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The Labor Cost of Motherhood And the Length of Career Breack Around Childbirth

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Pietro Garibaldi

The Labor Cost of Motherhood

And the Length of Career Breack Around Childbirth

Enrica Maria Martino

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The Labor Cost of Motherhood and the Length of Career Break around Childbirth*

Enrica Maria Martino†

The aim of this paper is to analyze the effect of career breaks around childbirth on maternal labor market outcomes and the role of parental leave policies in affecting maternal labor supply. I study the impact of childbirth on maternal earnings and labor supply at the extensive and intensive margin using an event study approach on the universe of employee in the private sector. Moreover, I exploit the introduction of a childcare subsidy conditional on early return to work as a quasi-experimental setting that allows estimation of the causal impact of shorter career break around childbirth on maternal labor market performance (earnings, labor supply at the extensive and intensive margins, wage, career path) in the short and medium run. Preliminary results show that women experience more than 35% loss in earnings after the birth of a child, mostly driven by a reduction in labor supply, and the loss is persistent up to three years after maternity leave. The shorter leave induced by the introduction of conditional childcare subsidy increases maternal earnings only in the very short run.

JEL: J13, J22, H31.
Keywords: Labor supply, fertility, family policies.

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Sintesi non tecnica

Il costo della maternità sulla carriera e l'effetto di congedi parentali più brevi.

La relazione fra natalità e performance delle donne sul mercato del lavoro è stata oggetto di numerosi studi empirici e teorici nel campo dell'economia.

In Italia, mentre l'occupazione delle donne senza figli appare in linea con la media Europea (67% nel 2015, dati Eurostat), l'occupazione delle madri è la più bassa in Europa, seconda solo alla Grecia (55% nel 2014, dati OCSE), trainando al ribasso le statistiche riguardanti l'occupazione femminile e portando il *gender gap* in termini di occupazione e redditi ad essere fra i più alti d'Europa. Per le donne italiane, la nascita di un figlio ha un impatto causale forte sulla probabilità di lasciare il mercato del lavoro e di peggiorare le prospettive di carriera per coloro che continuano a lavorare.

Sostenere l'occupazione femminile, ed in particolare delle madri, è fondamentale per incoraggiare una più equa divisione dei ruoli all'interno della famiglia, ed opportunità più eque nel mercato del lavoro, nonché per ridurre il rischio di povertà delle famiglie (secondo dati ISTAT, nel 2015 il 46.1% dei bambini in famiglie monoreddituali erano a rischio di povertà).

In questo articolo, utilizzando i dati amministrativi riferiti alle lavoratrici dipendenti nel settore privato, stimo il costo, in termini reddituali, che una lavoratrice sopporta dopo la nascita di un figlio in Italia. Studi precedenti suggeriscono che incoraggiare un più rapido rientro a lavoro dopo la maternità possa essere uno strumento efficace per ridurre il costo in termini lavorativi delle neo madri, riducendo il rischio di deprezzamento di capitale umano dovuto ad un'interruzione troppo lunga del percorso lavorativo. Pertanto, l'articolo riporta una valutazione preliminare del *Bonus Infanzia*, che sostiene un rapido rientro delle madri dopo il congedo obbligatorio di maternità, distribuendo un voucher spendibile per servizi di *childcare* alle donne che scelgano di rinunciare ai mesi di congedo parentale facoltativo.

Risultati preliminari suggeriscono che la perdita in termini reddituali della maternità è pari a circa il 35% del reddito potenziale della donna, in assenza della nascita del figlio; tale costo è prevalentemente determinato dalla scelta di uscire dal mercato del lavoro: per le donne che continuano a lavorare è pari a circa il 10%. Il congedo parentale più breve incoraggiato dall'introduzione del *Bonus Infanzia* non sembra avere un effetto duraturo sul reddito delle madri che rientrano prima.

1 Introduction

The relationship between fertility and labor force participation of women has been object of several empirical and theoretical work in economics for decades. Since the correlation reversed in the Eighties, when high employment countries started experiencing increasing fertility rates, the role of family policies, cultural norms and labor market institutions has been studied to reconcile the theoretical predictions with new evidence.

Many countries seem to be stack in a double negative equilibrium, with both low fertility rate and low female employment; Italy is one of those countries.

Low female employment is a crucial issue for several reasons.

It often reflects and endures an unequal gender division of roles inside the household and unequal opportunities in the labor market, where the cost of hiring women is much higher and translates in lower wages and job segregation and discrimination. The reduction of this gap is one of the main policy target at the European and international level (see Europe 2020 strategy and the UN 2030 Agenda for Sustainable Development) for both equity and efficiency reasons. In Italy, while employment rate among women without children is in line with the European average (67% in 2015 according to Eurostat), maternal employment is the lowest in Europe before Greece (55% in 2014, OECD), driving the low overall female employment rate and the highest gender gap in employment rate among European countries, after Malta, as shown in Figure 3. Having a child has a strong causal impact on the probability of leaving the labor market and a detrimental effect on women career prospects; the proportion of women who voluntarily left their job after childbirth declined by more than 20% between 2002 and 2012 and more than 40% of working mothers report having problems in reconciling their work duties and family responsibilities (Martino 2016). The *gender wage gap*, even if lower than in other European countries, has increased during the crisis (see Piazzalunga and Di Tommaso 2016).

Low employment rates are also an issue in relation with high risk of poverty of single-income households and higher risk of poverty of inactive women once they enter the retirement age: while the 2015 Pension Adequacy Report by the European Commission highlights that on average in the EU28 women's pensions are 40% lower than men's, Figure 4 shows that Italy performs particularly poorly in terms of poverty rate among children (Save the Children reports the about 1/3 children in Italy live at risk of poverty in 2015) and the rate is highest among single income families (46.1% of children in single income households are at risk of poverty according to ISTAT data).

This leads back to the second issue of low fertility. Figure 5 reports number of new born in Italy since 2001, and shows the dramatic decrease in births since the financial and economic crisis, until the lowest performance in Italian history in 2015.

For these reasons, reconciling work and family life and encouraging fertility while fostering female labor force participation are central themes in the current political debate.

Rigidity of the labor market and difficult reconciliation of market and family roles has been

pointed at as the main causes of the scarce participation of women, for both cultural and institutional reasons. In particular, the rigidity of working hours, the scarcity of part time opportunities and the inadequacy of childcare provision, together with a strong role division between men and women that still attributes women all family responsibilities, obstacle labor market participation of mothers (Del Boca 2002, Campa et al. 2011).

Long periods away from work to take care of the children may result in significant depreciation of human capital and thus difficult return to work later in time, so that temporary choices may permanently affect labor market potential outcomes of new mothers (Shapiro and Mott, 1994).

A rich strand of the economic literature has studied the impact of fertility on maternal labor market behavior, from both theoretical and empirical perspectives; natural experiments stemming from sharp policy introductions were used to assess the causal impact of family policies, while structural modeling has been used to explore the determinants and effects of family structure on education, labor market outcomes and, more recently, child development.

In a major Italian labor market reform in 2012 some measures were adopted to help reconciling work and family life. The aim of my paper is twofold: on one side, I exploit availability of administrative data for Italy to estimate the impact of motherhood on maternal earnings and labor supply at the extensive and intensive margin, using the event study methodology applied by Angelov et al. (2016) on Swedish administrative data and by Kleve et al. (2016) on Danish administrative data. This allows quantifying the relation between fertility and labor supply and labor market outcomes and highlighting the inequality stemming from the disproportion of such an impact on mothers and fathers. Second, I exploit the quasi-experimental setting provided by the introduction of a conditional childcare subsidy for each month of parental leave the woman agreed to give up to in order to assess the effect of shorter careeer breaks and early return to work on labor supply and labor market outcomes in the short and medium run. In doing so, I also provide the first evaluation of the policy, that was introduced experimentally in 2012 and confirmed in the next years.

In section 2 I report a review of related literature, Section 3 describes the institutional background and the policy that I exploit, in Section 4 I describe the data, Section 5 reports the event study and in Section 6 and 7 I describe the identification strategy and report the preliminary results and robustness checks of the investigation of the impact of the length of the career break around childbirth on later outcomes; Section 8 concludes.

2 Literature review

The relationship between fertility and maternal labor market outcomes has been object of large research in labor economics since 1973, when Becker introduced the concept of price of children in terms of increased opportunity cost of working because of higher value of time at home, need for alternative childcare arrangements, human capital depreciation.

Later theoretical and empirical literature have alternatively focused on each of these interpretations: while static discrete choice models are mostly convenient to explore the role of childcare cost, availability and subsidies (see, for example, Ribar, 1995), life cycle models aim at capturing the endogeneity of the wage formation process and thus taking into account the dynamic trade off between time at home and time in the labor market (e.g. Francesconi, 2002). Reduced form estimation aims at capturing the impact of number of children or timing of the first child on several labor market outcomes, using exogenous sources of variation to correct for endogeneity in fertility choices: for example, Rosenzweig and Wolpin (1980) use twinning occurrence, Angrist and Evans (1998) sex composition of the first two children, Bratti and Cavalli (2014) infertility shocks.

A more recent strand of the literature incorporates investment in child's human capital in the decision process of the mother, thus including an additional trade off in the labor supply choice: it requires taking into account childcare quality and the relative productivity of maternal time, alternative forms of care and household's income on child's development (see for example Bernal 2008, Del Boca et al. 2014)

Finally, another branch of research abandoned the unitary household decision model, or the assumption that the mother is the sole decision maker in the household to explicitly take into account the intra-household processes, allowing maternal labor supply to be the result of the interaction between the two spouses and of relative bargaining power (see Del Boca and Flinn, 2012).

Blau and Currie (2006) provide an extensive review of the literature exploring the effect of childcare prices on maternal employment; results usually show small and negative elasticity of labor supply (at both the intensive and extensive margin) with respect to childcare prices, but significantly differ in terms of magnitude. Moreover, different identification strategies are used, from exclusion restrictions in binomial discrete choice models to structural models including unpaid childcare options in a multinomial choice framework. Kornstad and Thoresen (2007) find negative impact of the introduction of home-care allowance in Norway using a model allowing for discrete choice among four alternative forms of labor supply and three alternative childcare settings; Del Boca and Vuri (2007) confirm the negative ad significant effect of childcare costs on maternal employment on Italian data, explicitly accounting for rationing in the provision of public childcare.

Dynamic models allow including endogenous wage formation[1] and/or child's human capital evolution; these additional elements enrich the trade off faced by the mother in her choices immediately

[1]Endogenous wage formation is achieved either assuming human capital depreciation as the woman is not working or including labor market experience as a positive component of the wage equation.

after childbirth and help exploring the long run effect of these choices on maternal labor market outcomes and child development. The impact of labor supply in the first years after childbirth on subsequent labor market prospects emerges from Eckstein and Wolpin (1989), Francesconi (2002), Del Boca and Sauer (2009).

An important *caveat* for reduced form models is that they allow to estimate only the *ex post* cost of children, i.e. the change in labor supply, occupation and job, and thus earnings, that occurs after realized fertility; this limit is also shared by structural models that incorporate endogenous wage formation or labor supply choices but take as given the level of education and household structure, or model fertility as an exogenous process. On the other side, structural behavior models that include investment in human capital decisions, entry in the labor market and fertility choices are also able to capture the "pre-child effect of anticipated fertility" (Kleven et al., 2016): women may invest less in their education or self-select into more family friendly firms, sectors and occupation in anticipation of their desired fertiltiy.

Adda et al. (2015) build a dynamic life-cycle model endogenizing human capital accumulation, labor supply, occupational choices, wages, savings and fertility, and allowing for the level of skills depreciation to differ across jobs and across the life cycle, in order to incorporate different trade-off faced by the woman in terms of optimal investment in her career and optimal timing for fertility. Estimating the model on German data, they find that, with respect to a scenario without possible fertility, women looses around 35% in terms of net present value of income; most of this loss (27%) comes from reduction in labor supply over the life cycle, while only 5% can be attributed to self-selection of women into lower-quality career paths based on desired fertility (pre-child cost).

In the first part of the analysis I follow a novel attempt to estimate the cost of motherhood, that applies the event study mehodology to earnings and labor market outcomes in order to estimate the impact of children on labor market trajectories in a fully dynamic setting. The event study approach can only estimate the post-child impact of fertility on labor market outcomes, given self-selection into fertility and initial conditions; the assumptions required for the impact to be correctly identified are slightly different than in standard reduced form models, and I will discuss them thoroughly in the next sections. Angelov et al. (2016) use Swedish data to estimate the impact of parenthood on within-couple inequality, finding that 15 years after childbirth the gender gaps in income and wage have increased by 32 and 10% respectively; Kleven et al. (2016) extend this analysis to Danish data to explore which proportion of overall gender inequality is explained by the disparity in child penalties, and how this proportion changed over time; based on a dynamic decomposition framework, they find that the fraction of gender inequality accounted for by inequality in the impact of childbirth has increased from around 40% in the Eighties to 80% in 2013.[2]

Finally, the impact of career breaks after childbirth has been indirectly explored in the policy

[2]Dobkin et al. (2016) apply the event study methodology to explore the consequences of hospital admission on a number of economic outcomes.

evaluation literature: as several reforms of family policies, and in particular of parental leave legislation and childcare costs and availability, took place in most developed countries, a rich literature emerged trying to evaluate the effect on several outcomes, namely maternal labor supply, fertility and child development. Childcare subsidies and increasing childcare availability are a crucial policy instrument to reduce the opportunity cost of labor market participation for new mothers.[3] On the other side, increase in paid maternity leave may have contrasting effects: on one side, reducing the risk of job loss around childbirth and guaranteeing protection of specific human capital accumulation, they may have a positive effect on fertility and on labor supply (at the extensive margin) after childbirth, since the woman does not have to face the cost of searching for a new job; on the other side, allowing for human capital depreciation, longer and better paid parental leave may weaken the incentive to go back to work soon after childbirth, causing loss of human capital and thus reduction in future wages and worse future career prospects. Previous research uncovered the positive relation between part time work and childcare availability on women employment in Italy (see Del Boca 2002, Brilli, Del Boca and Pronzato 2015).

Identification of policy impact usually relies on DID strategy and finds positive impact of different forms of childcare intervention on maternal employment, showing that the substitution effect prevails on the income effect: see for example Baker et al. (2008) on the introduction of highly subsidized universal childcare in Canada, Berlinski and Galiani (2007) on the large scale construction of childcare facilities in Argentina, Cascio (2009) on the introduction of public subsidies to kindergartens in the US. Havnes and Mogstad (2011), instead, find no effect on labor supply of the introduction of universal subsidized childcare in Norway.

As for intervention on parental leave legislation, results are inconclusive and show that the design of the policy is fundamental in determining different labor market outcomes of mothers: Pronzato (2009) compares parental leave legislation across European countries and finds that longer job protected leave encourages return to work of lower educated mothers, while longer paid leave increases time spent at home regardless of maternal education. Kluve and Tamm (2013) on German data find that the expansion of parental leave legislation reduces employment immediately after childbirth but encourages later labor supply at both the intensive and extensive margin; Lalive et al. (2014) evaluate the introduction of longer cash benefits after childbirth in Austria and find that they led to a delayed return to work though without jeopardizing long run labor market attachment; also Schonberg and Ludsteck (2014) find no effect of an expansion of maternity leave in Germany on labor supply in the long run but highlight a negative persistent effect on wages.

This paper contributes to the existing literature in several ways. First, I estimate motherhood

[3]Bernal (2008) highlights, however, that it is not obvious the direction of the effect of childcare subsidies on maternal employment, since they will also lead to an income effect, that may reduce the incentive to work. In her estimation, however, substitution effect prevails and the simulation of the introduction of childcare subsidies increases maternal employment in all periods after childbirth.

earnings penalty in the medium run on newly available administrative employer-employee data referring to the universe of employee in the private sector; the data are available on a monthly basis, allowing detailed analysis of the return to work decisions and take up of parental leave. This extends the work by Pacelli et al. (2013) on Italy and by Angelov et al. (2016) on Sweden and Kleve et al. (2016) on Denmark, even though I look at a shorter time span. Moreover, introduction of the *Bonus Infanzia*, which I describe in the next Section, allows estimation of the causal impact of the length of career break on maternal earnings; while my research closely follows Lalive et al. (2014) and Italy and Austria are quite similar in terms of fertility rate (respectively 1.37 and 1.46 in 2015, OECD data), they significantly differ in terms of maternal labor market position: maternal employment rate is 55.3% in Italy and 75.7% in Austria. Moreover, family policies reforms, included those exploited by Lalive and coauthors, usually aim at extending job protected leave or paid parental leave, while, to the best of my knowledge, the *Bonus Infanzia* is the first policy instrument aimed at encouraging earlier return to work.

3 Institutional background

3.1 Family policies in Italy

Major rearrangement of maternity protection in Italy led to the *Testo Unico sulla Maternità* (d.lgs.151/2001), which was integrated by some reforms in next years and is the foundation of family legislation in Italy.[4]

Maternity is protected by 5 months of mandatory leave from work (hereafter, ML), during which the woman is not allowed to work; by default, she has to stop working 2 months before delivery and return to work 3 months after, with some flexibility in the timing of the leave when health conditions allow so; the period is prolonged for specific categories of workers or if some health issues emerge during pregnancy. During the period of mandatory maternity leave, the woman receives by social security an allowance equal to 80% of her previous wage.[5]

In addition to the mandatory maternity leave, the household has 10 months (no more than 6 months for each parent) of voluntary parental leave (PL) until the child is 12 years old. Up to six months of parental leave are paid 30% of the wage until the child is six years old by social security.[6] [7]

With respect to leave systems in other OECD countries, Italy is characterized by a particularly generous maternity leave, both in terms of length and payment rate: according to OECD data, Italy has one of the highest full rate equivalent maternity leave (length in weeks times average payment rate), before, among the others, Austria, France, Germany, Spain and UK. As for the additional paid leave entitlements, Italy performs more poorly in terms of both generosity and length of the leave and entitlements reserved to fathers, so that in total public spending per child born on maternity and parental leaves is lower than the OECD average.

Another relevant characteristics of Italian family legislation is the scarce provision and use on early childcare services: while enrollment in age 3-5 is one of the highest in the OECD, around 95%, it is less than the average for children 0-2, lower than 25%.

Figure 8 shows the high heterogeneity in childcare coverage and childcare use across Italian provinces in 2015: moreover, where supply (measured in number of authorized slots) is higher, also demand (measured as the number of children attending some form of childcare) is higher, providing evidence for the presence of some rationing (on average, 33% in 2014, *CittadinanzAttiva*).

[4]The legislation I refer to is directed to dependent workers in the private sector and is complemented by collective national contracts.

[5]The allowance is integrated with the residual 20% by firms in some sectors and occupations, according to collective bargaining.

[6]If the father uses at least 3 months of leave, the household has 11 months in total.

[7]For individuals with personal income below 2.5 times the minimum pension, parental leave is paid until the child is 8 years old.

3.2 The use of parental leave in Italy

Figure 6 shows the slow return to work of mother after the end of compulsory maternity leave, highlighting that it takes more than one year and a half to go back to pre-birth levels of days worked.[8]The average number of months of parental leave in fact is 3.5, after a maternity leave lasting on average 7.4 months (the median is 6).[9] In more than 80% of the cases, parental leave is asked by a woman, even if this disparity has decreased over the years (in 2005, only 12% of demands were presented by a man, more than 18% in 2015). Figure 7 shows the average use of parental leave in the six months after the end of mandatory maternity leave; two main facts emerge: a slow constant decrease in the amount of leave asked in the first months after childbirth and a strong seasonality in maternal behavior. On average, a woman is away from the labor market 11 months (6 months of standard deviation) around childbirth. In particular, 20% of women start working immediately after the end of mandatory ML, 60% after 6 months from the end of ML (the maximum amount of paid PL leave), around 85% after 16 months (5 month of ML and 11 of PL).

In the context of a major labor market reform in Italy in 2012, some measures were introduced with the explicit purpose of "sustaining parenthood, promoting a culture of higher sharing of child care task within the family and facilitating reconciliation of work and family time".[10]

First of all, for the first time paternity leave was introduced (one mandatory day and two additional optional days, paid at 100% of the salary).

The second measure in described in detail in the next subsection.

3.3 The *Bonus Infanzia*

Law 28/06/2012 n. 92 introduced a monthly subsidy to pay for childcare services; the subsidy could be asked within 11 months from the end of maternity leave for a maximum of 6 months, upon giving up the corresponding number of months of optional parental leave. The conditional transfer took the form of a voucher to pay for private baby sitting services or direct payment from the Social Security Institute to public or recognized private childcare centers. The measure was introduced experimentally in the years 2013-2015, and confirmed for 2016 and 2017.

The introduction of the *Bonus Infanzia* (BI) thus changed incentives to go back to work *via* two different channels. On one side, directly reducing childcare costs with a conditional subsidy, it reduced

[8]The Figure is not conditional on working, and thus incorporates women who leave employment after childbirth.

[9]Even if it is legally fixed to 5 months, some measurement error arises because a month enters the calculation also if the leave started anytime in the month, potentially on the last days of it; moreover, health issues may lead to longer absences around childbirth.

The figures ignore 1st and 99th percentiles.

[10]In the same year, another law introduced the possibility to fraction parental leave on a hourly basis, in order to guarantee higher flexibility to working parents.

the opportunity cost of going back to work; this channel operates conditional on the supply of childcare centers in the relevant area for the mother. On the other side, since the parental leave allowance is a function of the wage while the subsidy was a fixed amount, higher than the average PL allowance, it directly increased the cost of staying home after the end of ML.

In particular, Figure 1 shows how the BI changed job protection and incentives around childbirth.

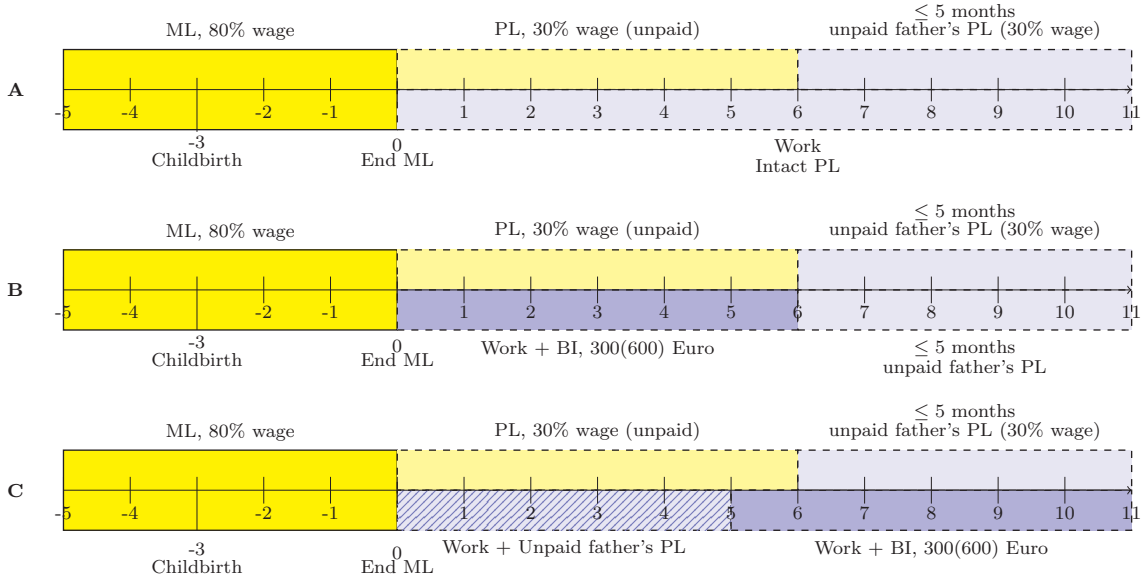

Figure 1: Job protection around childbirth [11]

More explicitly, in the baseline institutional setting (Panel A of Figure 1), the woman may decide to go back to work immediately after the end of ML and save her PL for later, or she may immediately use the optional PL and go back to work at most 9 months after the child is born; in this case, she would consume all the PL she is entitled to (either paid or unpaid) but the household would still have the paternal PL quota.

Panels B and C describe the changes induced by the introduction of the subsidy: in this case, if the woman decides to go back to work, she can ask for the conditional subsidy to pay for chidlcare services (300 Euro in the first tender, 600 Euro afterwards); if she does, she gives up her quota of PL and the household can only use the unpaid father's quota. This choice is possible in the first 11 months after the end of ML: if the mother decides to use her PL, then she can not ask for the subsidy (the first row is the same in all panels). The only way the household could delay the use of the BI is by using the unpaid father's PL first, while the woman goes back to work immediately after ML, and then ask for the subsidy (Panel C). In this case, the household would have consumed the entire PL entitlement.

[11] The Figure considers a regular 5-months ML (with no extensions) and the full use of the subsidy (6 months). Households may anyway decide to use part of maternal PL and then ask for the subsidy for the remaning available months.

The implementation of the policy, in terms of timing and amount of the transfer, was staggered in time and changed from one year to the other. The first tender came out on June 14th, 2013 and was open to all mothers within 11 months from the end of ML and to pregnant women whose expected day of delivery was within four months from the expiring date of the tender (November 2013). Demands could be presented starting July 1st until July 10th. In the first year of the experiment, take up rate was really low, with only 4000 demands, and only 37% of allocated funds (20 millions) was used, probably because of limited participation of childcare centers (a second tender for childcare providers was opened on November 8th), short time notice (apart from the short time window when demands could be presented, the complete list of childcare providers available for the voucher contribution was only published online on June 28th), little advertisement and prominently because the amount of the subsidy was too low (300 Euro).

A decree of the Ministry of Labor on October 28th 2014 redesigned the contribution: it raised the subsidy to 600 Euros per month, established that for years 2014 and 2015 demands could be received until the end of December and that a threshold on ISEE might have been introduced as an eligibility criterion if the trend in demands suggested resources would have not been sufficient to cover all demands[12]; otherwise, if such a limit were not introduced but resources were to finish, new demands could have not been received.

Relative instructions were published on INPS website on December 16th 2014, when the new tender was opened. In 2015, applications were allowed starting from January 1st and the budget (20 millions Euros) was finished on December 14th. In 2016, the budget (20 millions Euros) was finished on August 3rd.

Figure 2 summarizes the timing of the policy.

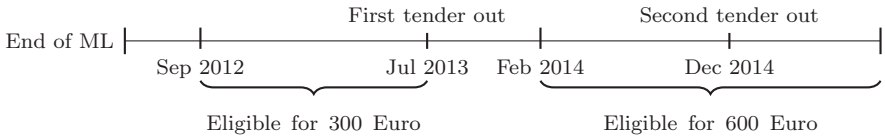

Figure 2: Policy time frame

In addition to women identified by the brackets, the first tender also allowed access to the subsidy to women who were pregnant and had expected delivery within four months (within November 10th,

[12]The ISEE (Equivalent Financial Situation Indicator) is an instrument which is used according to standard criteria to assess the financial situation of people requesting social security benefits or access to public utilities under favorable conditions. Household's financial situation is assessed by taking into account the income of all household members, their assets and the composition of the household (number of members and their characteristics).

2013).[13]

In total, about 20,000 women working as employees in the private sector, roughly 3% of workers with a maternity episode between 2012 and 2015, used the subsidy in the three experimental years. Around 70% of the applicants (all those who could according to eligibility constraints) asked for the maximum amount of 6 months of subsidy; roughly 30% were eligible for all 11 months after childbirth.

[13]Some women were thus excluded. Consider for example a woman who gave birth in June 2013: she was not pregnant anymore when the tender came out, and she probably ended her maternity leave in September, too late for the first tender and too soon for the second one. In my definition of eligibility I do not include these women.

4 Data

I use administrative data from the Italian Social Security Institute (INPS). Data cover the universe of dependent workers in the private sector with monthly frequency from 2005 and yearly from 1983; women working as employee in the private sector constitutes roughly 75% of the female workforce in Italy. Data come from the UNIEMENS modules that all Italian firms with at least one employee have to fill in and transmit monthly to the Social Security Institute and include rich information about each employee (occupation, salary, hours of work, days of leave, hiring and dismissal reasons, type of contract, time schedule).

Data also include some information about the firm, including age, size, sector according to ATECO07 classification, location and position of the firm if it belongs to a group; moreover, having information on all workers I can also derive information about workforce composition in terms of gender, age, citizenship, type of contract, time schedule etc.

As for demographic information, I know date of birth of the worker, her citizenship and municipality of residence.

I use monthly and yearly data to reconstruct tenure, work experience, age at first job, unemployment or inactivity spells.[14] I define a job by the employer, the type of individual contract (duration, full time/part time), the type of social contribution rule applied, the qualification of the worker and the type of collective contract.

I merge social security records with other data sources, namely applications for maternity leave and parental leave allowances and applications for the *Bonus Infanzia*. Doing so, I get precise information about pregnancy (date of expected delivery, date of birth of the child, date of beginning and end of the leave), and on the treatment (when the application was presented, how many months of subsidy the woman asked for, whether she used the subsidy to pay for private baby sitting services or as direct payment to childcare providers). Moreover, using data from parental leave applications, I can identify the father for a subsample of women; the identity of the father is asked to check on the cumulative periods of leave used by the couple, but it is not stringent to get access to the leave allowance, so that not all women correctly report it. When they do, if the father is a dependent worker in the private sector I can reconstruct his work history as well and get information on his current job from the social security records, as I did for the woman. Given that the sample of women who correctly fill in all the form, including information on the partner, may not be random, I will only present results including

[14] Since I do not observe workers in the public sector nor self-employed, I assume that short periods outside the available information flow do not correspond to employment spells in the public sector or as a self-employed; I am now working to merge my data to workers' contribution history in order to be able to distinguish periods out of employment from periods in which the woman was working in the public sector or as a self employed; however, it will not be possible to precisely distinguish unemployment from inactivity.

partner's characteristics as control variables as a robustness check.[15]

This data set is convenient for the analysis of interest for several reasons.

First of all, it contains information on the universe of Italian dependent workers in the private sector. This ensures validity and reliability of my results. Moreover, since the size of the policy of interest was relatively small, only access to the whole population of the women who benefit from it allows credible evaluation.

Second, given the administrative nature of the data, measurement errors are likely to be negligible. In particular, I have reliable information on the qualification of the worker, whom I can identify as white collar, blue collar, manager or trainee; on the type of contract, being able to distinguish between permanent and fixed-term jobs, full time or part time contracts (I also have precise information on contractual hours of work); on the duration of each contract, since the firm is required to report the starting and ending dates of each contract and the motivation of hires and terminations; I have precise information on periods of leave when the worker is not working and is covered by INPS allowances (sickness leaves or short-time work, for example). Finally, information on wages is complete and more precise than in sample data, and I have both information on the salary (contractual wage, *retribuzione teorica*) and on the wage that is actually paid by the firm, including bonuses, productivity premia and arrears and neat of leave periods. All monetary measures are corrected at current prices.

For the event study I use information about all women who had the first child between 2008 and 2012, in order to be able to observe them for at least 3 years before and three years after maternity leave. For the estimation of the impact of shorter leave on later outcomes, instead, I build my sample matching information about all women who used the childcare subsidy (and worked as employees in the private sector) with a random sample of workers who had at least one child between 2009 and June 2015 (in order to observe them for at least 6 months after childbirth).

Looking at the data, 20% of the mothers come from the South and from the Center, around 25% come from North-East and 35% from North-West; this shows that the regional distribution of working mothers is different from that of mothers in Italy: looking at ISTAT data from the 2012 Survey on Births and Mothers, 40% of births occur in the South and from the North. Around 12% of women are non Italian, and the median age is 35.

As for sector of occupation, 62% of women work in the tertiary sector, 24% in the industry, slightly more than 8% in handicrafts and 5% in finance; the remaining proportion works in agriculture.[16]

Slightly less than 30% are blue collar workers and 61% are white collar; the residual category includes managers (0.3%), trainees (6%) and other categories of workers. 94% of women has an open-ended contract and slightly more than 50% works full time.

Table 1 report descriptives statistics of relevant covariates on women who had a child in 2008-2012; 2 report relevant covariates by use of the *Bonus Infanzia*.

[15] I have not done this yet.

[16] Agricultural workers are usually subject to different contribution legislation and thus are rarely reported in the *UniEMENS* forms my data come from.

5 The Cost of Motherhood

Figure 9 plots raw data on earnings paid by the firm over time from the beginning of maternity leave: according to Italian legislation on maternity leave, labor income falls in the period of maternity leave (social security covers 80% during the 5 months of mandatory maternity leave[17] and 30% for the first 6 months of parental leave). As women go back to work, earnings go up again but never recover to the level before childbirth. Earnings are unconditional on employment status, meaning that I impute 0 earnings to women who are currently working.

In order to estimate the impact of childbirth on labor market outcomes, I adopt the event study methodology that allows to estimate the impact of childbirth on the whole dynamic trajectory of the outcome of interest.

The estimated impact only accounts for post-child costs of fertility, conditional on self-selection into motherhood and to prior investments and labor market choices; nonetheless, according to Adda et al. (2015), the post-child costs in terms of reduction in labor supply at the intensive and extensive margin and changes in wage, sector and occupation account for almost one third of the total impact of fertility.

My specification is

$$Y_{irt} = \sum_{R \neq -1} \alpha_r \mathbb{1}[R = r] + \sum_{K} \beta_k \mathbb{1}[age_{it} = k] + \sum_{T} \gamma_t \mathbb{1}[T = t] + \epsilon_{irt} \tag{1}$$

where the outcome of interest is earnings and it is modeled non parametrically as a function of the relative time from the event to capture the relation of interest, i.e. the impact of the event on the outcomes (first term on the RHS), age of the individual to take into account that the occurrence of the event at different points in time may change its impact and to capture life cycle effects (second term) and calendar time to control for economic cycle fluctuations, seasonality and the possibility that the occurrence of the event in different years or different months in the year may change its impact as well (last term). The excluded term for the time-to-event dummies is t-1, so that each coefficient can be interpreted as a change with respect to the period before entering maternity leave. Relative time and calendar time are expressed at a monthly level, while age is in years.

For the coefficients of interest α to correctly identify the impact of relative time from childbirth on earnings, I have to assume that, conditional on having a child, on age and calendar time, timing of the event is random with respect to the outcome.

Assumption of randomness of timing of maternity may be violated if

- individual specific components of the error term drive both the timing of childbirth and earnings. An example may be education, which I do not observe in my data: education is positively associated with both earnings and delaying fertility; not controlling for it would lead to biased

[17] In some cases, firms integrate the missing 20% according to national contracts.

estimates of the impact of time from childbirth on earnings.[18] In order to avoid this violation, I also adopt a specification where I control for individual fixed effects; because of collinearity issues, this does not allow me to include age and calendar time fixed effects.[19] Nevertheless, results are remarkably similar across specifications.

- Another possible violation of the identifying assumption would occur if the timing of fertility was affected by some shock to earnings; I rule out this hypothesis because, given the monthly detail in my data, I would be able to detect any change in earnings that could occur before the decision of having a pregnancy.

- Finally, another risk to identification relies in the possibility that timing of fertility responds to unobserved anticipated shock to earnings; in this case, my estimates would be biased. I assume this is not of concern in my setting for different reasons: first of all, given that my analysis is conducted at monthly level, violation of identifying assumption would occur if women could self select into a specific month of birth, which is not perfectly controllable. Second, given that it takes time to have a child, the choice should be driven by anticipation of at least 9 months; in case of a negative anticipated shock, the woman may decide at time t to have a child while still employed in order to get access to protected maternity leave: in this case, she should have predicted that the negative shock would occur at least 9 months from t, which is an implausible hypothesis[20] In case of a positive shock, instead (for example, an expected promotion or improvement in contract condition), if anything, I would be underestimating the impact of childbirth on earnings loss.

In order to allow for possible pre-trend in earnings, my preferred specification is

$$Y_{irt} = \sum_{R>-1} \alpha_r \mathbb{1}[R = r] + \delta r + \eta_i + \epsilon_{irt}, \tag{2}$$

where δ captures the trend in earnings prior to maternity, η_i are individual fixed effects. Assuming uncorrelation of time of the event and earnings (conditional on motherhood and controls), the parameters α in this specification capture the difference between earnings at t and the level of earnings at time t according to the trend prior to maternity leave. In order for predicted earnings to be a valid counterfactual of earnings in absence of a child, I have to assume that, for any individual and any $\bar{t}$, $\hat{y}_{t\geq\bar{t}} = E(y_{t\geq\bar{t}}|y_{t<\bar{t}})$ is a good predictor of $y_{t|t\geq\bar{t}}$.Then, the estimated α_r would capture the impact

[18]In particular, the bias would be negative: higher education is positively associated with earnings and negatively associated, given age, to relative time.

[19]Dobkin et al. (2016) normalize the initial relative time period to zero in order to avoid collinearity between relative time and calendar time when including individual fixed effects; this is possible under the assumption that there is no pre-trend in the outcome prior to the event, or that the pre-trend is linear up to r=-1. I repeated the analysis with this alternative specification and results do not change.

[20]Actually, maternity leave is protected up to 60 days from the beginning of an unemployment spell. Thus, the anticipation should cover 7 months.

of childbirth on earnings. Kleven and coauthors confirm the validity of the estimate obtained by the event study approach comparing them with the results from a common reduced form estimate, namely using gender composition of the first two sibling as an instrument for having a third child; results are not statistically different over time.[21]

Figure 11 reports results for the estimation of Equation 2[22]: even though labor income recovers to pre-birth levels about 20 months after maternity leave, it never closes the gap with the potential income in absence of childbirth and would the trend have been constant. Such loss is shown in Figure 12: labor income for mothers is stably more than 35% lower than potential labor market income three years after maternity.

This estimate is slightly higher than the one by Kleven and coauthors, around 20%, possibly incorporating the impact of additional children; since my results are driven by a sharp reduction in labor supply, the higher cost for Italian mothers may be driven by differences in the institutional and labor market characteristics. In particular, maternal employment is 30 p.p. higher in Denmark than in Italy (see Figure 16), and early formal childcare attendance (0-2) is 65% and less than 25% in Italy (OECD data).

The gross earnings loss include also the total drop in labor income experienced by women who decide to quit working: 20% of women are not employed as dependent workers in the private sector one year after childbirth. Indeed, focusing on the earning loss on women *conditional* on being employed (observed in the relevant population), the loss is reduced to around 12% (see Figure 13). This is driven by a reduction in labor supply also at the intensive margin: on average, after two years from childbirth, the number of days worked is reduced by 5% and 20% of women more work on a part time schedule, as shown in Figure 15.

I repeated the analysis for different subgroups, identified on job characteristics prior to childbirth (observed 6 months before entering ML): conditional on staying in employment, the drop is higher for women who were working full time prior to childbirth (-17%), for white collar workers (-16%) and for women who did not have a permanent contract before childbirth (around 20%), and lower for women in the South. Results are also robust clustering the errors at larger levels (province by sector dummies).

When looking at the longer run, up to five years after the beginning of ML (Figure 14), results do not change, showing that choices immediately after childbirth have long term consequences and there seems to be no re-entry in employment when the child becomes eligible for kindergarten.

The same analysis performed on men shows no income penalty associated with fatherhood.

[21] They also compare results coming from an IV estimation using twinning at second pregnancy - in this case the estimated coefficients are slightly lower, which is a standard result in the literature, as having twins represents a "more efficient child production technology" and has a specific impact on labor supply, violating the exclusion restriction assumption.

[22] 95% confidence intervals refer to standard errors that are clustered at the individual level.

6 Empirical methodology

My main relation of interest is the impact of the length of PL on labor market outcomes.

Endogeneity in the choice of parental leave prevents causal interpretation of the OLS estimates. I thus exploit the introduction of *Bonus Infanzia* as an exogenous variation in the incentive to take shorter parental leave after the mandatory absence from work. Voluntary take-up of the policy implies positive selection bias in the simple comparison of women who used the subsidy and women who did not, because only women with higher potential gains from early return to work will apply for the subsidy. However, the sharp introduction of the policy can be interpreted as randomization on eligibility and can thus be used as an exogenous variation that affected the expected length of parental leave.

As seen in Section 3, eligibility status was defined with respect to the date of end of ML: all women whose ML ended after August 2012 could apply to the first tender, all those whose ML ended after February 16th 2014 could apply to the second tender and finally all women whose ML ended in 2015 could apply (until the budget was exhausted at the beginning of December). Since applications were possible within eleven months after the end of ML, the cutoff dates also determined the maximum amount of the subsidy the woman was potentially eligible for: as an example, a woman whose ML ended in February 2014 was at the end of the tenth month when the second tender came out and could just apply for one month of BI, if she had not used her PL already. Since the timing of the tenders was unexpected and the rules for eligiblity referred to past events, the assumption of random assignment is satisfied. In fact, even if the date of end of ML could be in principle manipulated by the woman, she could not predict the exact timing of the tender opening in advance.[23] Furthermore, Figure 17 shows that the distribution of women across date of end of ML is homogeneous around the cutoff dates.

Ideally, I would compare only women around the eligibility threshold date, in order to avoid self selection of women into motherhood in response to the introduction of the policy, possibly based on unobservables which I could not control for, and to compare groups of women as similar as possible in terms of individual characteristics and socio-economic environment where they operate. However, comparison around the cutoff is not feasible for three main reasons: first, because of the continuous eligibility measure identified by the policy, women close to the cutoff are eligibility for at most 1 or 2 months of the subsidy, and are thus those with the lowest incentive to take it; as a consequence of that, and because of the small number of women who used the subsidy overall, I would end up with a very small sample of "treated" women. Finally, given that the amount of the subsidy changed after

[23] As rules changed in October 2014, allowing for application on a rolling basis in 2015, one may argue that eligiblity was not unexpected for women who ended their ML in 2015. Actually, as the new law passed in October, women whose ML ended in the first 10 months of 2015 were already pregnant (or on ML) at the time of the law. Anyway, in a robustness check I exclude all women whose ML ended in 2015; results do not change.

the first tender, I would compare either non eligible women with women eligible for the lowest (and least used) subsidy or women who were eligible for two different subsidies (300 vs 600 Euro).

On the other side, if I widen the time window around the cutoff and compare all eligibile women with non eligible ones, the exclusion restriction assumption may be too restrictive.

Nonetheless, I provide graphical evidence that the two groups are not significantly different in terms of observable demographic and pre-childbirth labor market characteristics. In order to further exploit heterogeneity of the IV and to highlight the exogeneity of the instrument itself, in a robustness check I use the continuous eligibility status: even allowing for some women to have chosen to have children in response to the policy, they could not predict the exact timing of the pregnancy, thus they could not be able to affect their continuous eligibility status. [24]

Thus my empirical model is:

$$Y_{i,r,t,c|r>0} = \alpha_1 X_{i,r,c,t} + \alpha_2 B_{i,c,t} + \eta_i + \eta_m + \varepsilon_{i,r,t,c} \tag{3}$$

$$B_{i,c,t} = \delta_1 X_{i,c,t} + \delta_2 E_{i,t} + \delta_3 itc_{i,c} + \eta_i + \eta_m + \xi_{i,c,t},$$

where r is time relative to the end of maternity leave, $X_{i,r,c,t}$ include a quadratic in age, months of experince in the labor market, type of contract (full time/part time, open ended/temporary), occupation and sector dummies (and childcare supply at the municipal level in some specifications), $B_{i,c,t}$ is equal to 1 if the woman used the *Bonus Infanzia*, η_i and η_m are respectivel individual and month fixed effects, $E_{i,t}$ is equal to 1 if the woman was eligible for the subsidy and $itc_{i,c}$ is the number of childcare centers in municipality c that decided to participate into the *Bonus Infanzia*.

I report results from three different identification strategies that help me identifying different mechanisms behind the data.

I first estimate a panel model where I include individual fixed effects, and I thus identify the impact of the *Bonus Infanzia* by the different within variation in the outcome of interest before and after childbirth.

[24] Another threat to the identification strategy would be the occurrence of other events in the same period that could invalidate the exclusion restriction assumption. Together with the introduction of *Bonus Infanzia*, one day of mandatory and one day of optional paternity leave paid at 100% of previous salary were introduced; there are no data available yet to control for take up of paternity leave, but I assume it did not significantly affect maternal behavior in term of optional parental leave based on the small size of the intervention and on previous evidence from a similar larger reform in Sweden: Ekberg et al. (2013) show that the introduction of the *Daddy month* did not change later behavior in terms of use of optional parental leave by the two parents. Cools et al. (2015) show similar results for the introduction of the same measure in Norway. In 2014, a law introduced the possibility to use parental leave on a hourly basis in order to guarantee higher flexibility in return to work; however, data until the end of 2015 show very little success of this policy, raising no concerns about it being a confounding factor in my identification strategy.

I then estimate a Diff-in-Diff model at each r:

$$Y_{i,r} = \alpha X_{i,r} + \beta_1 BI_i + \beta_2 post_{i,r} + \beta BI_i \times post_{i,r} + \eta_m + \varepsilon i, r,$$

where $r = -12$ or $r > 0$. This will allow me to estimate the impact on the women who actually used the policy compared to those who did not (*average treatment effect*).

Finally, I use the random assignment to eligibility as an instrument for the use of the subsidy itself, in a one-sided non compliance framework. In this case, if the exclusion restriction that eligibility does not affect *per se* the outcome of interest holds, I can deal with the endogeneity of the selection into use of the subsidy estimating the impact of the subsidy itself on the compliers. In order to account for different supply of childcare services and different participation of infant toddler centers to the *Bonus* across municipalities, I include childcare supply at the city level as a control and I add as an instrument the number of childcare centers in the municipality of residence of the woman that participate into the *Bonus Infanzia*.

In order to interpret the result about the *Bonus Infanzia* as working through the channel of shorter parental leave, I first show in a 2SLS that the use of the BI indeed significantly reduced the length of PL immediately after childbirth: results are reported in Figure 20.

Table 3 reports average length of leave and weeks worked by continuous treatment, the first stage regression is reported in Table 4; in the main analyses, I focus only on women who used the higher subsidy, but including also the lower subsidy does not significantly change the results.

7 Results

I look at outcomes of interest up to 12 months after the end of ML (roughly 15 months after childbirth), to be able to observe still more than 7,000 women who used the bonus in the last period, while, given the recent implementation of the policy, extending the analysis to longer periods would drastically reduce the number of women who used the Bonus that I can observe. [25]

Figure 23[26] report results from the regression on log earnings: data indicate a positive and large impat of the *Bonus Infanzia* in the first 6 months after the end of mandatory ML, but the effect decreases and gets close to zero after that. The impact on earnings is coherent with the impact that is observed on labor supply at the intensive margin, measured by days of work, that is shown in Figures 25.

As the first part of the analysis suggested that the main drop in maternal earnings is driven by exits from the labor market, I performed the IV analysis on the probability of a job separation, defined as the probability of leaving the labor market in the next period or probability of separation from the firm where the woman is currently employed. Results are reported in Figure 27 and suggest that the *Bonus Infanzia* is successful in encouraging permanence in the labor market after 6 months from the end of ML. Raw data (Figure 26) show that there is some propensity of women to leave the labor market after using the months of PL they are entitled to (the probability of observing job separations increasing sharply 6 months after the end of ML), but this probability is much higher and the increase much sharper for women who did not use the Bonus.

Results are also reported in Tables 5 and 6.

[25] As for earnings, I analyze the residuals from a regression of earnings over month fixed effects in order to clean the outcome from seasonality.

[26] The coefficients referring to the period prior to pregnancy are not significantly different from zero, supporting the assumption of a common pre-trend and thus validating the DID analysis.

8 Conclusions

Low maternal employment and poor labor market outcomes and the high risk of poverty of families with children are issues of great concern in contemporary Italian labor market and at the center of public debates. The persistence of significant family pay gaps, even in countries with low and decreasing gender wage gap, is also a concern in countries with lower disparity in terms of female labor supply. The problem with assessing the impact of childbirth on labor market behavior of the parents and the impact of choices immediately after childbirth on future labor market outcomes is the simultaneity of fertility and labor market choices and the likely presence of unobservable factors affecting both. The same problem arises when evaluating the role and effectiveness of family policies in affecting households' behavior and in improving their career prospects and wellbeing.

Availability of Italian administrative data allows to explore the relationship between fertility and maternal labor market outcomes with higher precision and on the universe of Italian dependent workers in the private sector. Italian case is of particular interest because, despite low gender gap in education and high female educational level, both maternal employment and fertility rate are among the lowest in Europe.

In this paper, I adopt event study methodology to quantify the medium run effect of childbirth of maternal labor income; results show that after 20 months the loss in earnings with respect to potential earnings in absence of the child is 10%, and the penalty is stable at least until 36 months after the end of maternity leave.

In the second part of analysis I exploit the introduction of a childcare subsidy conditional on early return to work to study the effect of shorter leave on maternal earnings in the short and medium run; the unanticipated eligibility requirements set by the policy allow causal interpretation of the 2SLS estimates.

I find that the policy was effective in reducing the length of optional parental leave by more than 2 months (on a maximum of 6, the treated use on average one month of leave), and this in turn increased maternal earnings 6 months after the end of compulsory maternity leave by roughly 30%; the effect is still significant one year after, increasing earnings by more than 40%.

These results have important policy implications since they shed light on the importance of the first months around childbirth in determining future earnings trajectories of women; interventions encouraging early return to work (through childcare subsidy, higher flexibility in working hours, higher childcare provision) or decreasing the cost of human capital depreciation while on leave, or promoting better division of childcare tasks among the parents can be effective in reducing the child penalties for women and reducing the risk of leaving the labor market because of motherhood.

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Tables

Table 1: Relevant covariates

	Pre ML	Post ML 6	Post ML 12
Demographics			
Age	31.8	33.4	34.0
Immigrants	.11	.12	.12
North-East	.26	.26	.26
North-West	.34	.34	.34
Center	.20	.20	.20
South	.11	.12	.12
Labor market			
Tenure	28.2	39.7	39.9
LM exp.	45.8	63.3	69.9
No. jobs	4.0	3.9	3.9
No. firms	2.5	2.4	2.4
Job			
Permanent	.85	.85	.77
Earnings	1,832	1,079	1,523
Wage	1,448	1,564	1,542
Full time	.70	.69	.61
Working hs	27.3	34.8	33.7
Days of work	24.6	16.1	21.7
Blue collar	.29	.27	.24
White collar	.56	.56	.52
Manager	.002	.002	.002
Trainee	.07	.05	.04
Other occupation	.07	.12	.20
Industry	.18	.11	.11
Handicrafts	.07	.04	.04
Agriculture	.002	.001	.001
Finance	.03	.02	.02
Tertiary	.44	.26	.25

Pre ML refers to 6 months before the beginning of ML

Table 2: Relevant covariates by use of *Bonus Infanzia*

	Pre ML		Post ML 6		Post ML 12	
	Bonus	Non bonus	Bonus	Non bonus	Bonus	Non bonus
Demographics						
Age	32.0	31.7	33.6	33.3	34.0	33.8
Immigrants	.10	.12	.10	.12	.10	.12
Labor market						
LM exp.	127	123	172	161	192	178
No. firms	1.48	1.36	1.45	1.28	1.45	1.31
No. jobs	1.03	1.02	1.02	1.02	1.02	1.02
Not employed	.05	.07	.05	.13	.07	.22
Job						
Earnings (uncond.)	1,709	1,617	1,373	1,011	1,596	1,188
Earnings (cond.)	1,795	1,732	1,437	1,159	1,708	1,519
Wage	1,564	1,548	1,689	1,554	1,613	1,532
Permanent	.93	.91	.97	.97	.96	.95
Full time	.68	.68	.67	.68	.62	.57
Days worked	25.2	24.7	23.8	18.1	23.7	22.5
Hours of work	34.4	31.1	34.3	34.2	33.7	32.8
Blue collar	.19	.32	.18	.30	.17	.30
White collar	.71	.60	.74	.63	.76	.65
Industry	.20	.23	.20	.24	.21	.25
Manifacturing	.07	.09	.07	.09	.06	.08
Finance	.05	.05	.05	.05	.06	.05
Tertiary	.68	.63	.67	.62	.67	.61
Obs.	11,620	912,271	9,427	854,811	7,257	803,456

Pre ML refers to 6 months before the beginning of ML

Table 3: Treatment and length of leave

	Parental leave		Weeks worked	
Bonus	6	11	6	11
0	2.66	2.98	10.11	23.81
1	2.90	3.77	9.94	25.36
2	2.77	3.44	10.22	25.89
3	2.26	2.88	11.09	27.10
4	1.75	2.19	12.80	29.22
5	1.34	1.76	13.42	29.86
5.32	1.47	1.70	14.75	32.69
6	.64	.90	14.19	30.17
Total	1.04	1.41	13.56	29.61

Table 4: First stage

First stage	
Eligibility	0.04418***
	(.001)
Childcare	0.00011***
	(2.42e-06)
N	891,015
KP	3,309

Robust SE in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Impact of Bonus Infanzia on labor market outcomes

	OLS		IV	
	Short run	Long run	Short run	Long run
Parental leave	-1.165***	-1.973***	-3.93***	-4.02***
	(.008)	(.012)	(.405)	(.495)
			430.016	376.442
Exit probability	-0.008***	-0.13***	-0.004	-0.098***
	(.0002)	(.0004)	(.004)	(.007)
			406.928	364.905

Short run: up to 6 months after end ML;

Long run: 6-12 months after end ML.

Table 6: Impact of Bonus Infanzia on labor market outcomes

	Overall	Short run	Long run
Unconditional earnings	295.277***	381.055***	127.825***
	(5.169)	(5.868)	(11.526)
Conditional earnings	178.401***	369.459***	115.130***
	(7.560)	(5.900)	(6.439)
Log earnings	0.186***	0.461***	0.099***
	(.008)	(.001)	(.012)
Days of work	2.971***	6.192***	1.089***
	(.071)	(.082)	(.100)

Short run: up to 6 months after end ML;

Long run: 6-12 months after end ML.

Figures

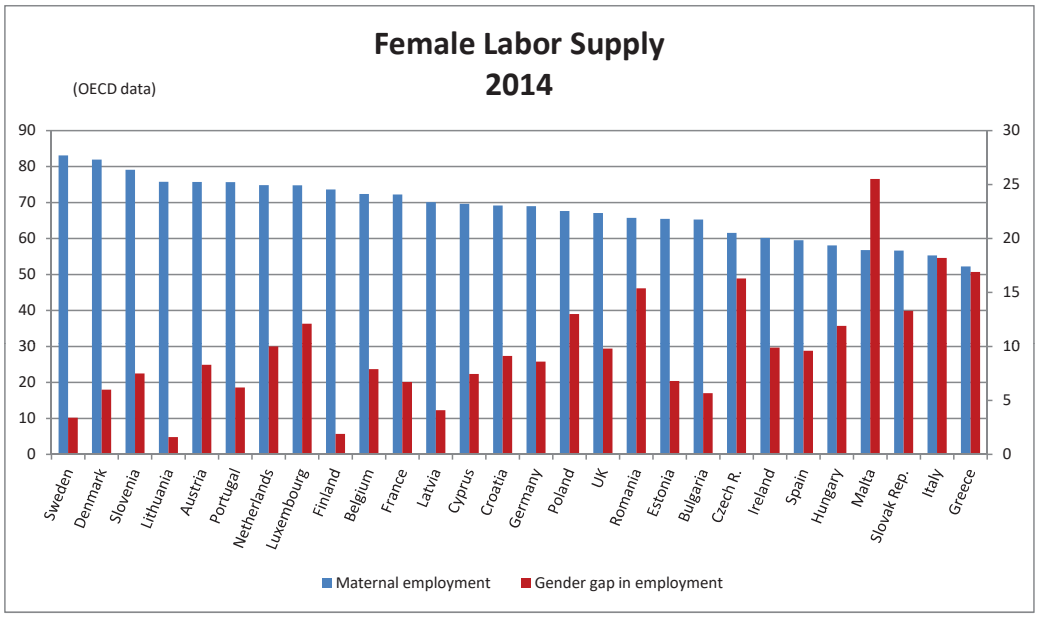
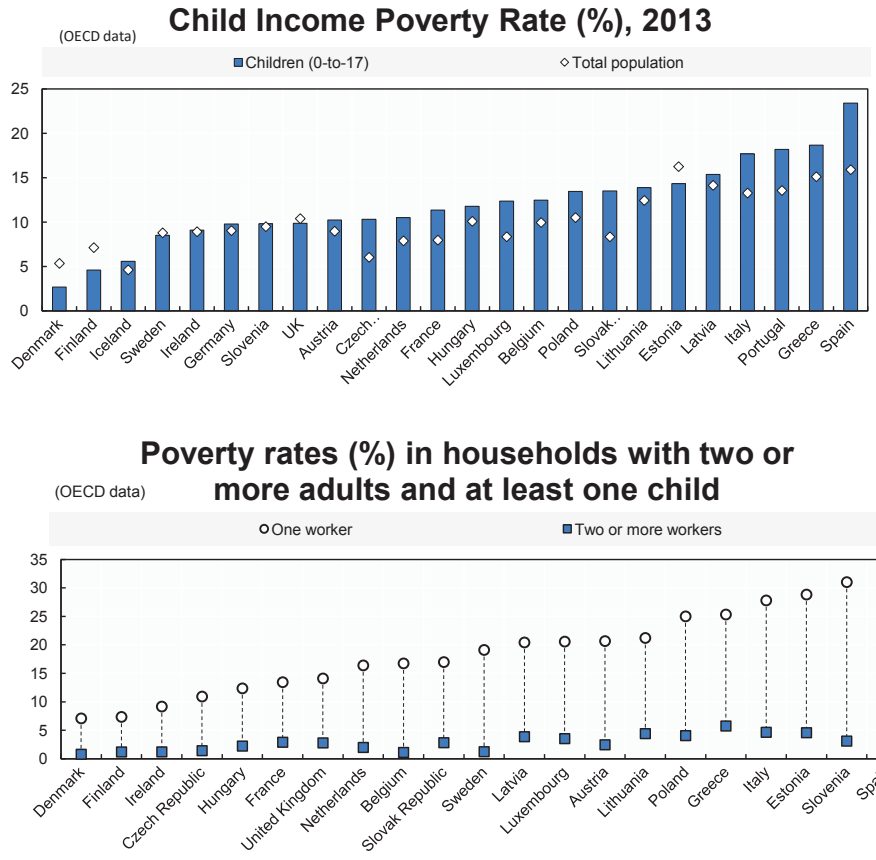


Figure 3: Maternal employment rate and employment rate gap in European countries

Figure 4: Income poverty in European countries



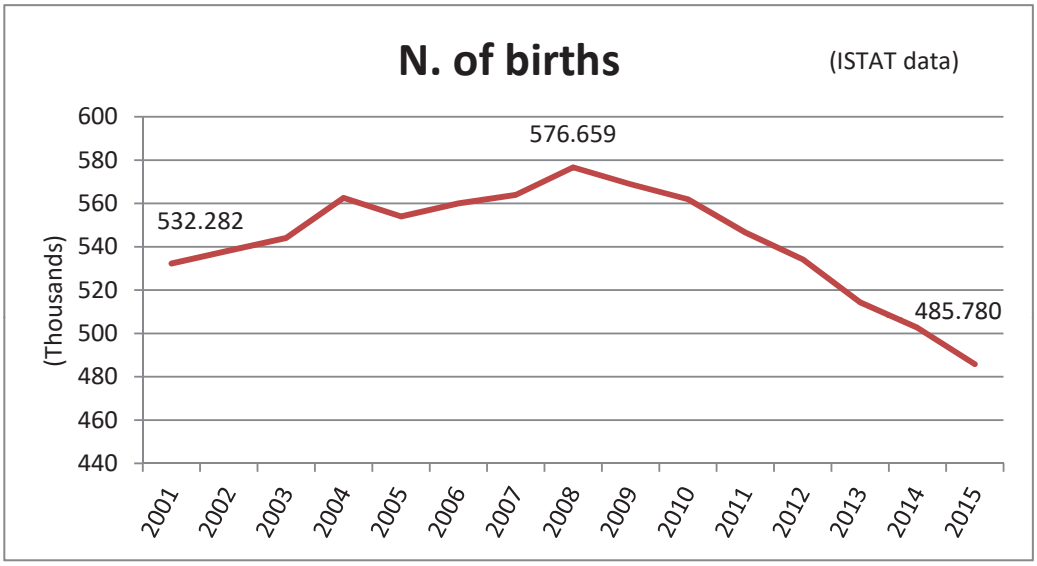


Figure 5: Births in Italy, 2001-2015

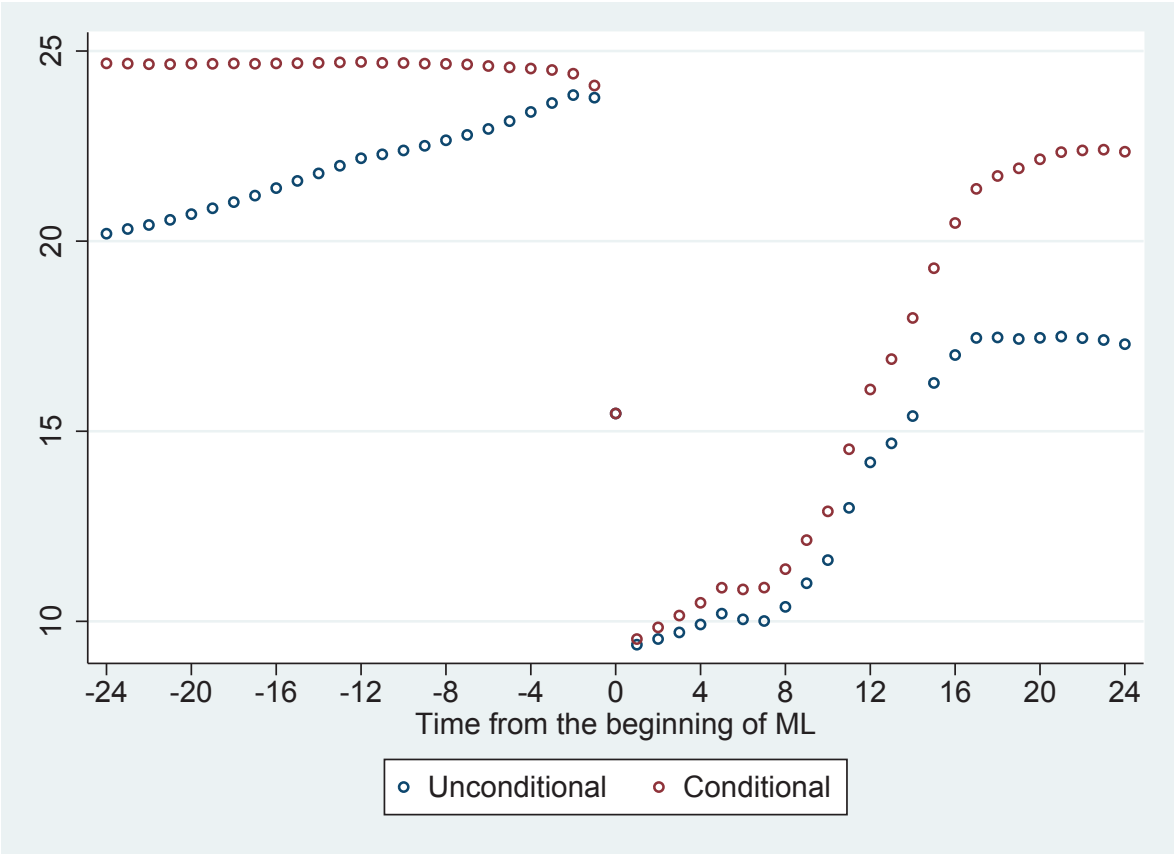


Figure 6: Days of work around childbirth

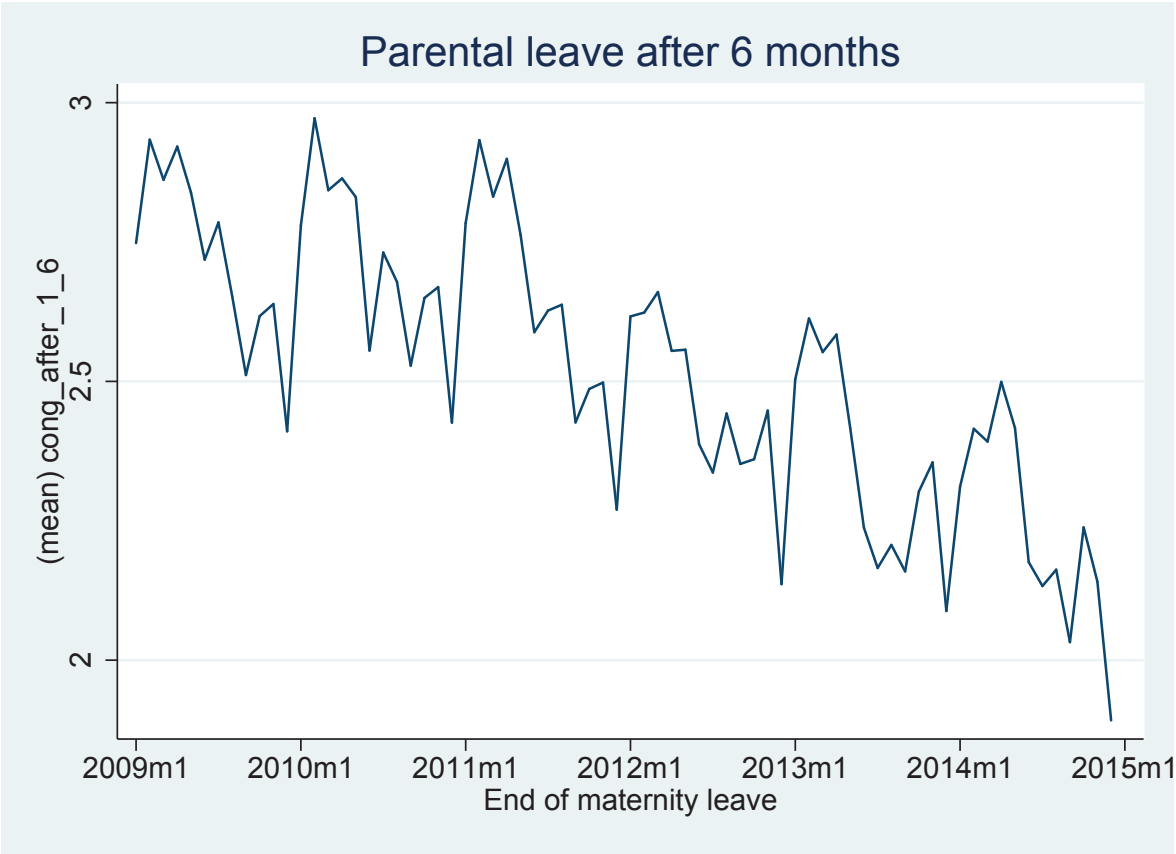


Figure 7: Use of parental leave 6 month after the end of ML

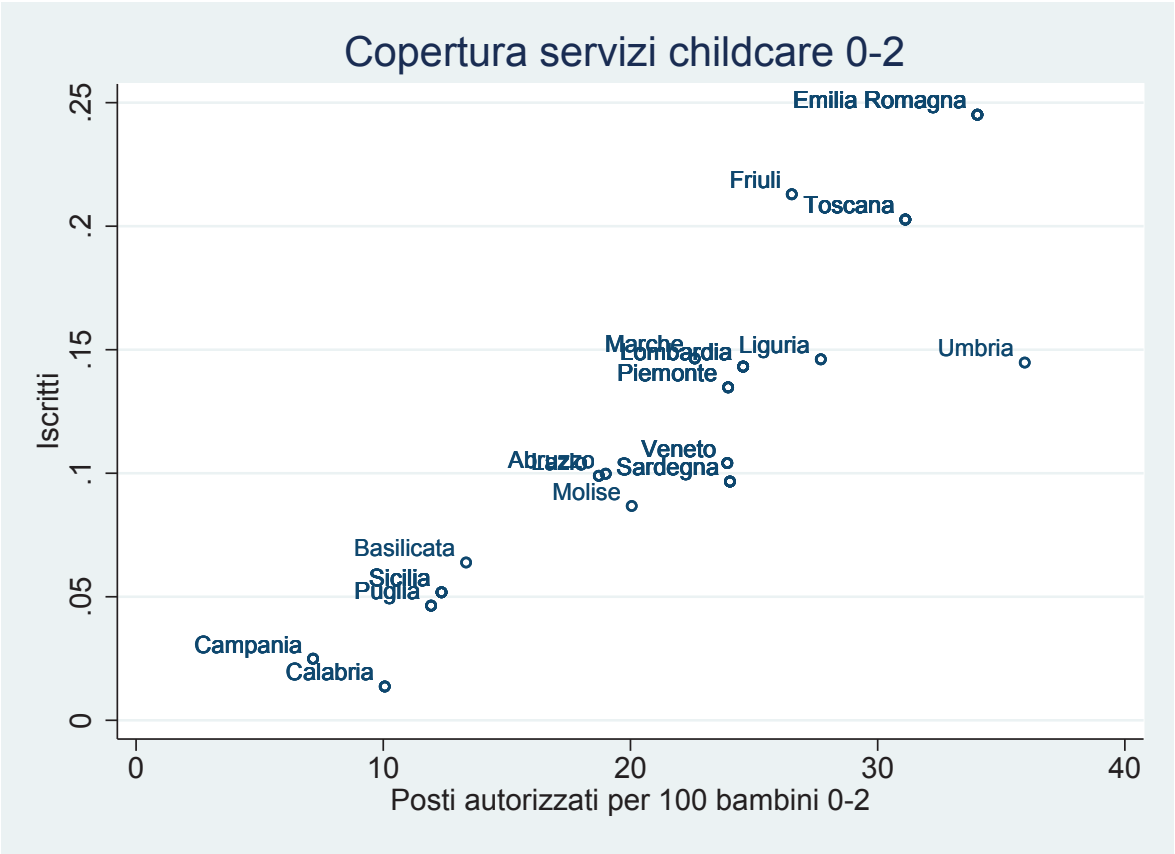


Figure 8: Childcare coverage by province, ISTAT data.

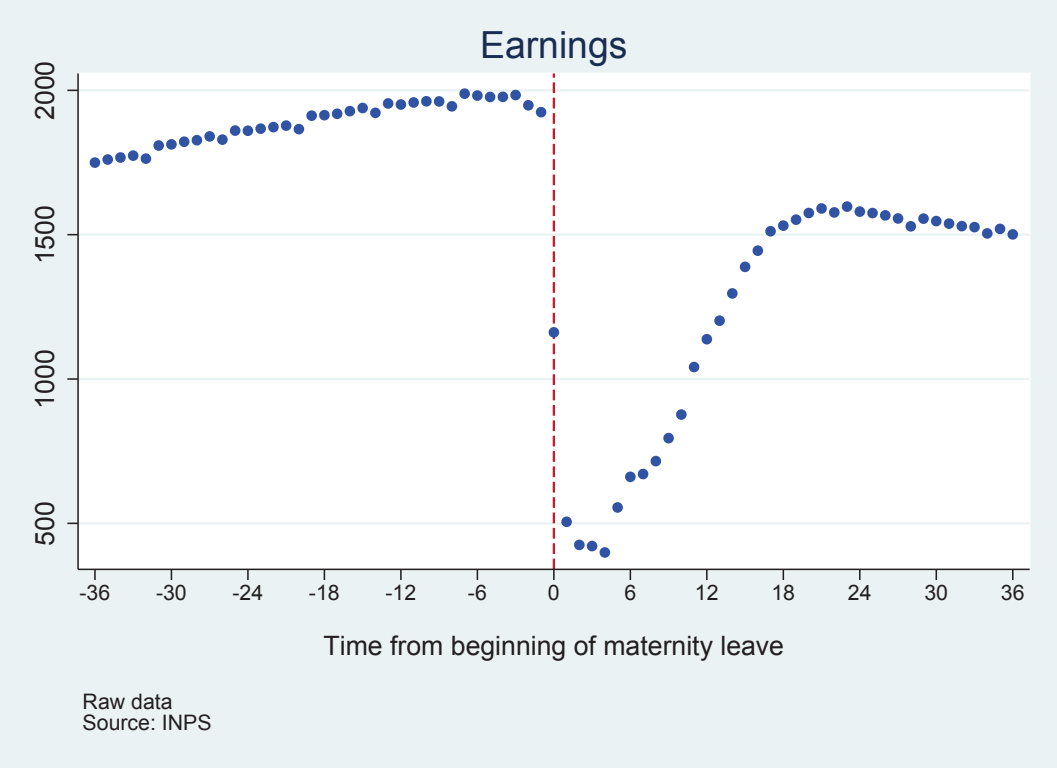


Figure 9: Earnings around childbirth, raw data

Figure 10: Earnings around childbirth

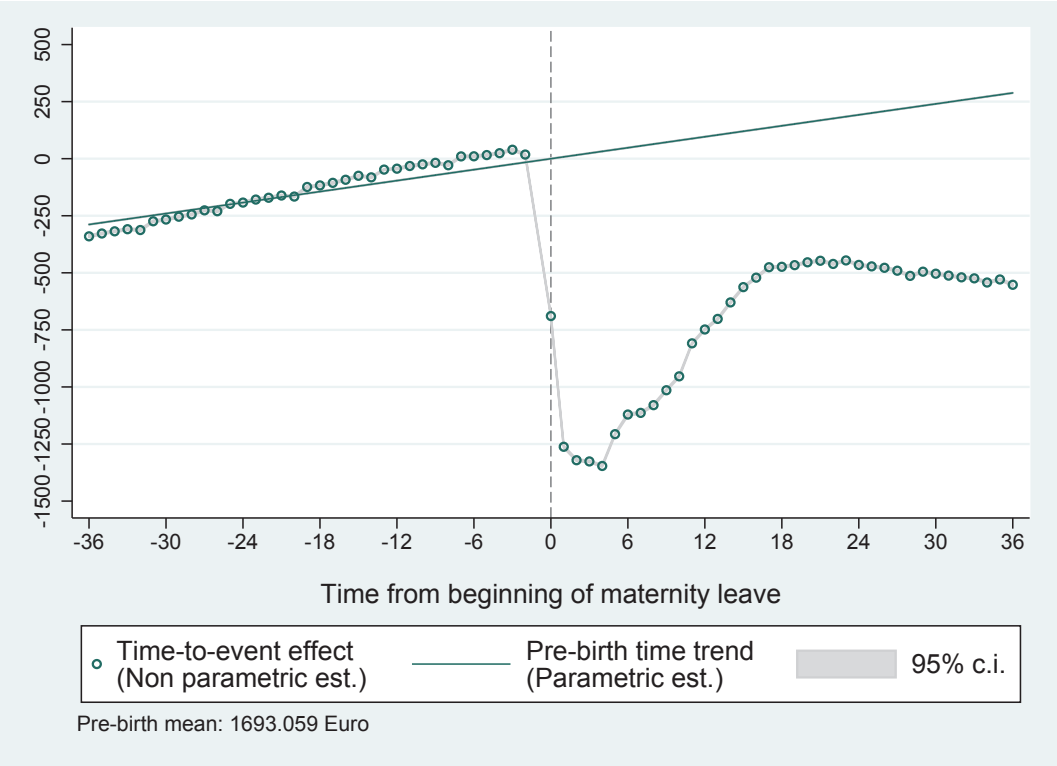


Figure 11: Earnings around childbirth

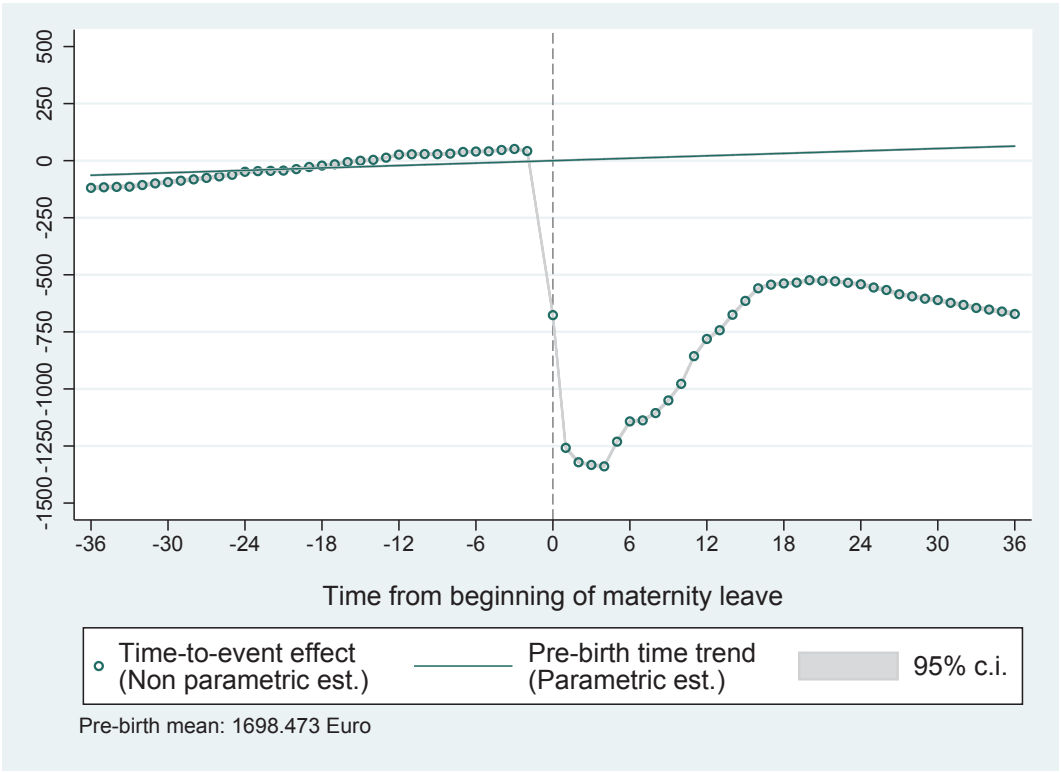


Figure 12: Earnings loss

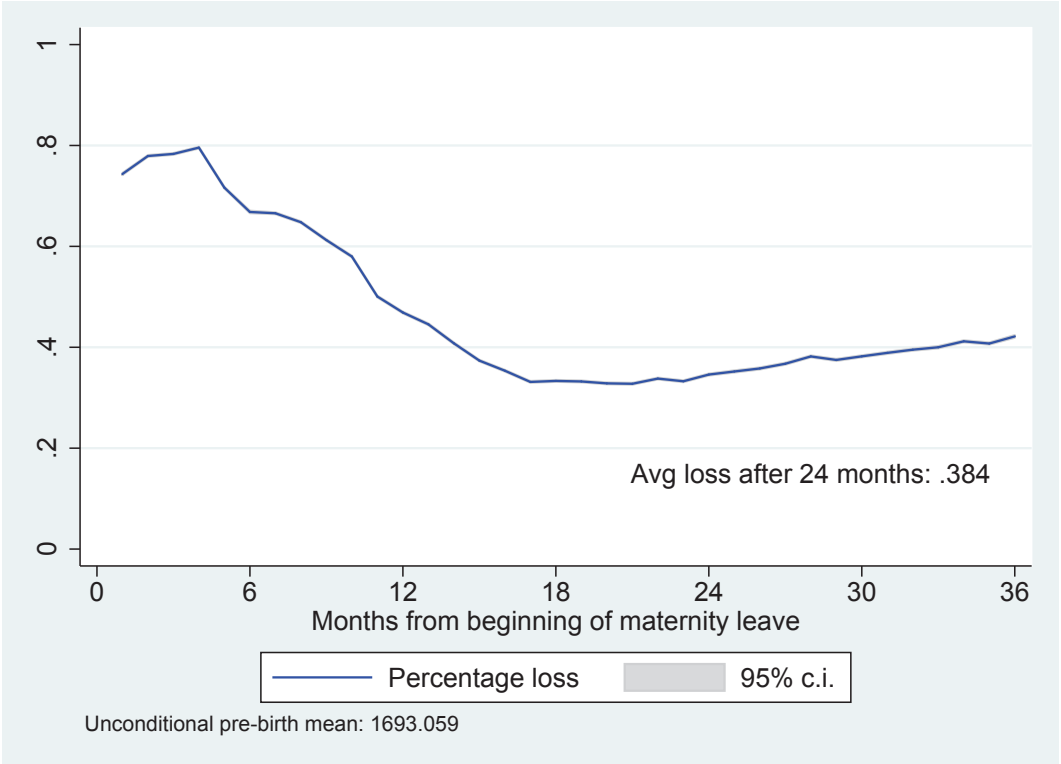


Figure 13: Earnings loss conditional on working

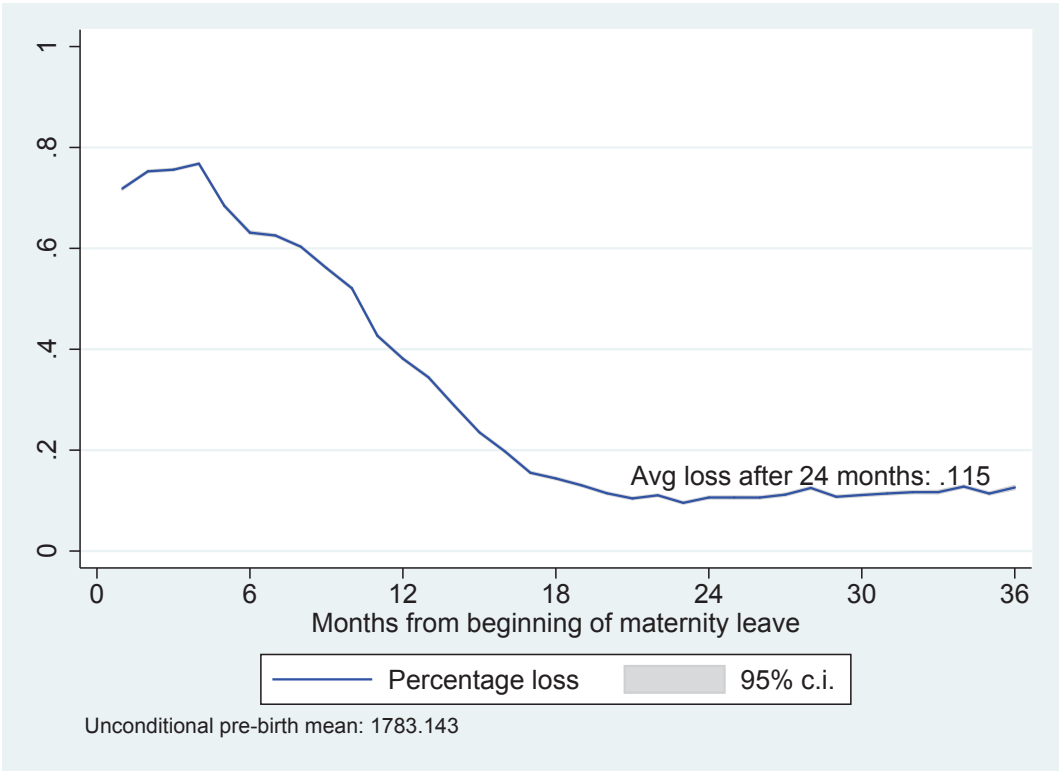


Figure 14: Earnings loss

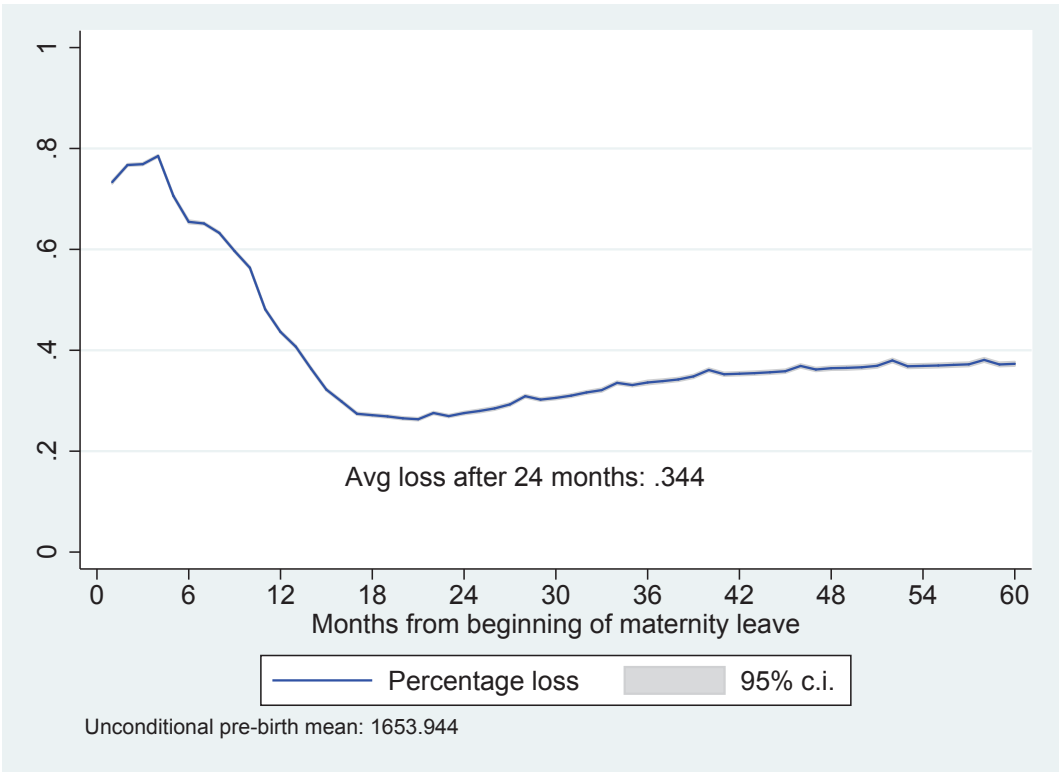


Figure 15: Decomposition of earnings loss

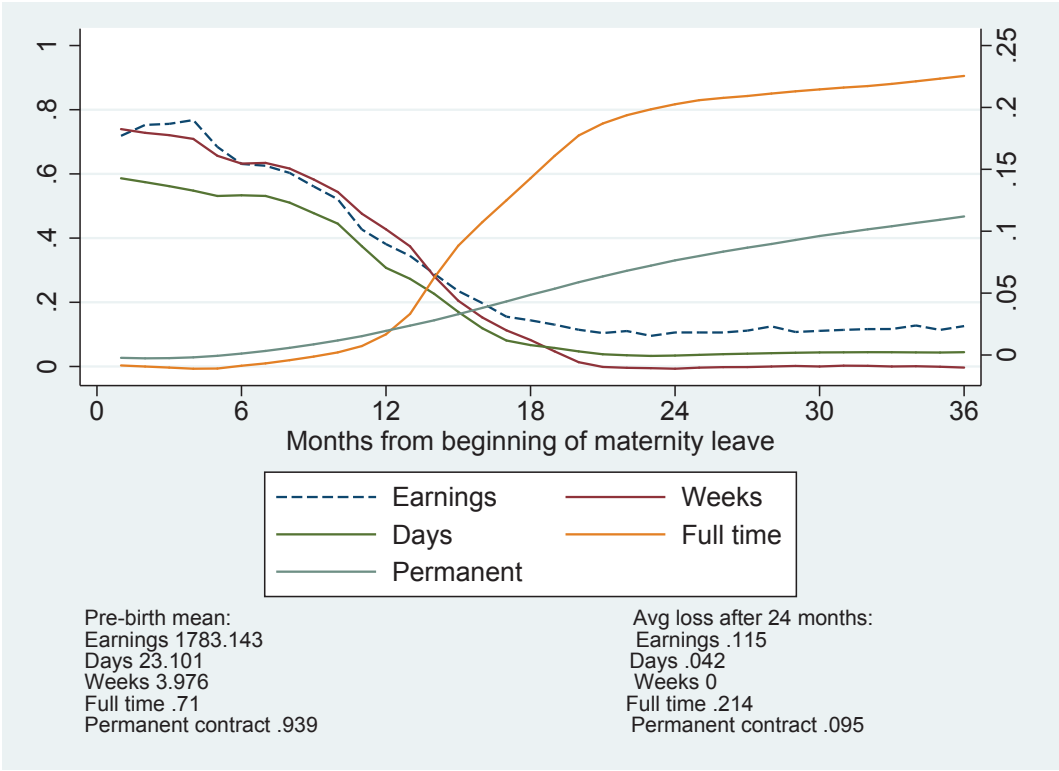


Figure 16: Maternal employment rate by age of the youngest child

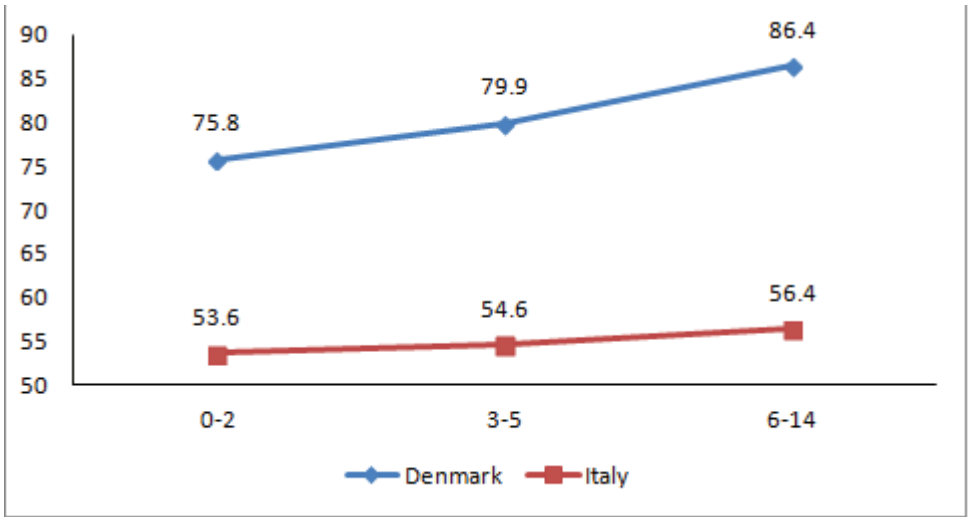


Figure 17: Distribution of ML over time

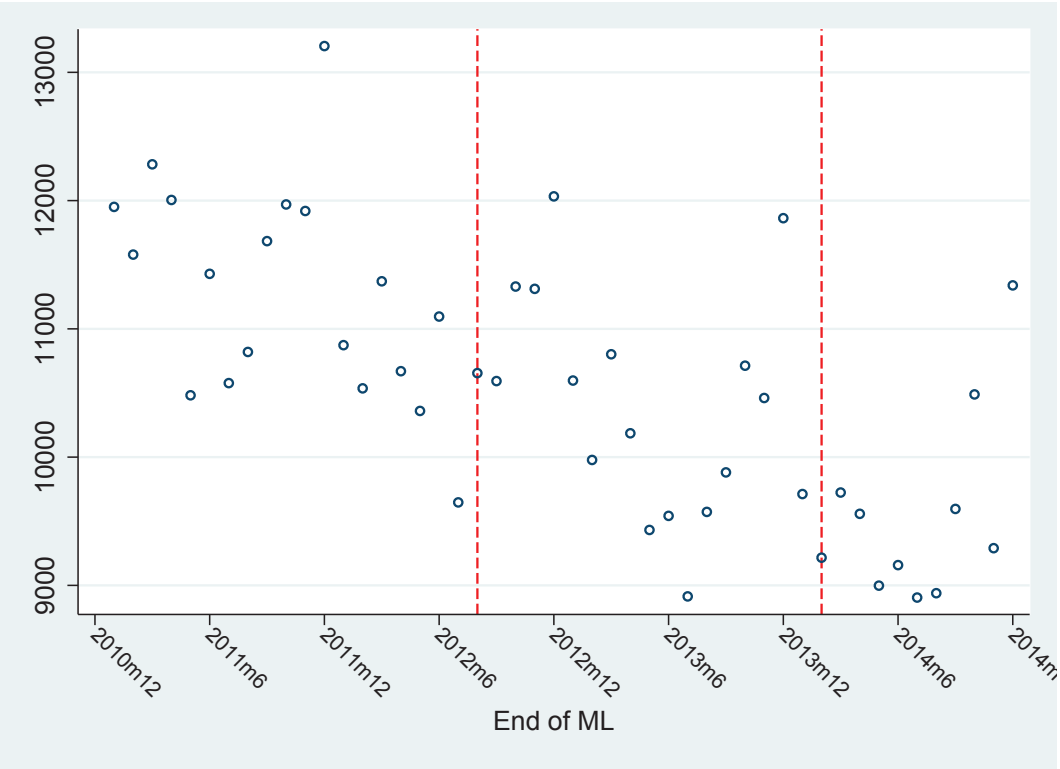


Figure 18: Length of PL: raw data

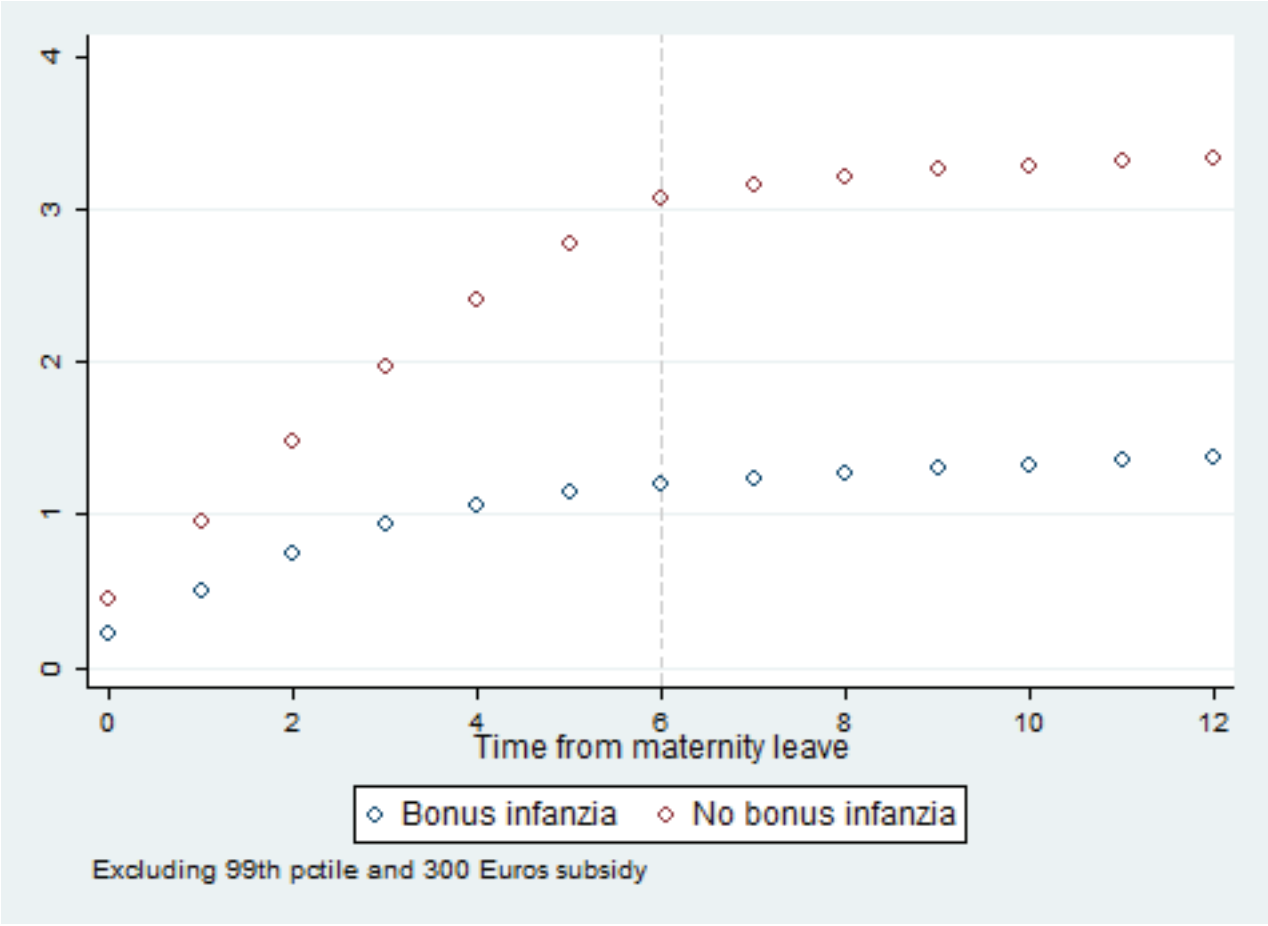


Figure 19: OLS estimate on the length of PL

Figure 20: IV estimate on the length of PL

Figure 21: Unconditional earnings: raw data

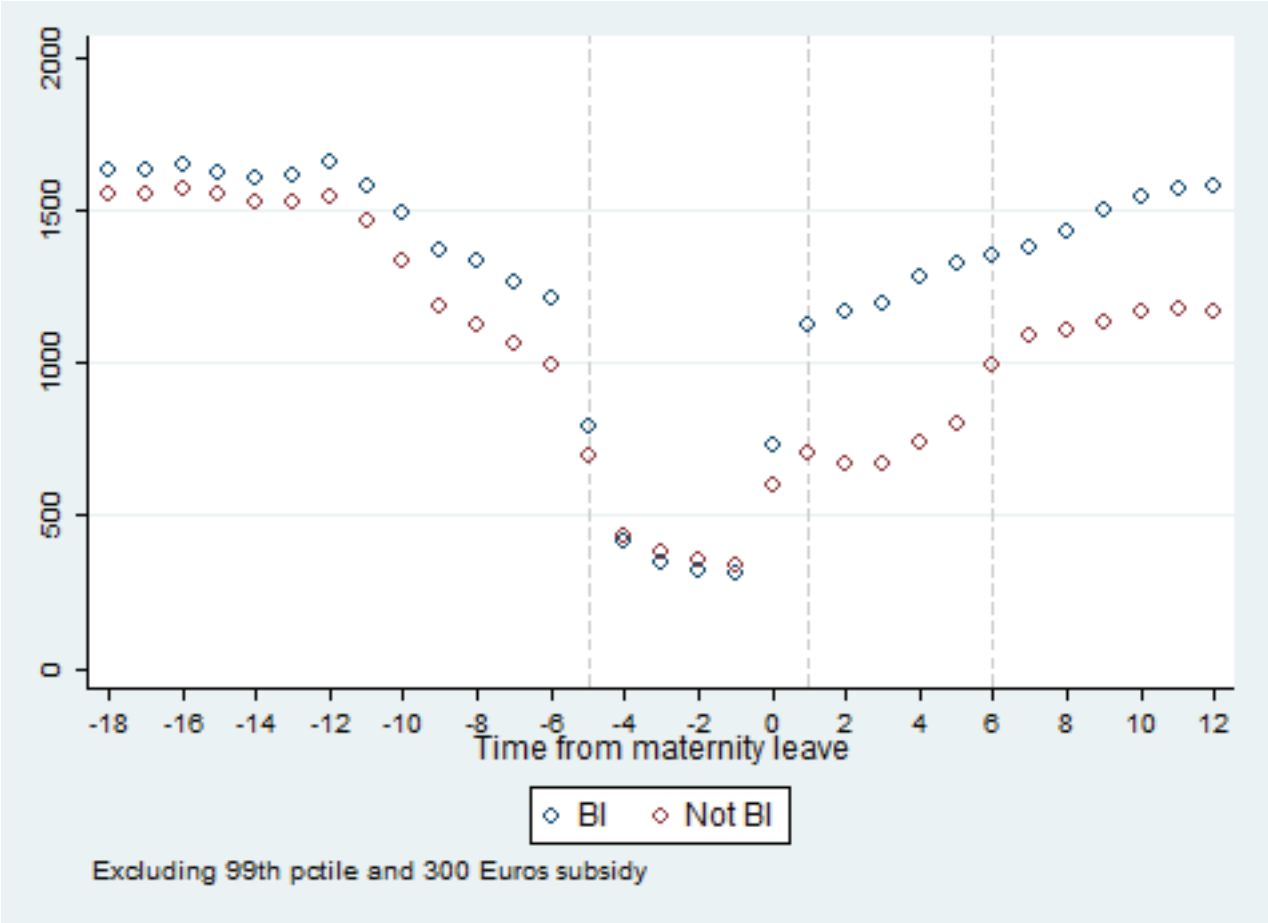


Figure 22: Conditional earnings: raw data

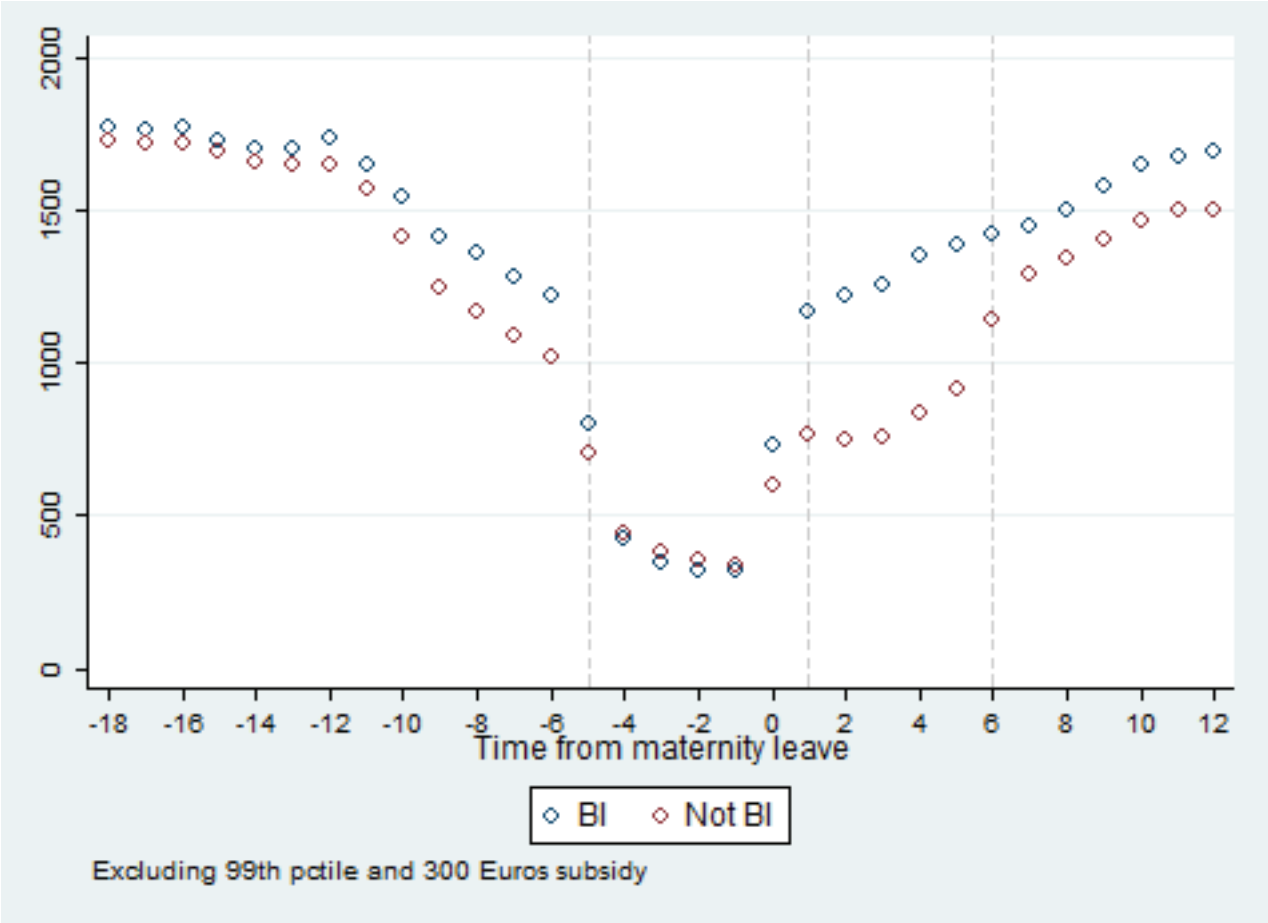


Figure 23: DID impact on log earnings

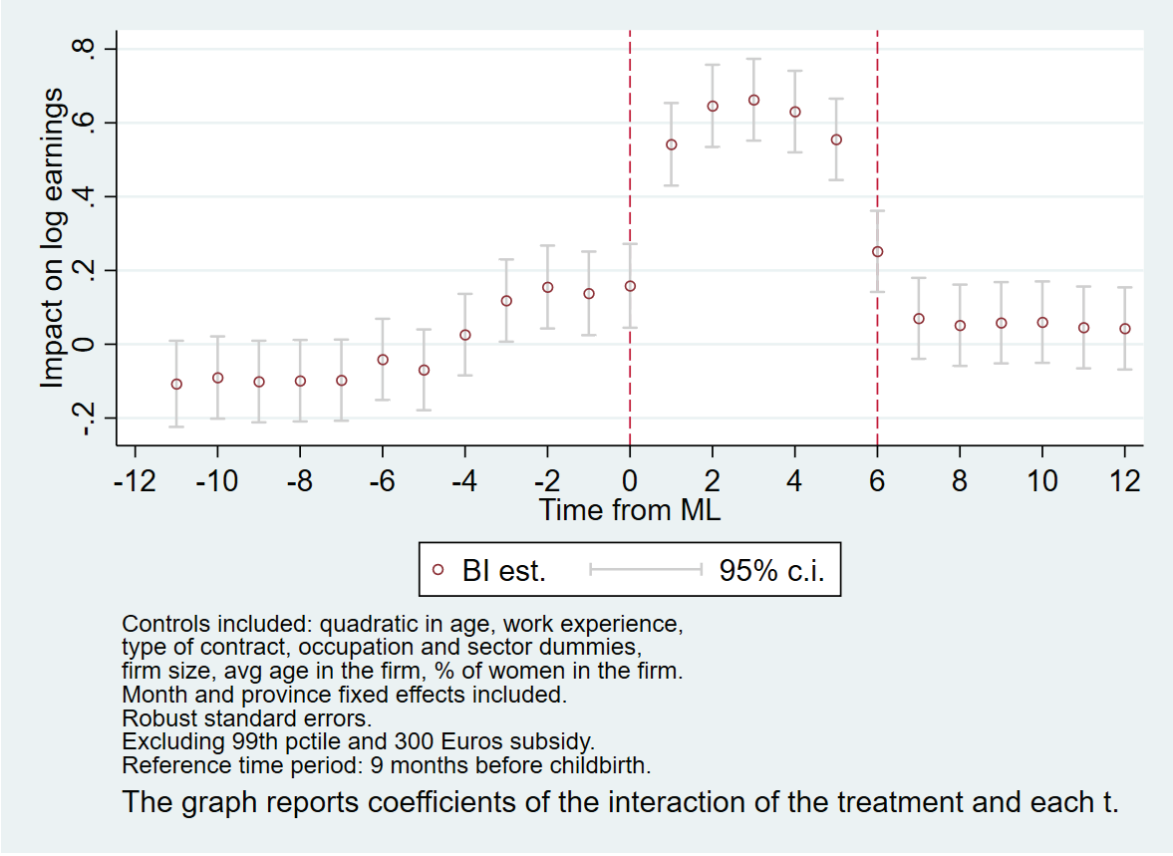


Figure 24: Days of work: raw data

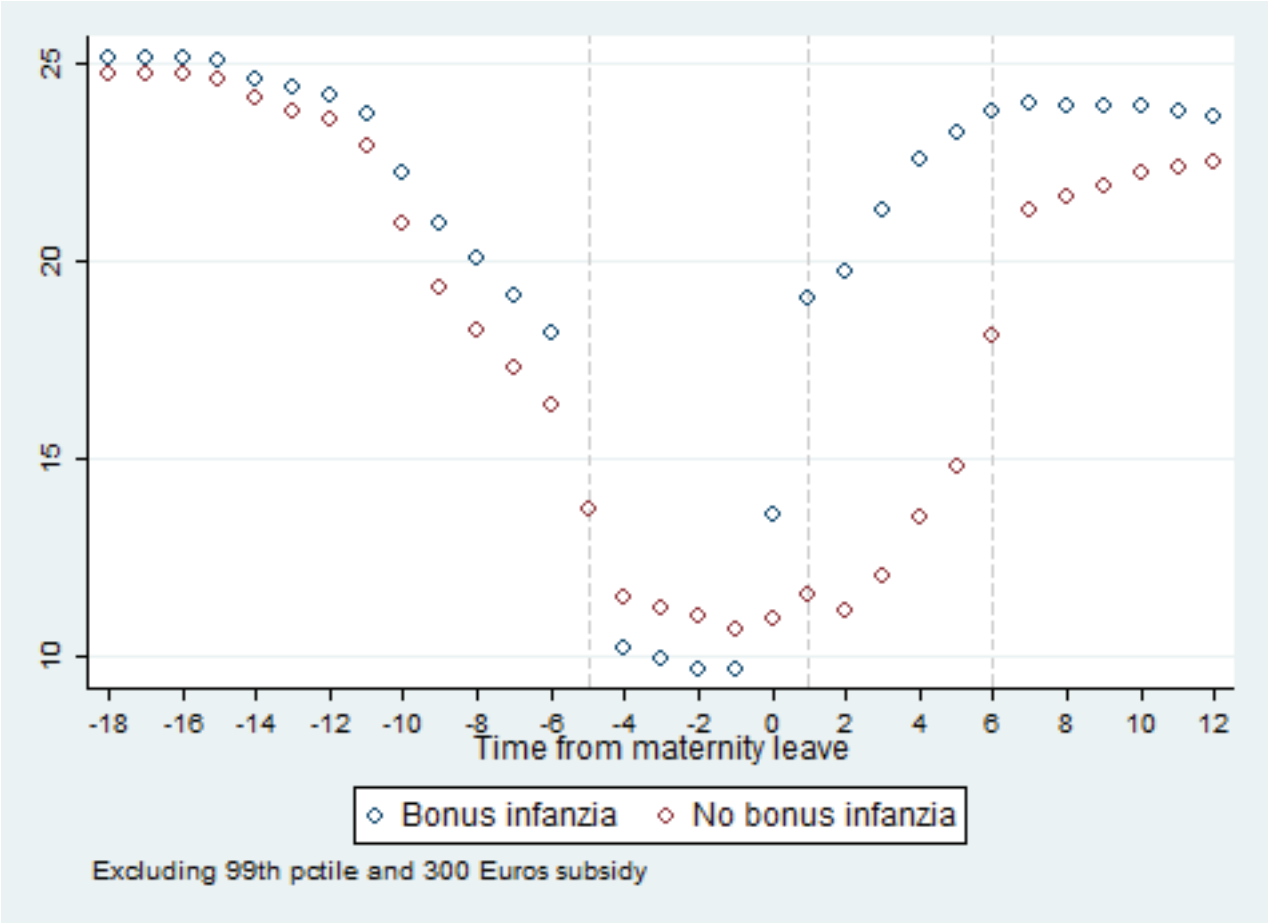


Figure 25: DID impact on days of work

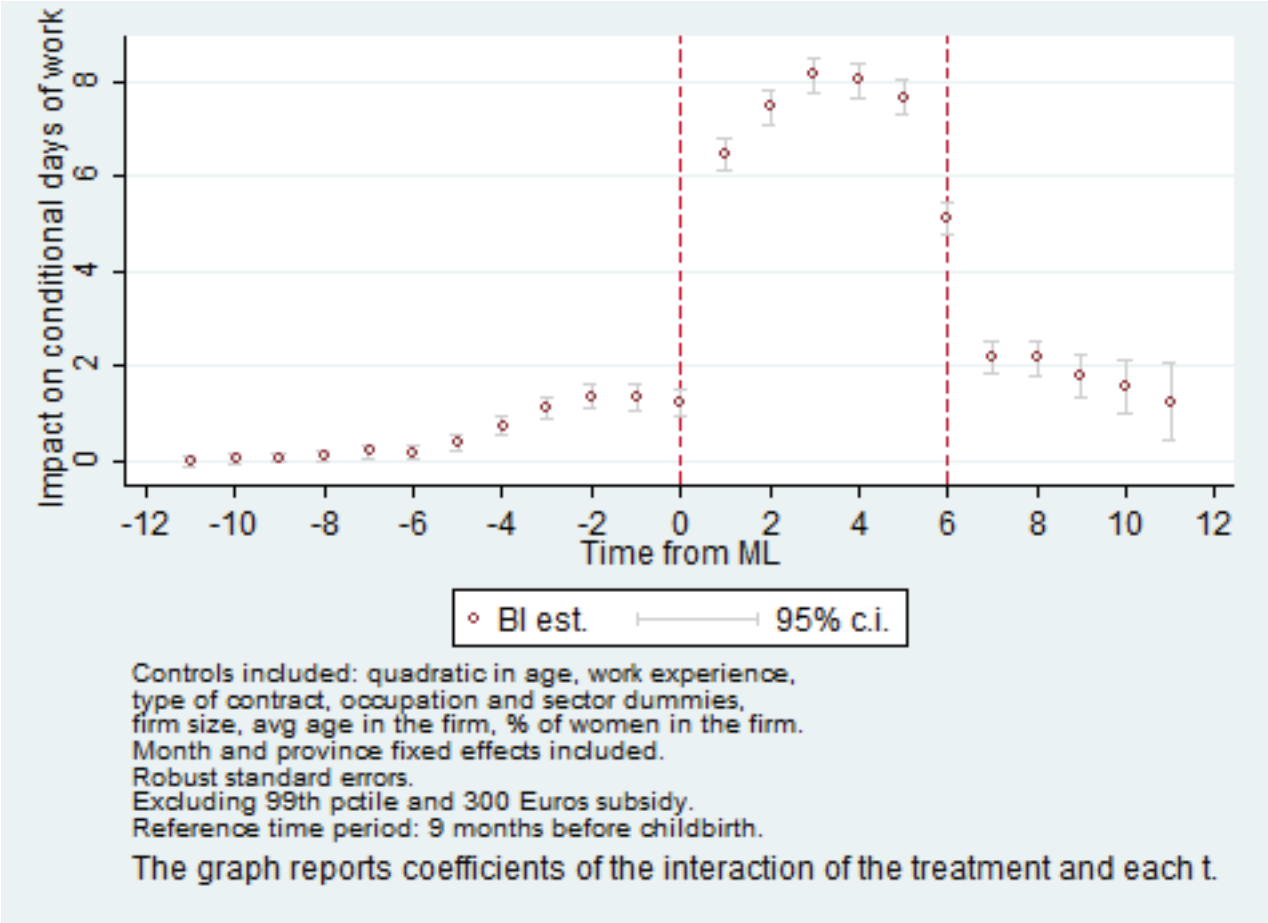


Figure 26: Exit rate - raw data

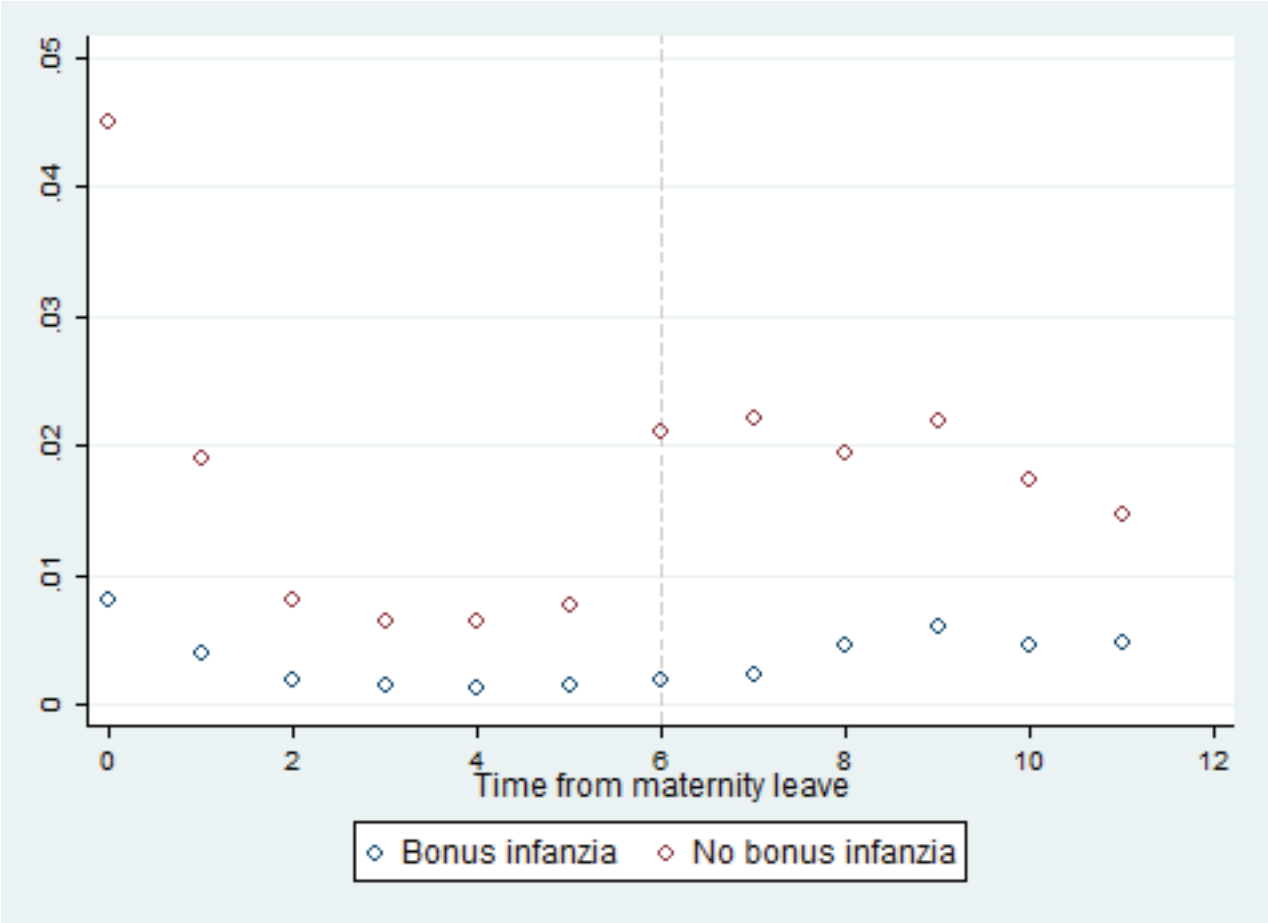


Figure 27: IV impact on exit rate