: the means between control and takers after the match are not different from zero for each covariate. The variances in both populations are also similar (expressed by the % bias in Appendix 5) at 5% level.[16] This is also true when propensity distributions are separated into several blocks: the mean of propensity score in each block is equal between control and takers.

6. Results

6.1. Intention to treat using difference-in-differences

The reform had little effect on employment of one-child mothers (Table 5). Hence, whatever the specification, the female employment rates are very similar before and after the reform. It had no effect neither in the short term (12 months after childbirth) nor in the medium term (24 months after). Therefore, the female employment rate of new mothers does not seem to be affected by a short parental leave. At this stage of the analysis, two explanations hold: either the reform has no impact neither for takers, nor for non-takers; or the reform impacts only parental leave takers but not strongly enough to affect general post-birth employment rate of all first-time mothers. We will analyse later whether this leave has an impact on takers' employment to disentangle these two explanations.

On the other hand, the reform had an impact on wages. A wage decrease (observed for working mothers[17]) is noticed 18 and 24 months after the reform in the four first specifications, i.e. when we do not

[12] As, it is not easy to match individuals on the basis of the characteristics X, Rosenbaum and Rubin (1983) used a function of those variables on the probability of being treated, called the propensity score.

[13] We tried other regional dummies but they were not significant.

[14] There are 100 departments (administrative areas) in France.

[15] Kernel estimator relates each mother who took parental leave to all the mothers having their first child before the reform by assigning to the latter a weight inversely proportional to their distance from the mother who took parental leave.

[16] To the exception of the lone mother indicator (at 7% in kernel matching and 11% in nearest neighbour matching) and the district unemployment rate (at 8% in nearest neighbour matching). Kernel matching is however our preferred method.

[17] As the employment rate is unaffected by the reform, the selection bias of observing only wage-earners is likely to be limited in this case.

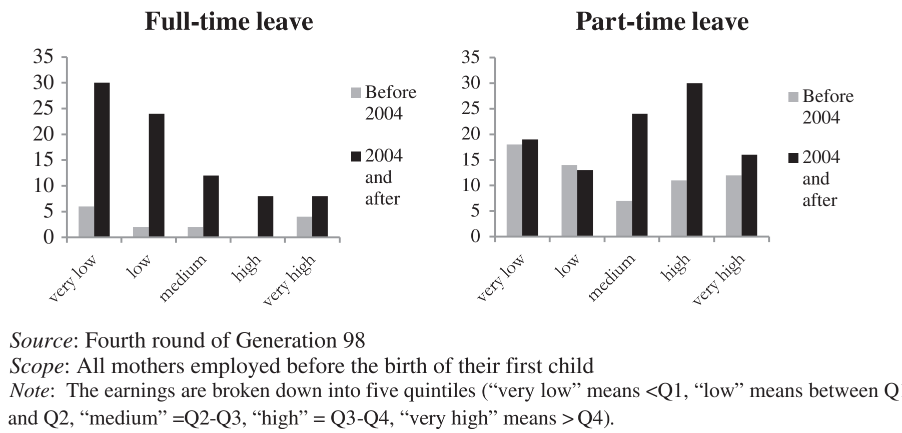


Fig. 2. Percentage of women opting for parental leave by year of birth of first child, by pre-birth wage. *Scope*: All mothers employed before the birth of their first child. *Note*: The earnings are broken down into five quintiles (“very low” means < Q1, “low” means between Q1 and Q2, “medium” = Q2–Q3, “high” = Q3–Q4, “very high” means > Q4). Source: Fourth round of Generation 98.

Table 4
Employment rate and average earnings 12, 18 and 24 months after the birth of the first child, by parental leave take-up.
Source: Fourth round of Generation 98.

	Child born before 2004			Child born in 2004 and after		
	Full-time leave	Part-time leave	No interruption	Full-time leave	Part-time leave	No interruption
Employment rate						
12 months after	0.522 (0.51)	0.898 (0.30)	0.913 (0.28)	0.832 (0.37)	0.986 (0.12)	0.949 (0.22)
18 months after	0.565 (0.50)	0.908 (0.29)	0.920 (0.27)	0.855 (0.35)	0.976 (0.15)	0.951 (0.22)
24 months after	0.545 (0.50)	0.908 (0.29)	0.918 (0.27)	0.869 (0.34)	0.964 (0.19)	0.934 (0.25)
Average monthly earnings (€)						
12 months after	[a]	1303 (485)	1363 (411)	1263 (483)	1373 (405)	1487 (541)
18 months after	[a]	1285 (547)	1361 (450)	1250 (512)	1368 (419)	1494 (568)
24 months after	[a]	1287 (538)	1385 (455)	1250 (457)	1363 (428)	1504 (593)

Standard errors within brackets.
Scope: All mothers employed before the birth of their first child.
[a] The sample size of mothers who interrupt completely and return to work within 12 months is too small to calculate the average wage.

include controls and when we control for local unemployment level, birth of a second child and years of experience. However, once education level is introduced, the negative impact on average wages is no longer significant. One also notes that this last control is the only one to improve the precision of the DD estimate (i.e. the standard errors reduce). Thus it seems that once heterogeneity in education level is controlled for, the reform has not significantly impacted the female wage rates. As we have seen that education is also a strong determinant of the type of parental-leave, we need to further analyse the precise effects by parental leave option and education level.

Table 5
Difference-in-differences estimator (DD) of employment rate and wages for new mothers giving birth between 2002 and 2005.
Source: Fourth round of Generation 98.

Specification	(1)		(2)		(3)		(4)		(5)	
	DD	SE	DD	SE	DD	SE	DD	SE	DD	SE
Employment rate after childbirth										
12 months after	0.009	0.036	0.008	0.036	0.008	0.036	−0.000	0.036	0.003	0.036
18 months after	0.044	0.036	0.043	0.036	0.044	0.036	0.036	0.035	0.039	0.035
24 months after	−0.011	0.037	−0.012	0.037	−0.010	0.036	−0.018	0.036	−0.015	0.036
Monthly wage after childbirth										
12 months after	−84.82	78.39	−84.54	78.40	−85.96	78.45	−100.03	78.37	−31.40	66.11
18 months after	−222.36[b]	93.71	−222.84[b]	93.70	−223.00[b]	93.75	−224.42[b]	93.46	−97.33	77.41
24 months after	−144.96[c]	86.71	−144.46[c]	86.72	−144.09	86.75	−150.78[c]	86.65	−61.10[a]	74.93
Controls										
Business cycle	No		Yes		Yes		Yes		Yes	
Second Child	No		No		Yes		Yes		Yes	
Experience	No		No		No		Yes		Yes	
Education	No		No		No		No		Yes	
N	1616									

Note: Only the coefficient of the diff-in-diff estimator and standard error (SE) are reported for each outcome.
Business cycle is controlled by the unemployment level at the local area (100 ‘departments’) the year before childbearing. Second child indicates whether a second child born in the 18 months following the first birth. Experience is the number of years in employment since the end of studies. Education indicates the highest level reached (7 dummies).
[a] Significant at 1%.
[b] Significant at 5%.
[c] Significant at 10%.

At this stage, our results differ from those found in other studies for longer leaves as they generally find a negative impact on employment and wages. This discrepancy may be linked to the effect of leave duration. Our results on employment rate are similar to some studies on the effect of shorter leaves, for instance Baker and Milligan (2008) who found that short mandates of 18 weeks have no effects on women's labour supply. On the other hand, our results on wage level differ from those obtained in Germany for similarly short leave (Schönberg and Ludsteck, 2007) or in Austria, although based on a longer leave of 12 months which found a negative effect. One explanation might come from the lower parental leave take-up rate in France.[18] We will analyse later the impact of the reform specifically on takers.

6.2. Effect for paid parental leave takers using matching methods

The difference-in-differences estimators measure the effect for the whole population assigned to the treatment (the mothers eligible to the reform in our case). They are able to measure the specific effect of the reform for the mothers receiving the treatment (parental leave takers) only under the assumption of perfect compliance, which is not respected in our case since parental leave takers may be different than mothers who do not take leave. Matching methods are then more appropriate to estimate the reform effect for parental leave takers.

Table 6 presents the impact of the reform on CLCA takers' employment status and wage 12 months, 18 months and 24 months after childbirth. There are incentives for women to return to work after the leave. Indeed, the CLCA recipients are more likely to be employed 12 months and 18 months after childbirth than those who would have been able to take the parental leave if the reform had been available sooner (Table 6). They are also less likely to stay out of the labour force, even 24 months after childbirth. This positive effect of the reform on women's employment is rather small but concerns both low and highly-educated women. However, it is stronger for less educated women who are less likely to remain out of the labour force 12, 18 as well as 24 months after birth. The gap in the employment rate increase reaches 6% for low-educated, which is quite high, and twice the increase for more educated mothers.

These results illustrate that before the reform, some mothers, mainly the less educated, remained outside the labour force for longer than their relatively short maternity leave (two months after the birth). The reform has enabled them to take longer leave and to return to work at the end of it. These results are consistent with those obtained in the case of the expansion of job-protected maternity leave in Canada (Baker and Milligan, 2008) or reduction of parental leave to 12 months in Germany (Kluve and Tamm, 2009) who both find a positive impact of short leaves on female employment. In the French context, the period of 6 months is considered to be long enough to enjoy the infant, find appropriate childcare or to breastfeed. Indeed, childcare facilities are widespread (Toulemon et al., 2008) and the breastfeeding period is limited to 3 months in average. It therefore emerges that for the birth of a first child, this type of shorter leave has fewer negative effects on women's labour-force participation than longer parental leave, which tends to keep mothers outside the labour force for a longer time (Piketty, 2005). The reform of the PAJE for the first child has therefore not reduced the labour force participation of mothers after the end of the benefit period. In this sense, it has rather helped to protect employment of mothers with a first young child. We are not in a position to estimate whether this effect remains valid for subsequent births, however workforce participation tends to decrease with each birth (Pailhé and Solaz, 2006).

The results for wages are even more interesting. One of the main results is that the reform has a quite large impact on earnings trajectories after the first birth. Mothers who received the parental leave allowance and returned to work after the birth have lower earnings 12, 18 and

[18] According OECD family database 2006, the percentage of one-child (under 1 year) mothers being on maternity or parental leave is 32% in France against 68% in Germany.

Table 6
Average treatment effect (ATE) for all CLCA recipients, and by educational level.
Source: Fourth round of Generation 98.

	All CLCA recipients		Low educated		Medium and highly educated	
	ATE	Standard errors	ATE	Standard errors	ATE	Standard errors
Employment status after childbirth						
12 months after						
Employed	0.041[a]	0.013	0.060[b]	0.028	0.039[a]	0.013
Unemployed	−0.018	0.012	−0.004	0.022	−0.030[b]	0.012
Non-workers	−0.023[a]	0.008	−0.056[a]	0.021	−0.008	0.006
18 months after						
Employed	0.041[a]	0.013	0.066[b]	0.027	0.031[b]	0.013
Unemployed	−0.018	0.011	−0.012	0.020	−0.023[c]	0.012
Non-workers	−0.022[b]	0.009	−0.054[b]	0.021	−0.007	0.006
24 months after						
Employed	0.023	0.015	0.064[b]	0.032	0.010	0.020
Unemployed	−0.004	0.012	−0.005	0.020	−0.006	0.018
Non-workers	−0.019[c]	0.010	−0.059[b]	0.027	−0.003	0.009
Monthly wage after childbirth (employed mothers)						
12 months after	−56.6[b]	22.9	−10.8	36.0	−58.7[b]	23.8
18 months after	−67.7[a]	25.3	6.2	37.2	−76.0[a]	29.1
24 months after	−77.1[a]	25.2	11.9	36.7	−104.5[a]	33.5
Diff	−84.5[a]	21.2	−59.6	38.7	−92.3[a]	24.7
N (treated)	1909 (409)		660 (147)		1227 (242)	

The estimation uses a Gaussian kernel with a Silverman window, only observations on common support are taken into account. The standard errors are computed by bootstrap (200 iterations).
[a] Significant at the 1% level.
[b] Significant at the 5% level.
[c] Significant at the 10% level.

even 24 months after the birth than those with the same profiles who could have taken the parental leave before 2004 if the reform had existed. The wages of parental leave takers are systematically lower, with a magnitude of around 4–5% of pre-birth wage average, which is increasing in time. This negative impact of the short parental leave on wages only concerns medium and highly educated women. This negative impact of short parental leave on female earnings was also found in Germany in the case of an increase of the maximum duration of parental leave from 2 months to 6 months (Ejrnaes and Kunze, forthcoming; Schönberg and Ludsteck, 2007). The smaller increase in earnings might be due to the labour market interruption that induces a depreciation of human capital over an extended maternity leave, lowers rate of promotion, or can give a negative signal of employment commitment to the employer. This explanation is consistent with the fact that the decrease of earnings only affects highly educated women, who have higher career prospects and thus a higher penalty in case of an employment interruption. It might also be due to the fact that low educated women are more likely to work at the minimum wage rate, which protects from wage losses. But it might also be the consequence of decisions to work part-time for medium and highly educated after the period of the paid parental leave. Unfortunately the data do not enable us to know whether these mothers actually switched to part-time work. However, it is possible to identify which recipients of the parental leave chose the reduced (part-time) rate. Part-time takers and full-time takers are going to be distinguished in the next section to measure to what extent this income effect is due to the type of parental leave option chosen or to other unobservable effects.

6.3. Effect for full-time parental leave takers

For mothers who stopped working completely, almost no differences either in the employment trajectory or in the earnings profile after the birth are observed (Table 7), except for a lower likelihood of being out of the labour force two years later visible only for low-educated women. Receiving the full CLCA therefore had no effect on wages, either negative or positive on future career, even for highly

Table 7
Average treatment effect (ATE) for all full-time CLCA recipients, by educational level.
Source: Fourth round of Generation 98.

	All CLCA recipients		Low educated		Medium and highly educated	
	ATE	Standard errors	ATE	Standard errors	ATE	Standard errors
Employment status after childbirth						
12 months after						
Employed	0.011	0.027	−0.006	0.040	0.027	0.026
Unemployed	0.005	0.025	0.033	0.041	−0.028	0.027
Non-workers	−0.015	0.016	−0.027	0.022	−0.001	0.015
18 months after						
Employed	0.034	0.026	0.049	0.038	−0.20	0.034
Unemployed	−0.006	0.023	−0.007	0.029	0.017	0.033
Non-workers	−0.028	0.017	−0.042[c]	0.025	0.003	0.016
24 months after						
Employed	0.010	0.029	0.050	0.047	−0.049	0.041
Unemployed	0.022	0.026	0.007	0.032	−0.034	0.041
Non-workers	−0.031[b]	0.015	−0.058[b]	0.034	0.014	0.021
Monthly wage after childbirth (employed mothers)						
12 months after	−16.7	29.8	−2.3	43.6	−1.0	50.1
18 months after	−22.2	31.6	9.9	43.4	−51.3	55.6
24 months after	−35.8	35.4	30.2	43.4	−61.0	48.7
Diff	−73.9[b]	37.2	−49.0	55.1[a]	−93.4	61.2
N (Treated)	1688 (180)		596 (81)		1055 (70)	

The estimation uses a Gaussian kernel with a Silverman window, only observations on common support are taken into account. The standard errors are computed by bootstrap (200 iterations).
[a] Significant at 1%.
[b] Significant at 5%.
[c] Significant at 10%.

Table 8
Average effect of the part-time CLCA recipients.
Source: Fourth round of Generation 98.

	All CLCA recipients		Low educated		Medium and highly educated	
	ATE	Standard errors	ATE	Standard errors	ATE	Standard errors
Employment status after childbirth						
12 months after						
Employed	0.060[a]	0.011	0.110[a]	0.035	0.051[a]	0.013
Unemployed	−0.034[a]	0.009	−0.038[c]	0.020	−0.039[a]	0.012
Non-workers	−0.026[a]	0.006	−0.072[b]	0.030	−0.012[a]	0.004
18 months after						
Employed	0.047[a]	0.012	0.072[c]	0.040	0.049[a]	0.011
Unemployed	−0.026[a]	0.010	−0.020	0.027	−0.037[a]	0.010
Non-workers	−0.021[a]	0.007	−0.051[c]	0.029	−0.012[b]	0.005
24 months after						
Employed	0.030[c]	0.016	0.090[c]	0.048	0.032[c]	0.017
Unemployed	−0.017[c]	0.010	−0.026	0.020	−0.021	0.015
Non-workers	−0.013	0.012	−0.064[c]	0.044	−0.011	0.010
Monthly wage after childbirth (employed mothers)						
12 months after	−93.1[a]	29.1	−73.1	55.4	−95.1[a]	30.1
18 months after	−114.5[a]	34.6	−72.5	56.8	−101.1[a]	35.8
24 months after	−113.2[a]	31.4	−43.0	60.8	−129.0[a]	36.6
Diff	−88.2[a]	18.6	−76.4[c]	37.2	−93.2[a]	26.1
N (treated)	1757 (257)		597 (82)		1156 (171)	

The estimation uses a Gaussian kernel with a Silverman window, only observations on common support are taken into account.
The standard errors are computed by bootstrap (200 iterations).
[a] Significant at 1%.
[b] Significant at 5%.
[c] Significant at 10%.

educated women. This result emphasizes that taking a short parental leave has no negative effect on female labour market outcomes. Of course, this short parental leave occurs at the beginning of the life cycle since it is for the first birth, and the result might be different for subsequent births. Furthermore, as full-time leave takers are less well-off, it is also possible that their wage trajectories would have been flatter anyway with or without short parental leave. But contrary to previous French results, based on mothers with two children taking a longer parental leave (Lequien, 2012; Piketty, 2005), no negative effect of taking a short parental leave is found here.

6.4. For part-time parental leave takers

For mothers who opted to receive the reduced benefit and work part-time, lower probabilities of becoming non-workers or unemployed and, symmetrically, higher probabilities of staying in employment 12 and 18 months after the birth are observed (Table 8). Thus working part-time after the birth protects against the risk of unemployment and non-working by maintaining a link with the labour force. After two years, these differences are weaker for the whole population. Results by education level are consistent with the previous ones. Low-educated women are more likely to return to work thanks to the introduction of a part-time parental leave, the effect being long-lived, and twice as stronger than for medium and highly educated women. The effect also holds for these women, but to a lower extends and is shorted-lived.

Although the labour-force participation continues, the earnings profile differs for the women who choose to work part-time. Lower earnings in the treatment group than in the control group are observed, and the difference increases with the amount of time since the birth. The magnitude of the wage decrease is around 7 of the average pre-birth wage. There is probably a windfall effect: mothers who would have taken part-time work before the reform anyway took it after the reform and received the benefit to boot. That is probably the case for mothers with limited prospects or less career-oriented mothers with medium earnings. But the fact that this negative effect is only found for medium or highly educated women moderates this explanation (the coefficient is also negative for low educated women but not significant). The most likely explanation is that the possibility to reconcile family and work on a part-time base and a wage compensation was liked by a part of the medium and highly educated women. The main reason for these lower earnings could be attributed to part-time work that continues after the period of the benefit. In this likely case, by encouraging mothers to shift to part-time work (for those working 80% of a full-time load, the loss of earnings can be completely offset by the benefit), the reform might have given them a taste for more flexible family organization. They therefore continued to work part-time after the end of the benefit period. This explanation seems valid since Generation 2004 data from Cereq show that the share of part-timers among women who had one child between 2004 and 2007 does not diminish between 2007 and 2009 (30%), and only modestly between 2009 and 2011 (from 30% to 26%). This indicates a “mommy track” since women experience reduced earnings after the first birth and a risk of flattening of the wage profile (Miller, 2011). It is also possible that plans for a second child contributed to the decision to remain in part-time work. Whatever the reason, this reduction of working hours may be prejudicial for mother's future career. As pointed by Simonsen and Skipper (2012) on Danish twins data, the number of hours worked is a key determinant of motherhood wage penalty.

6.5. Robustness check

Even if the matching covers a whole set of observable characteristics that are expected to capture the main differences in access to parental leave between mothers, there are probably some unobserved characteristics, which may be correlated with the variable of interest. This may be a limitation of this type of estimator (Dias et al., 2008). To verify this, a difference-in-differences estimator is combined with the matching analysis by calculating the difference in earnings 12 months before and 12 months after the birth for the treatment group and for the control group[19] (last line of Tables 6, 7 and 8), as suggested by

[19] In this case, the covariate wage before the birth is dropped from the propensity score regression.

Guo and Fraser (2010). In general, difference estimators eliminate the correlation between the treatment and the variable of interest by differencing the data observed with those of the control group (Crépon and Jacquemet, 2010).

For the all the recipients of the CLCA (Table 6), the difference in earnings remains significant and negative after the unobserved heterogeneity has been taken into account in this manner. For the recipients of the full-time CLCA (Table 7), a negative effect appears for the whole population, meaning perhaps than some unobservable might be responsible for a weaker increase in wages for parental leave full-time takers. Another interpretation might be that, as we did not control for wage level in this specification, this heterogeneity might come from income heterogeneity that was take into account on previous specification. The fact that results remain unchanged when we perform separate analyses by education probably confirms this hypothesis.

Finally, results obtained with the difference-in-differences estimator combined with matching analysis confirm those previously obtained with the standard average treatment effect are very similar (Table 8). It makes us confident about our matching identification strategy. It is likely that some unobservable are not taken into account but the rich set of observables introduced, both subjective and objective ones, both family and work-related (and particularly pre-birth wage), probably capture most of pre-birth heterogeneity.

7. Conclusion

Much attention has been paid in the literature to the economic consequences of parental leave interruptions, but less to what extent the length of paid parental leave might play on labour market outcomes. This study seeks to evaluate the impact of the introduction in 2004 of a short parental leave in France called *Complément Libre Choix d'Activité* (CLCA) to provide financial support for new parents who temporarily interrupt their careers after the first birth. Prior to the reform, family policy – particularly parental leave measures – targeted subsequent births. The decision to compensate six-month parental leave for the birth of the first child revived the debate about women's career interruptions for childbearing and child rearing.

Drawing on the data from the fourth round of the Generation 98 survey, our results show that more new mothers interrupted their careers between 2004 and 2008 compared with the 2000–2004 period and that this interruption was usually part-time for the most educated mothers who held high occupational positions. Before 2004, young women could opt for parental leave, but with no financial compensation. By broadening access, despite eligibility conditions, the 2004 reform has enabled more new mothers to interrupt their careers after the birth of their first child. But the effects on their career outcomes differ depending on whether they take full-time or part-time parental leave.

Full-time short paid parental leave has no effect on post-birth wages and small positive effects on labour market participation. The only visible effect is a lower likelihood of being out of labour force for low-educated women 18 and 24 months after birth. Part-time paid leave also prevents some women from giving up work and increases the employment rate, especially for low-educated women. This positive effect on employment is stronger than that of full-time leave. But part-time leaves have a negative impact on wages, especially for medium and highly educated women. The wage increase is lower for part-time parental leave takers and remains so two years after the child's birth. This suggests that mothers may prefer part-time employment, for work–family balance reasons for instance, and continue working part-time beyond the benefit period. Even though the interruption is short, some negative effects on later earnings are then observed.

Of course, short parental leave has fewer negative effects on female participation than longer leave, but the polarization observed is puzzling. This short paid parental leave has helped low-educated women to remain on the labour market after childbearing. It has also helped the most well-off to reduce their working hours (part-time) from the first birth and thus to alleviate the work–family conflict. It has acted as a threshold effect for some of them. Furthermore, even though it is available for fathers, this parental leave is almost never taken by men and is likely to encourage couple specialisation, with the woman reducing her labour market investment quite early in the life-cycle. The debate over the introduction of short but better paid parental leave as a tool to involve fathers is still on the agenda. However, we wonder whether a shared parental leave with separate rights for mothers and fathers, currently debated, might not be more appropriate.

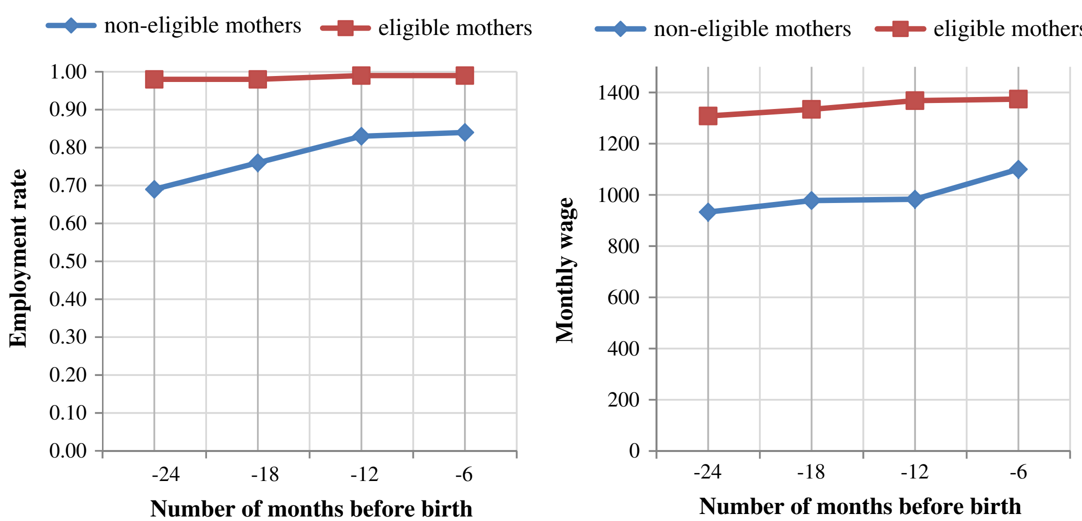
Appendix 1. Samples description

	All working mothers before birth								Working mothers giving birth from 2002 to 2005							
	Before 2004		After 2004		Non-eligible		Eligible		Before 2004		After 2004		Non-eligible		Eligible	
Variable	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.
Mother was OLF	0.19	0.39	0.19	0.39	0.19	0.39	0.19	0.40	0.20	0.40	0.19	0.39	0.20	0.40	0.19	0.39
Family is priority	0.69	0.46	0.66	0.47	0.70	0.46	0.67	0.47	0.71	0.45	0.69	0.46	0.71	0.46	0.70	0.46
Lone mother at birth	0.97	0.18	0.93	0.26	0.97	0.17	0.94	0.25	0.97	0.16	0.93	0.25	0.98	0.15	0.94	0.24
No diploma	0.04	0.19	0.06	0.23	0.03	0.17	0.05	0.21	0.03	0.17	0.04	0.21	0.03	0.16	0.03	0.18
Professional	0.12	0.32	0.13	0.34	0.10	0.30	0.13	0.33	0.11	0.31	0.13	0.33	0.09	0.29	0.12	0.33
Technical degree	0.15	0.36	0.19	0.40	0.15	0.36	0.19	0.39	0.16	0.36	0.19	0.39	0.15	0.36	0.18	0.38
Baccalaureate	0.04	0.19	0.06	0.23	0.03	0.17	0.05	0.22	0.03	0.17	0.06	0.24	0.02	0.15	0.05	0.22
University (2)	0.39	0.49	0.35	0.48	0.40	0.49	0.37	0.48	0.40	0.49	0.36	0.48	0.43	0.49	0.38	0.49
University (4)	0.17	0.37	0.14	0.35	0.19	0.39	0.15	0.36	0.18	0.39	0.15	0.35	0.19	0.40	0.16	0.36
University (master)	0.09	0.29	0.07	0.26	0.10	0.30	0.08	0.26	0.09	0.28	0.07	0.26	0.09	0.29	0.07	0.26
Middle town (ref = city)	0.09	0.28	0.11	0.32	0.09	0.28	0.11	0.32	0.09	0.28	0.12	0.33	0.09	0.28	0.12	0.32
Small town	0.15	0.35	0.13	0.34	0.15	0.35	0.13	0.34	0.15	0.36	0.14	0.35	0.15	0.36	0.15	0.35
Rural area	0.12	0.33	0.06	0.24	0.08	0.27	0.04	0.19	0.08	0.27	0.06	0.23	0.05	0.22	0.03	0.18
Paris or suburb	0.11	0.32	0.12	0.32	0.12	0.32	0.12	0.32	0.11	0.31	0.11	0.31	0.11	0.31	0.12	0.32

Appendix 1 (*continued*)

	All working mothers before birth								Working mothers giving birth from 2002 to 2005							
	Before 2004		After 2004		Non-eligible		Eligible		Before 2004		After 2004		Non-eligible		Eligible	
Wage 1 year before birth	1221	494	1359	537	1297	440	1414	504	1287	459	1342	528	1331	430	1390	508
# Months of unemployment	2.76	5.68	5.54	10.36	1.87	3.74	4.35	7.99	3.02	6.17	4.18	7.74	2.06	4.14	3.27	6.16
# Months of OLF	0.92	2.99	1.11	3.38	0.72	2.39	0.92	2.93	0.80	2.89	0.92	3.16	0.70	2.47	0.73	2.62
District unemployment rate	8.06	1.94	8.37	1.70	7.99	1.88	8.38	1.70	7.98	1.70	8.61	1.69	8.00	1.68	8.62	1.67
N	1508		1431		1214		1216		878		749		785		641	

Appendix 2. Evolution of pre-birth wage for eligible and non-eligible women



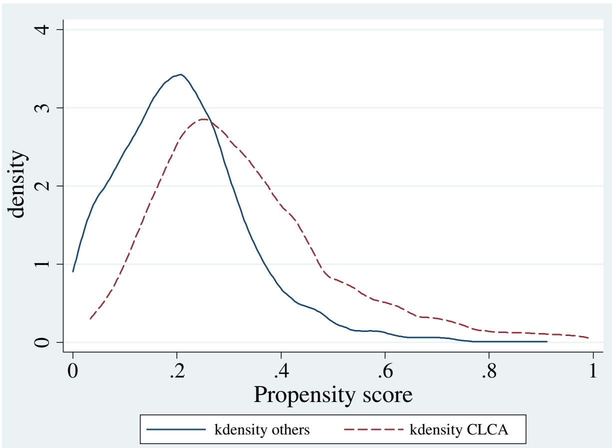
Appendix 3. Estimation of the propensity score for being parental leave takers (probit)

	All takers		Full-time takers		Part-time takers	
	Coef.	Std err.	Coef.	Std. err.	Coef.	Std. err.
Mother was OLF	0.019	0.083	−0.051	0.113	0.052[a]	0.094
Family is priority	−0.066	0.071	0.056	0.100	−0.137[a]	0.080
Lone mother at birth	−0.340[b]	0.158	−0.419[b]	0.194	−0.282[a]	0.191
No diploma	0.049	0.220	−0.469[b]	0.204	0.295[a]	0.261
Professional	−0.135	0.184	−0.421[b]	0.192	0.164[a]	0.255
Technical degree	−0.175	0.175	−0.555[b]	0.278	0.549[a]	0.291
Baccalaureate	−0.572[a]	0.169	−1.039[a]	0.191	−0.038[a]	0.247
University (2)	−0.810[a]	0.183	−1.078[a]	0.211	−0.344[a]	0.260
University (4)	−1.476[a]	0.222	−1.783[a]	0.294	−0.938[a]	0.293
University (master)	0.068	0.111	0.088	0.144	0.062[a]	0.129
Middle town (ref = city)	−0.207[b]	0.101	−0.183	0.135	−0.203[a]	0.118
Small town	−0.942[a]	0.145	−0.969[a]	0.198	−0.848[a]	0.174
Rural area	−0.191[c]	0.110	0.058	0.139	−0.345[a]	0.133
Paris or suburb	0.001[a]	0.000	0.001[a]	0.000	0.001[a]	0.000
Wage 1 year before birth	0.046[a]	0.006	0.042[a]	0.007	0.044[a]	0.007
# Months unemployment	0.035[a]	0.011	0.038[a]	0.013	0.028[a]	0.014
# Months of OLF	0.047[a]	0.018	0.056[b]	0.023	0.030[a]	0.021
District unemployment rate	−1.625[a]	0.298	−1.480[a]	0.362	−2.369[a]	0.372
N	1981(473)		1801(293)		1688(180)	
R2	0.112		0.115		0.125	

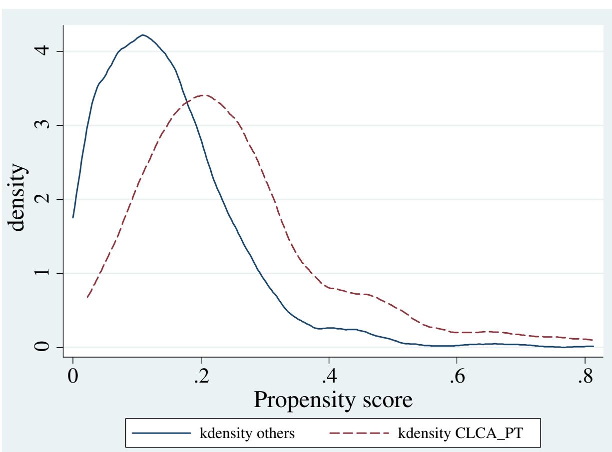
[a] Significant at 1%.
[b] Significant at 5%.
[c] Significant at 10%.

Appendix 4. Common support of propensity score

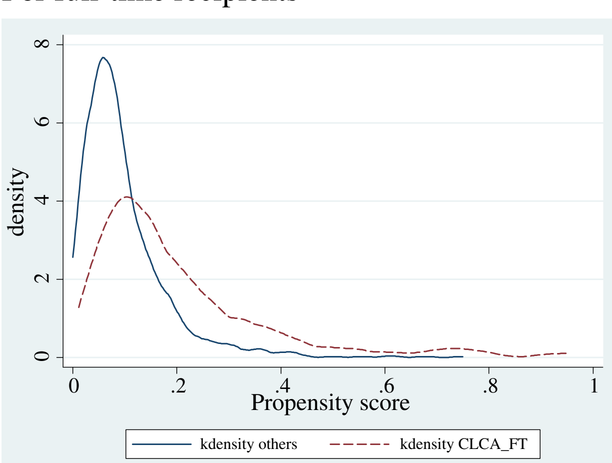
All CLCA recipients



For part-time recipients



For full-time recipients



Appendix 5. Balancing tests for covariates included in propensity scores (Kernel) treated = parental leave takers after 2004

Variable	Treated	Control	%Bias
Mother was OLF	0.196	0.196	−0.2
Family is priority	0.667	0.665	0.6
Lone mother at birth	0.934	0.948	−6.6
No diploma	0.054	0.048	2.7
Professional	0.115	0.111	1.2
Technical degree	0.186	0.170	4.2
Baccalaureate	0.054	0.047	3.2
University (2)	0.396	0.411	−3.1
University (4)	0.139	0.147	−2.2
University (master)	0.056	0.065	−3.4
Middle town (ref = city)	0.110	0.107	1
Small town	0.117	0.118	−0.1
Rural area	0.054	0.057	−1.1
Paris or suburb	0.115	0.120	−1.6
Wage 1 year before birth	1382	1372	2.1
# Months unemployment	4.249	3.702	8
# Months of OLF	0.951	1.032	−2.6
District unemployment rate	8.483	8.476	0.4

Note: The differences between the treated and control covariate means are not significant at 10% level.

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