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ABSTRACT

School Schedule and the Gender Pay Gap*

We provide causal evidence that children's school schedules contribute to the persistence of the gender pay gap between parents. Historically, French children have had no school on Wednesdays. In 2013, a reform reallocated some classes to Wednesday mornings. Exploiting variations in the application of this reform over time and across the age of the youngest child, we show that mothers are more likely to adopt a regular Monday-Friday full-time working schedule after the reform, while fathers' labor supply is unchanged. Consequently, the reform decreased the monthly gender pay gap by 6 percent, generating fiscal revenues that substantially outweigh its costs.

JEL Classification: H52, J13, J16, J22

Keywords: school schedule, gender inequality, female labor supply, child penalty

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Introduction

The parenting-work conflict and its relationship with gender inequality is a source of continuous debate in most advanced economies. An increasing number of studies show that the gender pay gap between parents emerges after the birth of the first child, and tends to persist over time, even when children grow up (Angelov, Johansson and Lindahl 2016, Kleven and Landais 2017, Chung et al. 2017, Kuziemko et al. 2018, Kleven, Landais and Sogaard 2019, Andresen and Nix 2020, Kleven, Landais and Søgaard 2020). Less is known about the factors that explain such persistence, especially in countries characterized by high female labor force participation (Bertrand, Goldin and Katz 2010, Le Barbanchon, Rathelot and Roulet 2019, Petrongolo and Ronchi forthcoming).

This paper exploits a unique institutional setting to identify the causal effect of the organization of children's time on the parental pay gap. Since the introduction of compulsory primary education in 1882, French children have always had a full day off in the middle of the week. This was first allocated to Thursday, and then, from 1972 onward, to Wednesday. While other aspects of the school calendar have changed over the last several decades, the break on Wednesday has always been maintained. Meanwhile, although women's labor force participation in France has attained one of the highest levels across OECD countries (OECD 2016*b*), in Figure 1 we show that French mothers spent significantly less time at work on Wednesdays than on the other working days of the week. In contrast, women with children in other developed countries such as the United States, the UK, Germany, and Spain distribute their working time uniformly over the week, and French fathers and women without children also have a regular working schedule. Remarkably, the raw monthly pay gap between parents of primary-school-age children is as high as 33 percent in France today.

In January 2013, the French government decided to abandon a school schedule of 24 hours of classes concentrated in a four-day week. In order to lighten the daily workload of children without changing the total number of weekly teaching hours, it reduced the length of the teaching time per day and added an extra half day of classes on Wednesday morning. Moreover, to compensate for the shortening of each school day, the government introduced three optional hours of extracurricular activities, at almost no additional cost for families. We exploit this reorganization of the teaching schedule and the introduction of classes on Wednesday morning to study how institutional constraints affect mothers' and fathers' labor supply choices and pay differentials.

To conduct this analysis, we focus on parents whose youngest child is of primary school age

and compare them, using a difference-in-differences strategy, to parents whose youngest child is twelve to sixteen years old. The data come from the restricted-use version of the French Labor Force Survey and span the period 2009-2016. To ensure that our results do not capture the mechanical impact of the reform on school personnel, we exclude from the main estimation sample all respondents working in schools, from teachers to administrative staff.

Our analysis delivers two key insights. First, treated mothers took advantage of the 2013 reform to adopt a regular full-time working schedule. In the pre-reform period, the break in the middle of the school week was accompanied by a clear gender division of roles in the households: while mothers of primary school age children were almost 20 percent less likely to work on Wednesdays than on the other days of the week, fathers were equally likely to work on each day of the week. With the introduction of the reform, the probability of working on Wednesdays rose by three percentage points for treated mothers compared to mothers in the control group. In other words, the reform allowed treated mothers to close 40 percent of the pre-reform Wednesday-gap with mothers of older children. While the increased presence at work on Wednesday is in part explained by a substitution of Wednesday for Saturday work, the reform mostly led treated mothers to shift from part-time to full-time contracts and catch up with the control group in terms of hours worked per week. In contrast, treated fathers continued to work full-time as in the pre-reform period.

The second insight is that the reform of the school schedule led to a statistically significant 3 percent increase in mothers' (log) monthly wage compared to "control" mothers, while fathers' pay did not change in comparison to the control group. In other words, a longer and more regular working schedule allowed mothers to close up to 6 percent of their pay gap with fathers, on a pre-reform base of 33 percent.

All these results are highly significant and robust to different specifications, including changes to the definition of the control group, restrictions to the pre-treatment period, the use of different groups to cluster standard errors, or a conservative computation of standard errors to take into account multiple hypothesis testing.

As for the mechanisms driving the main effects, we do not find any significant effect on job mobility, occupational changes or tenure in the firm. Nor the reform seems to increase women's probability of engaging in on-the-job training. This suggests that the effects on mothers' labor supply are driven by re-definitions of contracts within the same firm rather than by changes in women's job opportunities.

Finally, the paper offers a welfare analysis of this reform. Supporters of a shorter school week point to the potential savings that these reforms can generate for public finances (Heyward

2018, *NCLS* 2018). An important caveat to this type of argument is that it ignores important spillovers such as those on mothers' labor supply. Adopting the recent approach developed in Hendren and Sprung-Keyser (2020), we calculate the so-called marginal value of public funds, or MVPF, for this reform. Our most conservative estimates show that in the short run, each euro invested in this reform repays at least 3.7 euros if we simply take into account family savings on childcare for Wednesdays and the fiscal externality generated by higher income tax revenues from increased women's earnings. Importantly, this is likely to be a lower bound on the marginal value of this reform, given that we did not take into account any effects on children, for which—as far as we know—there are no reliable estimates.

Overall, this paper offers two contributions to the literature on the gender pay gap. First, while a strand of the literature studies how maternal labor supply is affected by expansions of childcare (Gelbach 2002, Cascio 2009, Fitzpatrick 2010, Havnes and Mogstad 2011, Bauernschuster and Schlotter 2015), to the best of our knowledge, there is little evidence regarding why the gender pay gap persists even when children age out of pre-school care. Our paper shows that scheduling constraints in primary school help explain this persistence. Relative to contemporaneous work on this topic (Berthelon, Kruger and Oyarzun 2015, Contreras and Sepúlveda 2017, Martínez and Perticará 2017, Ward 2019), our study offers an in-depth analysis of intensive-margin labor supply responses. Exploiting a setting characterized by high female labor force participation with small extensive-margin elasticities, and unique data on daily labor supply decisions, we are able to precisely identify how children's school schedule dictates mothers' working hours and days and contributes to the parental wage gap. Moreover, we show that labor supply responses to changes in the school schedule happen mostly within the same firm, rather than by changing women's job opportunities.

As for our second contribution, we quantify the effect of reducing the gender pay gap on public finances, offering an efficiency perspective to a debate often centered on issues of equity (Galor and Weil 1996, Blau and Kahn 2017). Moreover, our estimates of the welfare implications of the French school schedule reform suggest that cost-benefit analyses of childcare expansions may largely overestimate the costs of these policies if they fail to include in their computation the potential positive wage effects on mothers (*The Guardian* 2015, *Brookings Institute* 2017, Hendren and Sprung-Keyser 2020).

The paper is organized as follows. Section 1 gives a detailed description of the French primary school system and how it has been affected by the 2013 reform. Section 2 describes the data used to conduct this analysis and provides a descriptive analysis of the pre-reform period. Section 3 sets out the identification strategy. Results are presented in Section 4. We discuss

robustness checks in Section 5, mechanisms in Section 6 and present our welfare analysis in Section 7. Section 8 concludes.

1 Institutional Context

The French educational system is divided into three stages: elementary education, for children aged six to eleven; secondary education—which, in turn, is divided into middle school (*collège*) and high school (*lycée*)—and tertiary education. Education is compulsory from the age of six to sixteen. However, parents can already send their children to free public pre-kindergarten (*école pre-maternelle*) when they are two, or to kindergarten (*école maternelle*) at the age of three. 23 percent of two-year-old children and 95 percent of children aged three to five attend this pre-school stage (Goux and Maurin 2010).

Public primary schools are financed by municipalities. The private sector comprises mainly religious schools and receives fourteen percent of all primary school pupils. With respect to the structure of the school calendar in primary school, France has always been a country with among the longest holidays, the highest number of class hours per year, and the longest school days.

Since the introduction of compulsory primary education in 1882 (*Loi Ferry*), French children had a full day off in the middle of the week. Until the end of the 1960s, children spent five full days at school, with a break on Thursdays and Sundays, for a total of 30 hours per week. In 1969, Saturday afternoon school was abolished, and three years later, in 1972, the break in the middle of the week was switched from Thursday to Wednesday, and two hours of physical activities were added to the school week. Finally, in 2008, all classes on Saturday were abolished and a 4-day school schedule, with six hours per day—plus a 2-hour lunch break in the middle—was adopted.

In the meantime, with the development of chronobiology in the 1980s, an intense debate as to the optimal structure of the school schedule arose. Experts of this discipline pointed out that primary school children need more frequent holidays and shorter days at school. This was precisely the rationale for the 2013 reform. A diagram describing the changes in school schedule for primary school children before and after the reform is presented in Appendix Figure A2.[1] The reform shortened the school day by an average of 45 minutes and, to maintain the total number of weekly hours, it added half a day, usually on Wednesday mornings and

[1]Additional details, including information on the implementation of the reform by private schools, are presented in Appendix A.2.

exceptionally on Saturdays. Moreover, to compensate for the reduction in daily teaching time, the government urged municipalities to provide three hours per week of free extra-curricular activities for children. Precisely because of this organizational burden, the government also gave municipalities the possibility to implement the new schedule in either 2013–14 or 2014–15. Twenty percent of them chose to do it in 2013; the rest only adopted the new system in 2014.[2] Crucial for our identification strategy, the 2013 reform affected only kindergarten and primary school children. In middle and secondary school, pupils have at least 24 hours of classes per week, spread over five days.

Finally, it must be said that the implementation of the reform generated political tensions between municipalities and the government. Controversies emerged primarily because municipalities bore the bulk of the cost of the reform due to the additional extracurricular hours. In parallel, another debate emerged between municipalities and families regarding the organization of extracurricular activities (Bonnard and Perret 2016).[3] As a result, in 2017, under political pressure from municipalities, the newly elected President Macron relaxed the framework of the reform. In our welfare analysis, we argue that the fact that municipalities did not benefit directly from the positive fiscal externality of the 2013 reform can partly explain their resistance to it.

2 Data and Descriptive Analysis

2.1 Data Description

To study this setting and the consequences of the 2013 reform, we use two main databases. First, we use the French Labor Force Survey (*Enquête Emploi en Continu*, hereafter LFS), a quarterly survey conducted by the French Statistical Office (*Institut National de la Statistique et des Etudes Economiques*, herafter, INSEE) and covering a representative sample of about 55,000 households each quarter. Our main analysis will be based on all quarterly repeated cross-sections from 2009-2016. For each household member aged 15 or above, the LFS provides information on age, level of education, marital status, labor market status, income, and the structure of the household in which they reside. Crucially for our identification strategy, our restricted-use version of the LFS also provides respondents' place of residence, together with

[2]Each municipality could also choose how to allocate the extracurricular activities, whether to concentrate them on two days a week or spread them over the whole week.

[3]Anecdotal evidence from opinion surveys (Union Nationale des Associations Familiales 2015) suggests that parents' negative perceptions of the reform often stem from a lack of information about the organization of extracurricular activities.

the number and age of respondents' children. Finally, from 2013 onward, the surveys include questions on the decision to work on each day of the week. This dataset is therefore particularly suitable for our analysis because it provides us with a measure of the allocation of working time during the week.

Our second source of data is the Enrysco database, an administrative dataset created by the French Ministry of Education which provides a precise description of the weekly teaching schedule for each school, in each municipality. As such, this dataset is crucial for identifying the timing of the implementation of the 2013 reform across municipalities.

In the main analysis, we focus on the sample of parents aged 18 to 55[4] whose youngest child is between 6 and 16, giving a total of 176,955 men and 210,090 women.[5] In a series of robustness checks, we also include parents whose youngest child is up to 17 years old. We exclude from the main estimation sample all respondents working in schools, such as teachers, school heads, school psychologists, and also the administrative staff (a total of 26,303 observations). This restriction ensures that any results we find are not simply driven by the mechanical effect of the reform on this group of workers. Our main findings remain practically unchanged when including the school personnel (see Section 5).

As for the main outcomes of interest, we construct them as follows. To measure labor force participation, we use a dummy equal to one if the parent is employed or looking for work. We measure part-time work using a dummy equal to one if the parent declares to be working part-time in her main job.[6] Next, we use a continuous variable indicating the number of hours worked on average per week; and we construct a series of dummies that take the value one if the parent works on each specific day of the week. Because whether or not the person works on each day of the week is only measured from 2013 onward, we complement the analysis on these outcomes by also considering another variable, available for the entire sample period, which measures the number of days worked per week. Finally, to measure earnings, we consider both the log real net monthly wage and the log real net hourly wage.[7] To construct this last variable, we take the log of the ratio between real net monthly wage, which is directly available in the Labor Force Survey, and hours worked per month, computed as four times the hours

[4]We do not consider younger parents, as less than 1 percent of women aged 15 to 17 have children in France.

[5]Mothers with children between two and three in France are entitled to receive specific childcare subsidies that are withdrawn as children enter primary school. In addition, kindergarten is not compulsory and only 30 percent of families whose youngest child is two years old actually make use of this service (Goux and Maurin 2010). For all these reasons, we prefer to exclude mothers with children of kindergarten age from our analysis.

[6]In France, an individual works part-time if she works less than 35 hours per week. According to the Labor Code (article L3123-5), a part-time worker benefits from the same rights as a full-time worker in terms of paid vacation, training and unemployment insurance.

[7]In the French context, the net monthly wage corresponds to the gross one minus deductions of employers' and employees' Social Security contributions, but including the income tax.

worked per week. Respondents report their monthly wages only once out of the five times they are interviewed. Thus, the sample size consistently falls when analyzing the impact of the reform on wages (N=98,221). As a final remark, all outcomes that concern employed parents, such as hours or days worked, daily labor supply, or part-time work, are set to missing for non-employed parents. Accordingly, when analyzing the impact of the reform on mothers' labor supply decisions, the sample only includes employed parents (N=320,588).

2.2 Pre-Reform Period

Tables 1 and 2 describe the characteristics of French parents aged between 18 and 55 and interviewed in the Labor Force Survey before the introduction of the 2013 reform. We regroup them according to the age of their youngest child living in the household.

A few preliminary considerations are worth mentioning. First, Table 1 shows that mothers' labor force participation is strongly correlated with their children's age and, in particular, it increases discontinuously as soon as their youngest child starts attending primary school. Conditional on participation, the probability of working part-time for women decreases as the youngest child grows older and the average number of hours and days increases accordingly. In contrast, Table 2 shows that fathers' labor force participation is high and remarkably constant across these groups. Fathers have a relatively lower level of education compared to mothers, which is consistent with the well-documented gender gap favoring women in terms of education attainment common to many OECD countries (OECD 2016*a*). Finally, the vast majority of fathers work full-time, irrespective of the age of their youngest child, with an average of 42 weekly hours.

What appears especially striking in Table 1 is the large gap in the proportion of mothers who work on Wednesdays as their youngest child moves from primary to middle school. More than 40 percent of working mothers whose youngest child is in kindergarten or primary school do not work on Wednesdays, and this proportion decreases by almost ten percentage points as soon as the youngest child enrolls in middle school. Moreover, such a pattern does not emerge at all when looking at the probability of working on any other day of the week, such as Thursdays. As shown in Appendix Figure A1, these figures are in line with the results of a survey on childcare arrangements for Wednesdays aimed at families with children aged 0-6 before 2013. There, up to 70 percent of respondents declare that parents themselves take care of their children when they do not have school on Wednesday.[8] In principle, the institutional constraints imposed by

[8]A large fraction of mothers choose to stay at home on Wednesdays, despite the fact that other forms of childcare, both public and private, are available for that day. This is consistent with the growing evidence

the school schedule of children in France might affect the employment decisions of both parents. Yet, as suggested already by the Multinational Time Use Survey data, Table 2 confirms that before the reform, fathers worked on Wednesdays as much as on the other days of the week (79 percent), whereas only 59 percent of mothers did so.

Finally, comparing earning figures in Tables 1 and 2, we can see that the monthly pay gap between parents increases with the age of the youngest child up until age 12. Moreover, this pay gap is as high as 33 percent for parents of children of primary school age (6-11). We will now study how the reform affects these parental pay differentials.

3 Empirical Strategy

To study how the 2013 reform affects the gender salary gap, we adopt a difference-in-differences strategy that exploits variation across age of the youngest child and time in the application of the reform. We define a parent as being treated if her youngest child is affected by this reform—i.e., parents whose youngest child is six to eleven years old. We compare them with parents whose youngest child is between twelve and sixteen, corresponding to the minimum school-leaving age in France. Our regression model looks as follows:

$$Y_{icmt} = \gamma_m + \delta_t + X'_{icmt}\pi + \alpha D_c + \beta(D_c \times \text{Post}_{mt}) + u_{icmt}, \quad (1)$$

where i stands for each interviewed parent, c for the age of the youngest child, m for the municipality of residence and t for the wave in which the parent is interviewed. Here, Here, Y_{icmt} is either labor force participation, the decision to work part-time, hours worked per week, days worked per week, or the decision to work each day of the week. The vector X_{icmt} includes standard individual variables that can affect parents' labor supply decisions. These comprise age, age squared, level of education, number of children, marital status, and presence of other members in the household. In all regressions, we also include municipality-of-residence and wave-of-interview fixed effects, γ_m and δ_t, respectively. The inclusion of municipality fixed effects controls for any time-invariant municipality-specific unobserved factors, while the inclusion of quarter fixed effects captures changes over time that affect all respondents' labor market outcomes. Next, D_c is an indicator variable equal to one if the youngest child is between six and eleven and zero if she is between twelve and sixteen. Therefore, α measures the impact of having a youngest child of primary school age. Our main regressor of interest is the interaction

that parents, and particularly highly-educated ones, are increasingly spending more time with their children (Bertrand, Goldin and Katz 2010 and Ramey and Ramey 2010).

term between D_c and Post_{mt}, a dummy equal to one starting from September 2013 for those parents living in municipalities that introduced the reform in 2013, and from September 2014 for parents living in municipalities that postponed the implementation to 2014. Conditional on the validity of our identification strategy, its coefficient β captures any deviation from a parallel evolution in the outcome of interest between the treatment and the control group due to the implementation of the new schedule in primary schools.[9]

The model is estimated separately by gender, and standard errors are clustered at the municipality level.[10] In the tables of results, we report both p-values corresponding to cluster-robust standard errors, and adjusted p-values (q-values) that account for multiple hypothesis testing.[11] These are calculated by family of outcomes,[12] and separately by gender.

In the following paragraph, we open the description of our results by first presenting a series of event-study plots to formally test for the parallel trend assumption, and visually represent the effects of the reform on the outcomes considered. These event studies are estimated using the following dynamic specification:

$$Y_{icmt} = \gamma_m + \delta_t + X'_{icmt}\pi + \alpha D_c + \sum_{s=2009}^{2016} \beta_s (D_c \times 1_{\{t=s\}}) + u_{icmt}, \quad (2)$$

where, as above, i stands for each interviewed parent, c for the age of the youngest child, m for the municipality of residence and t for the wave in which the parent is interviewed. Here $1_{\{t=s\}}$ is an indicator variable equal to one for year s. In Figures 2, 3 and 4, we plot the estimates of the coefficients $\{\beta_s\}$, which capture the impact of time-specific shocks by the age of the youngest child. The reference year is 2012, the year prior to the approval of the reform.[13]

[9]Note that the staggered adoption of the reform by municipalities does not constitute a threat to our identification strategy because we use a "within-municipality between-youngest-child-age" comparison. However, in Section 5 we provide additional tests to account for the fact that our treated group becomes fully treated after 2014.

[10]Results are robust to clustering at the level of age-of-youngest-child × quarter-of-interview (see Tables B3 and B4).

[11]The method we use is the False Discovery Rate (FDR) control, or the expected proportion of all rejections that are type-I errors, which involves a p-value adjustment less severe than some other methods such as the Familywise Error Rate control or the Bonferroni correction, as long as one is willing to tolerate some type-I error in exchange for a less stringent adjustment. Specifically, we use the sharpened two-stage q-values introduced in Benjamini, Krieger and Yekutieli (2006) and described in Anderson (2008).

[12]We consider together the standard labor supply measures on the one hand, and the decision to work each day of the week on the other.

[13]To be fully consistent with this specification, in the section of robustness checks we will also report the estimates of model (1), where we assume that the reform was implemented in the entire country in 2013.

4 The Impact of the School Schedule Reform

Figures 2, 3 and 4 introduce our findings by illustrating the results of the event-study exercises, corresponding to Equation (2). In all the graphs, the hollow square dots (women) and solid round dots (men) represent the estimated coefficients β_s from Equation (2). The reference year is 2012 and the vertical dash line corresponds to the last quarter of 2013, when the reform started to be implemented.

Overall, these figures show that the coefficients on the pre-reform years are mostly insignificant across the various outcomes, both for men and women. Moreover, in Appendix Table B1, we test for their joint significance and show that we cannot reject the null for any of the outcomes considered. Taken together, these two pieces of evidence strongly suggest that we are identifying a causal impact of the reform, rather than picking the effect of other elements that were already affecting the treatment and control groups differently before the introduction of this intervention.

As for the post-treatment period, Figure 2 Panel A shows that the the reform does not trigger any significant response at the extensive margin—for either men or women. This should not be surprising given that 85 percent of treated mothers and 96 percent of treated fathers are already in the labor force. However, Figure 2 Panel B shows that women experience a progressively larger decrease in the probability of working part-time. Figure 3 Panel A shows a corresponding increase in hours worked per week for working mothers, with the effect becoming significant at 5 percent in the last year studied. Figure 3 Panel B further complements these results by showing that mothers' working days seem to increase in the post reform period, though the dynamic is slightly noisy. In contrast, across all these figures it emerges that fathers' labor supply dynamics remain practically unchanged throughout the period considered.[14]

Figure 4 concludes our series of event studies by presenting the dynamic effect of the reform on men's and women's (log) net monthly and hourly wages (Panels A and B, respectively).[15] Similar to the other outcomes, we find no evidence of different pre-trends in the years prior to the reform for either men or women. However, after the reform, treated mothers start experiencing

[14] In the Appendix Figures B3 and B4, we report the dynamic effects on the probability of working each day of the week. Here t refers to a quarter, and the estimation sample comprises parents interviewed starting in 2013, the year the French LFS began to include questions on the allocation of daily labor supply. While this limits our ability to precisely depict the evolution of these outcomes for the pre-reform period, Figure B3 shows that the reform clearly increases mothers' probability of working on Wednesday, with some potential anticipation effects taking place as soon as the reform was announced in April 2013. Reassuringly, Figure B4 shows that there is no systematic sign of differential pre-trends on the other days, for either men or women, nor the reform seems to strongly and significantly affect parents' labor supply in any other day of the week.

[15] Appendix Figure B5 further complements the event-study exercises by showing the row trends in the main outcomes of interest. These graphs confirm that all the effects discussed here come from treated mothers, rather the control ones.

an increase in monthly wages (Panel A). Additionally, earning trajectories of treated mothers and fathers start diverging distinctly, with wages of treated mothers increasing relative to their male counterparts. Panel B shows similar dynamics for (log) hourly wages, though the estimates are less precisely estimated.[16]

As for the average effect of the reform, Table 3 reports the estimates of β from Equation (1) on each outcome of interest. Panel A presents results for women, while Panel B those for men. At the bottom of the table, we also report the p-values of the test of equality of coefficients on the two genders. According to these estimates, while the reform does not affect labor force participation of either parent (column 1), the reorganization of the teaching time, coupled with the introduction of three hours of extracurricular activities, leads treated mothers to adopt a longer and more traditional working schedule. In line with the dynamics seen in the event studies, following the implementation of the reform, the probability of working part-time significantly decreases by more than 2 percentage points for treated mothers compared to the control group, or by 6 percent with respect to the pre-reform mean (column 2). Accordingly, the point estimate on hours worked per week is positive and significant (column 3). Treated mothers also significantly increase the number of days they work, closing more than 50 percent of the pre-reform gap with the control group on this margin (column 4). In contrast, men's labor supply remains practically unchanged (Panel B). Finally, treated mothers experience a three-percent increase in (log) monthly wages (column 5). The estimate is significant at the one percent level and is significantly different from the effect on men's monthly wages. As such, it represents an approximate 6 percent reduction in the unadjusted gender pay gap.[17] Importantly, this increase in mothers' monthly wages does not seem to result mechanically from the change in hours worked, as women also experience a marginally significant increase in their (log) hourly wages (column 6).

To further explore how parents respond to the reform, we exploit the key feature of the French Labor Force Survey that, starting in 2013, allows us to measure labor supply choices for each day of the week. Figure 5 illustrates the impact of the reform on parents' organization of their weekly working schedule. The hollow square dots (women) and solid round dots (men) represent the estimated coefficient β in Equation (1), where the outcome is the probability of working each given day of the week. The figure shows a significant increase in the probability of

[16]Note that mothers' wages visibly start increasing as soon as the reform is introduced, while the effect on part-time and hours worked takes some time to become apparent. While no obvious institutional feature could explain this, we simply attribute this time discrepancy to women's notorious under-estimation of hours worked.

[17]The average monthly salary of treated mothers is €1612.52, and the pre-policy unconditional gender pay gap amounts to 785.61 = 2398.13 - 1612.52. As such, the 3 percent increase in mothers' monthly salary triggered by the reform corresponds to €48, or 6 percent of the parental gap.

working on Wednesdays for mothers, accompanied by a weaker but significant decrease in their probability of working on Saturday. Table 4 shows the full regression results. The increase in the number of days worked per week documented in column 4 of Table 3 corresponds to a three percentage-point rise in the probability that treated mothers work on Wednesdays, significant at the one percent significance level (Table 4 Panel A). The magnitude of the coefficient for women is four times larger than that for men, whose working schedule is virtually unaffected by the reform (Table 4 Panel B). As shown in column 6, this effect on mothers' working schedules is in part accompanied by a reduction of weekend work, although the effect is only marginally significant. In other words, some mothers who worked on Saturdays prior to the reform—probably to compensate for their absence on Wednesdays—take advantage of the reorganization of the school schedule to shift their Saturday hours to Wednesdays. This result points to distaste for weekend work, which is line with the recent evidence proposed by Mas and Pallais (2017) on workers' positive willingness to pay to avoid working during the weekend, and more generally with the growing evidence on the importance of leisure complementarities in explaining individuals' labor supply choices (Goux, Maurin and Petrongolo 2014, Georges-Kot, Goux and Maurin 2017).

Overall, these results suggest that the reform helps shrink the gender pay gap by triggering two effects: first, it pushes women to increase their working hours, and second, it allows them to adopt a more typical weekday schedule. While we cannot establish whether one effect matters more than the other, in Section 6, we will investigate whether these changes happen within the same firm, or through the opening of new job opportunities for women.

5 Robustness Checks

This paragraph serves three purposes. First, it provides further evidence in favor of the parallel trend assumption. Second, we show that our results do not depend on the choices we made regarding the control group or other elements of the specification such as the clustering of standard errors. Finally, the last section of this paragraph illustrates why the staggered implementation of the reform does not play a major role in the identification of our results. For convenience, we graphically summarize all the robustness checks that we discuss here in Figures 6, 7 and 8, and report each regression table in the Appendix.

First, to complement the event studies and further support the parallel trend assumption, we restrict the pre-treatment period by successively excluding observations from the years 2009, 2010 and 2011 from our sample. While the coefficients on hours worked and (log) hourly wages

become marginally insignificant when doing so, overall the estimates are remarkably similar to those obtained on the entire sample (see Figure 6 Panel B, Figure 7 Panel B, and Appendix Table B2).[18]

Second, we show how the estimates change when relaxing the choices made in the main specification. Results are robust to clustering at the level of age-of-youngest-child × quarter-of-interview, to the exclusion of municipality fixed effects, or the inclusion of province fixed effects instead of municipality fixed effects (see Figures 6-8, and Appendix Tables B3 and B4). We also document the evolution of the estimates of the impact of the reform on each outcome of interest when changing the size of the control group. We include successively in our control group mothers whose youngest child is between twelve and thirteen, twelve and fourteen, up to twelve and seventeen. Overall, restricting or expanding the control group does not affect either the magnitude or the significance of the reform coefficients (see Figures 6-8, and Appendix Tables B5 and B6). Our main results also hold for alternative samples such as including school personnel or restricting the sample only to respondents reporting their monthly wages as opposed to all respondents (see Figures 6-8, and Appendix Tables B7 and B8). By presenting all these robustness checks together, Figures 6, 7 and 8 show that our results are remarkably consistent across specifications.[19]

Finally, to study whether and how the staggered implementation of the reform across municipalities plays a role in our results, we check whether results are different across groups of municipalities who adopted the reform in September 2013 (early adopters) and those who implemented it in September 2014 (late adopters). Results presented in Appendix Table B9 reject the hypothesis that the impact of the reform on women's labor supply varies significantly across these two groups of municipalities. In addition, in Appendix Tables B10 and B11, we report the estimates of model (1), where we assume that the reform was implemented in the entire country in 2013, and show that the results are practically unchanged compared to our main specification.

Overall, this battery of robustness checks strongly supports the validity of our identification strategy.[20]

[18] Note that this exercise cannot be performed on the outcomes measuring daily labor supply, as we only observe them since 2013.

[19] Admittedly, the estimates on the outcomes hours worked and hourly wages tend to be sensitive to the restriction of the sample size, which could be explained by the fact that hours worked are often measured with noise (see Figure 6 Panel B, Figure 7 Panel B, and Appendix Tables B2 to B7).

[20] Appendix Figure B6 reports the corresponding robustness checks for men.

6 Mechanisms

Between-Firm Mobility and Change of Occupation. We first investigate whether changes in the labor supply of treated mothers following the reform arise from an increased likelihood of finding better-paid job opportunities. With the relaxation of time constraints imposed by the school schedule, women are less tied to family-friendly firms. This channel could be important given that gender differences in mobility across employers strongly contribute to explain the gender pay gap (Goldin et al. 2017, Morchio and Moser 2019). Another possible channel is the increase in the cost of statistical discrimination. If employers' recruitment decisions are influenced by the assumption that women are more likely than men to ask for temporal flexibility because of the break in the middle of the school week, it could become more costly for them to discriminate against women after the reform.[21] Finally, after the reform, women may gain access to high-paying occupations that offered less temporal flexibility, such as managerial occupations. We explore these three channels in Appendix Table C12, by looking at job and sectoral mobility, and Appendix Table C13, by considering the probabilities of working in each of the six 1-digit groups of occupations. Overall, we do not find evidence that treated mothers' tenure in the company and contract duration (both measured in years) are affected by the reform (see columns 1-2 of Appendix Table C12). Nor do we find any impact on the probability that a woman works, respectively, in a medium-large firm (fifty employees or more), in an occupation with low prevalence of part-time work, or in the private sector (see columns 1-2 of Appendix Table C12). Accordingly, Appendix Table C13 shows that, except for a decrease in the probability of working as craftsmen/in small businesses —which is not robust to the use of conservative standard errors— the reform does not trigger movements across occupations.

To complement these results, in Appendix Table C14 we explore the effect of the reform on other decisions that could impact women's careers. By having a longer and more regular presence in the workplace, women could have gained access to more training opportunities. Besides, the reform could decrease the career costs associated with children (Adda, Dustmann and Stevens 2017) and affect women's desired fertility. However, none of these effects seem to take place here. The first two columns of Appendix Table C14 show that treated mothers' human capital investment decisions are unaffected by the reform, and column 3 shows that the reform did not change women's fertility decisions either.

Overall, these results suggest that the reform helped mothers closing the parental pay gap

[21] Using occurrences of the expression "school schedule" in the two main French business outlets, we provide suggestive evidence that employers were informed about the implementation of the reform (see Figure C7).

by facilitating shifts from part-time to full-time contracts within the same firm, while, at least in the short run, it did not change their job opportunities, nor it decreased gender segregation across occupations.

Part-time Penalty. Our main results show that the reform allows mothers to adopt a longer and more regular working schedule, with positive effects on their monthly wages. Importantly, the marginally significant effect of the reform on hourly wages points to the presence of a part-time penalty, or cost of flexibility as recently defined by Goldin (2014). This would be consistent with the fact that women receive only a share of the firm-specific pay premiums earned by men (Card, Cardoso and Kline 2016). The theory also predicts a larger part-time penalty for highly-educated female workers, as these are potentially less substitutable and more likely to play a key role for their firm (Goldin 2014). We explore this possibility in Appendix Table C15, by studying the heterogeneous effects of the reform by mothers' education. This exercise shows that, following the 2013 reform, highly-educated mothers (with a college degree or more) are 4 percentage points less likely to work part-time, with their coefficient being significant at 1 percent and statistically different from that for low-educated mothers. In other words, high-skilled mothers show to be more responsive to the opportunity of working regularly, which is consistent with the hypothesis of heterogeneities in the cost of flexibility along the skill distribution.

Impact of the School Schedule Across Households. One of the striking features of our results is the fact that there is virtually no impact of the change in children's school schedule on fathers' labor supply decisions. This suggests that even in a country in which a high proportion of women participate in the labor market, a strict division of roles persists within households with children, and that institutional constraints are only binding for women. Yet, these results may mask heterogeneous effects depending on the degree of task-specialization within the household. To investigate this possibility, we construct two groups of households according to their degree of education-based assortative matching. The first group ("Low W High M") is composed of mothers who have the same or a lower level of education than their partner, while in the second ("High W Low M"), they have a strictly higher level of education than their partner. Results presented in Appendix Table C16 suggest that the mothers' labor supply response to the reform is not statistically different across different types of households. This finding stands in contrast to the standard model of joint labor supply (Chiappori, Iyigun and Weiss 2009) and suggests that women's labor supply decisions stem from an individual maximization problem.

7 Welfare Analysis

Thus far, we have provided causal evidence that the organization of the school schedule has important implications for gender inequality in the labor market. We now want to assess the overall social welfare effect of this policy, and in particular to quantify the effect of reducing the gender pay gap on public finances. To do so, we follow the approach developed by Hendren (2016) and compute the marginal value of public funds (MVPF) of the French school reform. The MVPF is defined as the ratio of marginal benefit to marginal cost, where the marginal benefit is measured in terms of individual willingness to pay (WTP) and the marginal cost is given by the difference between the overall cost of the policy and any fiscal externality that it generates:

$$\text{MVPF} = \frac{\text{WTP}}{\text{Cost} - \text{Fiscal externality}}$$

The MVPF measures the amount of welfare delivered to beneficiaries directly per dollar of government expenditure. To compute the MVPF, we use causal estimates of the benefit and cost of providing extracurricular activities together with a more regular and continuous teaching schedule. We present our main assumptions here while details of the datasets used and the computation are presented in Appendix D.

Cost of the policy. The marginal cost is defined as the cost of the reform net of the fiscal externality this produces. We use estimates for the cost from Cassette and Farvaque (2019), who document that the reform's cost ranges between €177 and €211 per pupil for public schools in French municipalities of more than 3,500 inhabitants. To derive a conservative measure of the MVPF, in our preferred specification we use the upper bound estimate of these figures. In addition to the direct cost in terms of the public finances, the policy generates a fiscal externality: a percentage of the mechanical cost of adding extracurricular time is recouped by the government through the additional taxes from increased labor earnings of female earners. We estimate that the labor supply response of mothers leads to an increase in government revenues of €105.29 per year. Finally, we provide suggestive evidence in Appendix D.2 that the reform did not trigger displacement effects in the labor market that might potentially bias our estimation of the fiscal externality. Subtracting the positive fiscal externality from the cost of the program, we estimate a net cost of the program of €106.26 per year per child.[22]

[22]We provide alternative estimations in Appendix D.3 using the lower bound estimate for the cost of the policy.

Willingness to Pay. This term could potentially include all the benefits generated by this reform (savings on childcare costs, effects on children and even subsequent wage effects). One way to bound the WTP is to include only the private cost of extracurricular activities that would allow mothers to work more continuously. To this end, we provide a conservative WTP estimate using solely the transfer value of the availability of free childcare.[23] It is also worth noting that direct causal estimates of this policy on children are not available.[24] While this is an important caveat in our setting, it is reasonable to assume that in the presence of positive effects on children's health and development—as suggested by the work of chronobiologists from the French National Academy of Medicine (see Touitou et al. 2010)—our MVPF is likely to be a lower bound. To compute the WTP, we use statistics from the 2013 Survey on Childcare Arrangements. Descriptive statistics are presented in Appendix Table D20.[25] The monthly cost varies substantially across different childcare arrangements, from €59 to over €400 per month, so we choose to adopt the lower bound cost for our analysis—the most conservative one, using other values as robustness checks. Moreover, we assume that the public provision of extracurricular activities crowded out private options for mothers who were already working on Wednesdays before the reform—approximately 59 percent of our population of interest. This also means that we set the WTP of mothers who did not work on Wednesdays before the reform at zero, knowing that there could be some heterogeneity in preferences across these mothers. Some of them could value spending time with their children such that they would have a negative WTP, while for others this decision could have been influenced by social norms or by their employers' decisions. Absent credible estimations of the parameter of preferences for time spent with children, we prefer to remain agnostic and choose a WTP of zero for this group.[26] Based on these assumptions, we derive a WTP of €385 per child per year.[27]

Marginal Value of Public Funds. Combining our estimates of the cost and willingness to pay, we obtain a MVPF of 3.669 [2.808; 4.530] in our preferred specification.[28] Details relating

[23]By doing so, we implicitly assume that women's increase in after-tax earnings came at the expense of increased effort as opposed to increased opportunities. This is in line with the envelope theorem, according to which the willingness to pay for government transfer is determined by the mechanical cost of that transfer, with behavioral responses therefore considered second-order.

[24]To our knowledge, the only attempt to estimate the impact of the 2013 reform on children's performance is the primarily descriptive analysis by MENJ-DEPP (2017) (see Appendix D.1).

[25]The survey is only conducted every seven years, which prevents us from directly identifying the impact of the reform on childcare spending.

[26]Note that if we were to assume a negative WTP for these women, it would have to be as high as €680 per year per woman to obtain an MVPF lower than one.

[27]In details, assuming that mothers pay childcare during eleven months, (excluding holidays), we derive the following WTP= €59.27 × 11 × 0.59 = €384.6

[28]We follow Hendren and Sprung-Keyser (2020) and compute 95 percent bootstrapped confidence intervals for the MVPF; see Appendix D.3.

to the computation of these confidence intervals are provided in Appendix Figure D10. We also provide alternative estimates assuming other values for the cost of the policy, the cost of pre-reform childcare, and assuming that all women have the same WTP (no crowding-out effect), and find systematically higher values for the MVPF (see Appendix Figure D9). Based on our assumptions, our preferred estimate for the MVPF implies that each euro invested in this reform pays back at least 3.7 euros in the short run. The MVPF for this intervention is typically higher than MVPFs for policies targeting adults (such as on-the-job training, for example, see Hendren and Sprung-Keyser 2020), even though we do not take into account potential effects on children. In contrast, policies targeting children traditionally have higher MVPFs. Our results suggest that cost-benefit analysis of public pre-school childcare expansions may actually overestimate the costs of these policies if they fail to include in their computation the potential fiscal externalities derived by positive wage effects for mothers. Finally, the most conservative approach would be to assume that the willingness to pay is equal to the cost of the current policy. This is not a realistic assumption in our setting, as we see empirically that the cost of public childcare provision is much lower than the cost of private options. However, even under this assumption, we still find an MVPF of 1.99, which means that the policy pays for itself (see Appendix D.3).

8 Conclusion

This paper identifies the causal impact of children's school schedule on the parental gender pay gap. Since 1972, French children in kindergarten and primary school had no school on Wednesday until 2013, when a reform reallocated some classes to Wednesday mornings. We exploit this setting to study how the organization of children's time helps to explain why the gender wage gap persists even when children get older.

To conduct this analysis, we use a difference-in-differences strategy and compare parents whose youngest child is of primary school age to those whose youngest child is between twelve and sixteen years old, estimating separate regressions by gender.

Our analysis delivers two key insights. First, the reform increased the probability of mothers adopting a regular Monday-Friday full-time working schedule after the reform, while fathers continued to work full-time as in the pre-reform period. Second, the reform led to a statistically significant 3 percent increase in mothers' monthly wages compared to control mothers, while fathers' pay did not change in comparison to the control group. In other words, a longer and regular working schedule allowed mothers to close up to 6 percent of their pay gap with fathers,

on a pre-reform base of 33 percent.

A welfare analysis of the reform shows that the fiscal revenues generated by this reform coupled with families' savings on childcare costs substantially outweighed its costs. Adopting the recent approach developed in Hendren and Sprung-Keyser (2020) to calculate the marginal value of public funds, our most conservative estimates show that in the short run, each euro invested in this reform repays at least 3.7 euros if one simply takes into account family savings on childcare for Wednesdays and the fiscal externality generated by higher revenues from increased women's earnings.

One final consideration is worth mentioning in light of our results. Hour and wage effects seem to be mostly driven by the rewriting of contracts within the same firm, and we do not find evidence that the reform increased mothers' job mobility, or their likelihood of working in better-paid occupations. On the one hand, these effects may take time to materialize, while we only consider short-term effects. On the other hand, mothers of young children may be unable to take advantage of the reform to find alternative job opportunities, as this opportunity set may be constrained by their past choices in terms of job location—working in firms close to their home—or firm type—family-friendly vs. career-oriented (Sorkin 2017, Le Barbanchon, Rathelot and Roulet 2019). To us, this points to important complementarities between the provision of pre-school childcare and a regular organization of children's schedules as they grow up as measures to narrow the parental gender pay gap.

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Figures and Tables

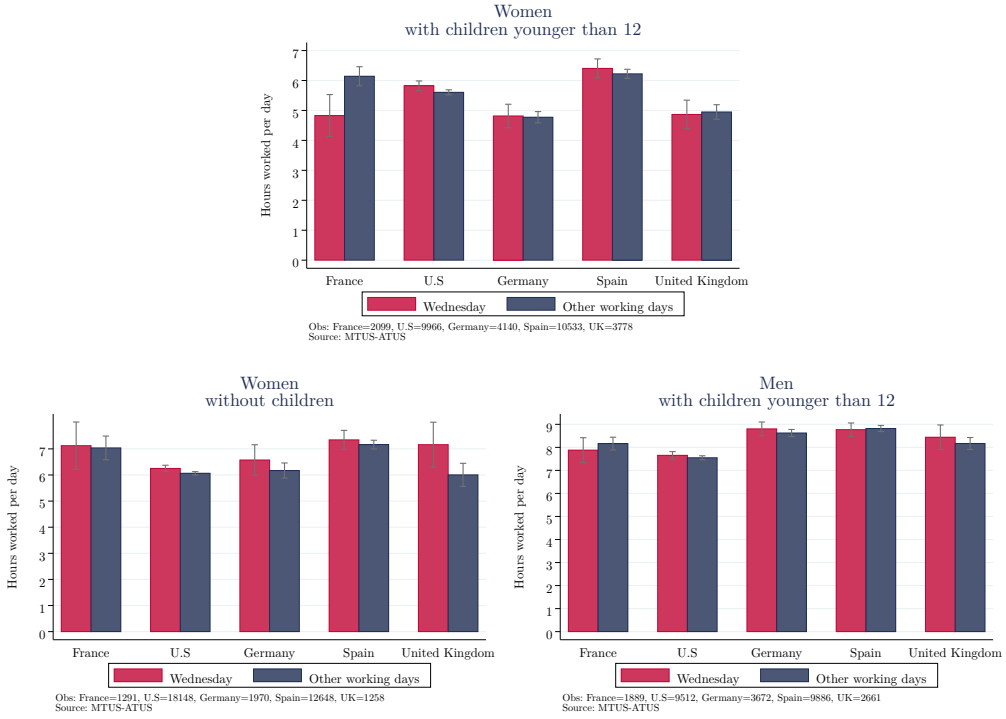
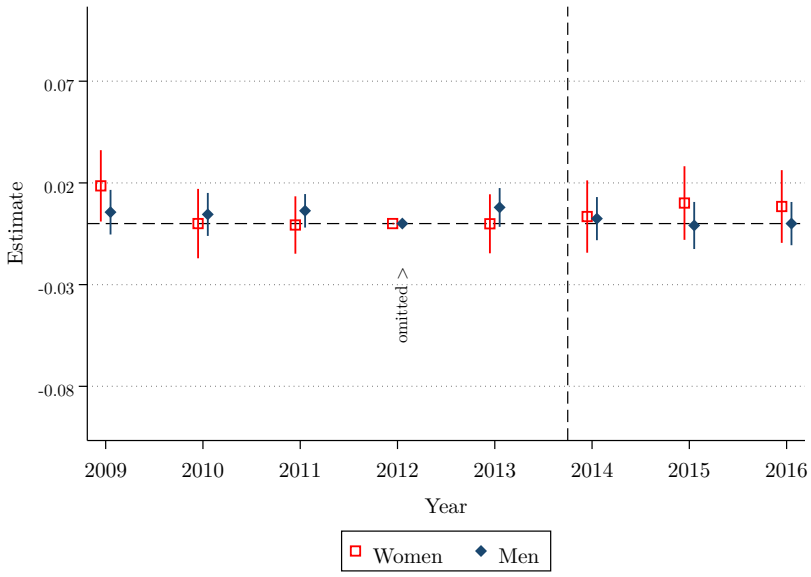


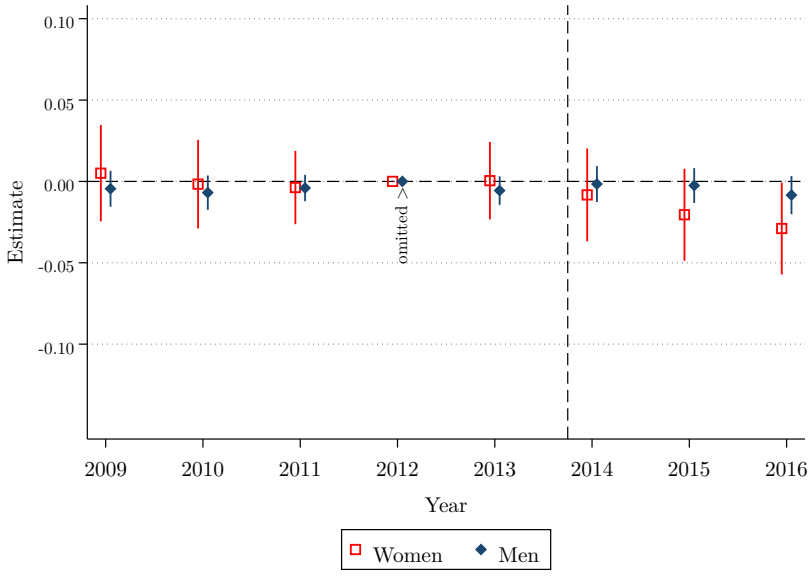
Figure 1 – Working Time Across Countries

Notes: The figures are bar graphs representing the average number of hours spent at work by, respectively, mothers with children younger than 12 years old, women without children, and fathers of children younger than 12, in France, the U.S, Germany, Spain, and the United Kingdom. Working time includes paid work, paid work at home, second job, and travel to/from work. To highlight the peculiarity of the French case, we show the working time declared for Wednesday separately from that reported for the other days of the week. The graph is constructed using the 1991-2010 averages of the Multinational Time Use Survey, and the 2003-2016 averages of the American Time Use Survey for the U.S.

Source: Multinomial Time Use Study, 1991–2010 averages, American Time Use Survey, 2003-2016 averages.



(A) Labor Force Participation of Men and Women

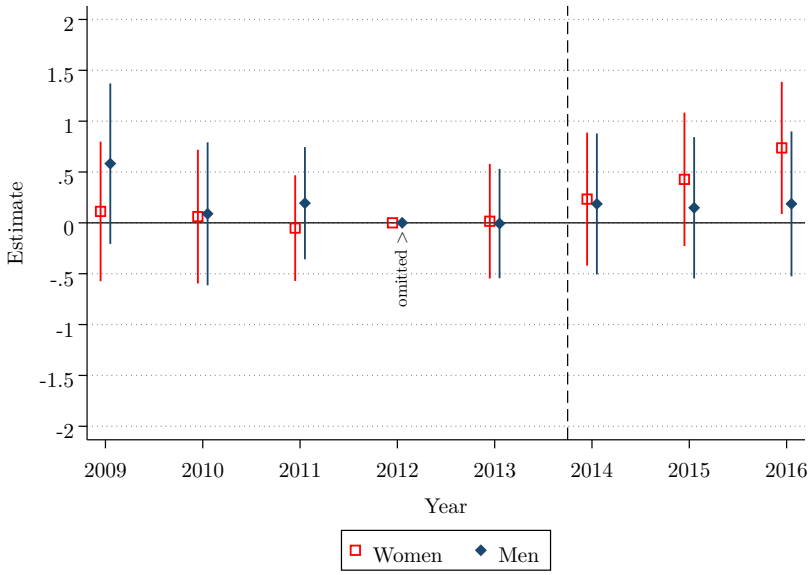


(B) Part-Time Work of Men and Women

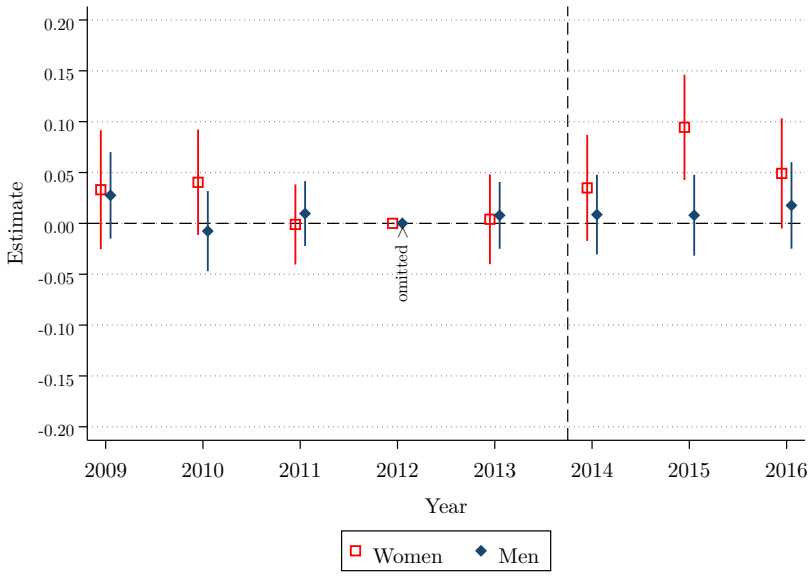
FIGURE 2 – EVENT STUDY – LABOR SUPPLY

Notes: The graph reports the dynamic response to the reform on the labor force participation (Panel A) and the decision to work part-time (Panel B), separately by gender. The coefficients are obtained from the estimation of Equation (2) on the years 2009-2016 on separate samples by gender. The reference year is 2012, the year before the approval of the reform. The vertical dashed line corresponds to the date when the reform started to be implemented. The 95 percent confidence intervals shown are based on standard errors clustered by municipality. The analysis controls for wave-of-interview and municipality fixed effects, and individual controls. The estimation sample includes all parents (Panel A) and all working parents (Panel B), aged 18 to 55, whose youngest child is between six and sixteen, with the exception of those employed in schools.

Source: French Labor Force Survey 2009-2016.



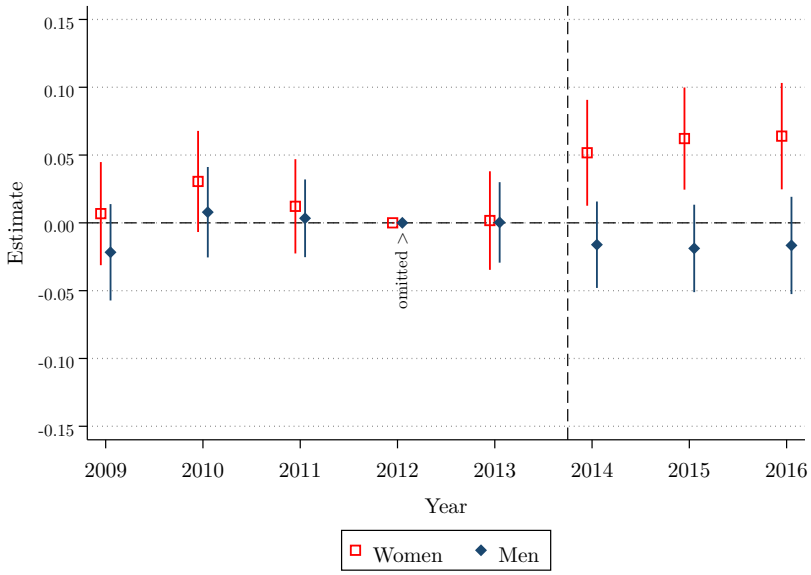
(A) Hours Worked per Week of Men and Women



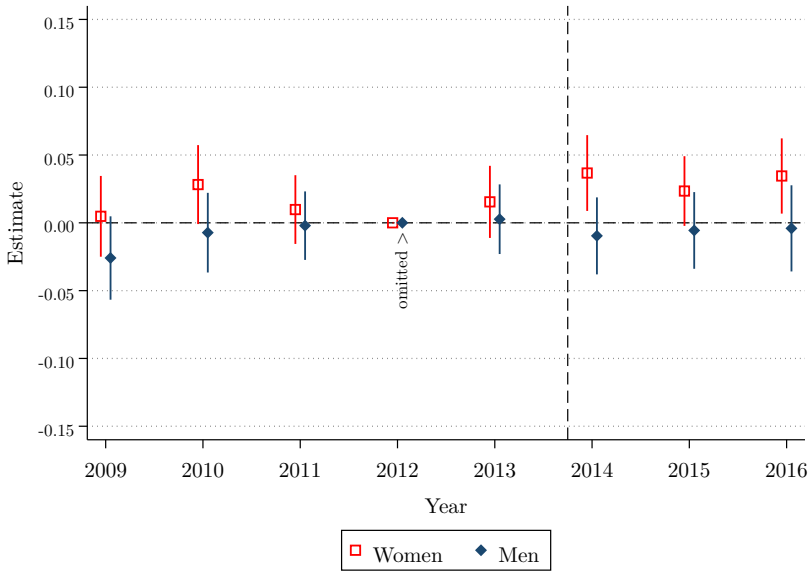
(B) Days Worked per Week of Men and Women

FIGURE 3 – EVENT STUDY – WORKING TIME

Notes: These graphs show the dynamic response to the reform on the number of hours worked per week (Panel A) and on the number of days worked per week (Panel B) separately by gender. The coefficients are obtained from the estimation of Equation (2) on the years 2009-2016. The reference year is 2012, the year before the approval of the reform. The vertical dashed line corresponds to the date when the reform started to be implemented. The 95 percent confidence intervals shown are based on standard errors clustered by municipality. The analysis controls for wave-of-interview and municipality fixed effects, and individual controls. The estimation sample includes all working parents, aged 18 to 55, whose youngest child is between six and sixteen, with the exception of those employed in schools.
Source: French Labor Force Survey 2009-2016.



(A) Average Monthly Wages of Men and Women



(B) Average Hourly Wages of Men and Women

FIGURE 4 – EVENT STUDY – EARNINGS

Notes: The graphs show the dynamic response to the reform on the monthly wages (Panel A) and hourly wages (Panel B) of men and women. The coefficients are obtained from the estimation of Equation (2) on the years 2009-2016 on the (log) of the real monthly and hourly wages. The reference year is 2012, the year before the approval of the reform. The vertical dashed line corresponds to the date when the reform started to be implemented. The 95 percent confidence intervals shown are based on standard errors clustered by municipality. The analysis controls for wave-of-interview and municipality fixed effects, and individual controls. The estimation sample includes all working parents, aged 18 to 55, whose youngest child is between six and sixteen with the exception of those employed in schools, including only waves when parents report their wages in the French Labor Force Survey.
Source: French Labor Force Survey 2009-2016.

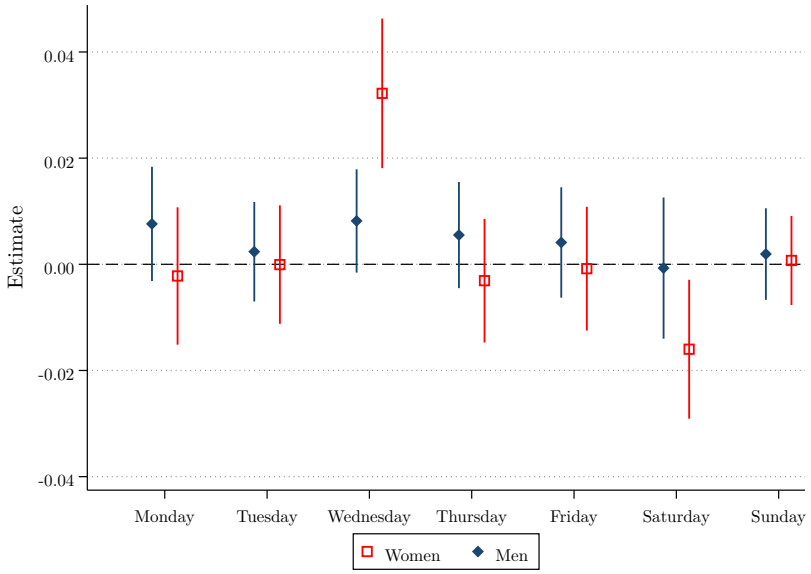
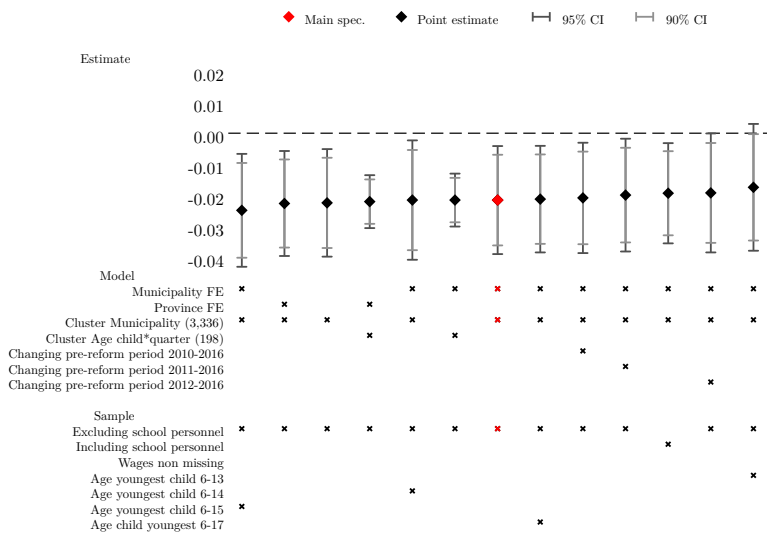
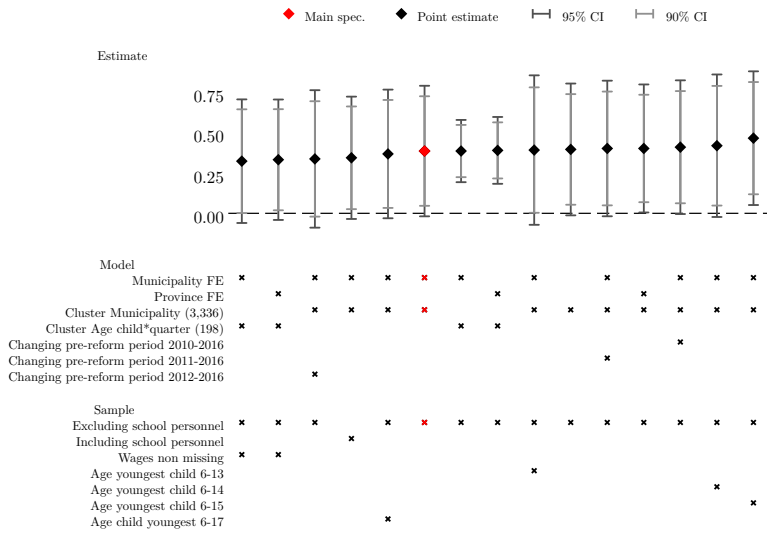


FIGURE 5 – DAILY LABOR SUPPLY RESPONSE TO THE REFORM BY GENDER

Notes: The figure shows the coefficients capturing the effect of the reform on the decision to work each day of the week, with 95 percent confidence intervals, obtained from the estimation of Equation (1). The corresponding estimates are reported in Table 4. The effects for women and men are obtained on separate samples by gender, which comprise all working parents whose youngest child is between six and sixteen years old, with the exception of those employed in schools. We only consider parents who are employed at the time of the interview. As the French LFS starts including questions on the allocation of working time along the week only in 2013, the samples only comprise parents interviewed in 2013-2016. All regressions include age and age squared, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household.
Source: French Labor Force Survey 2009-2016.



(A) Part-Time Work

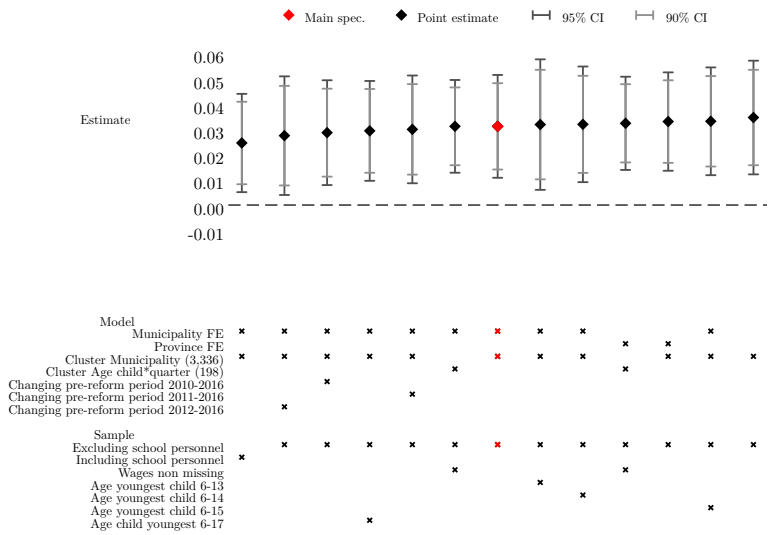


(B) Hours Worked per Week

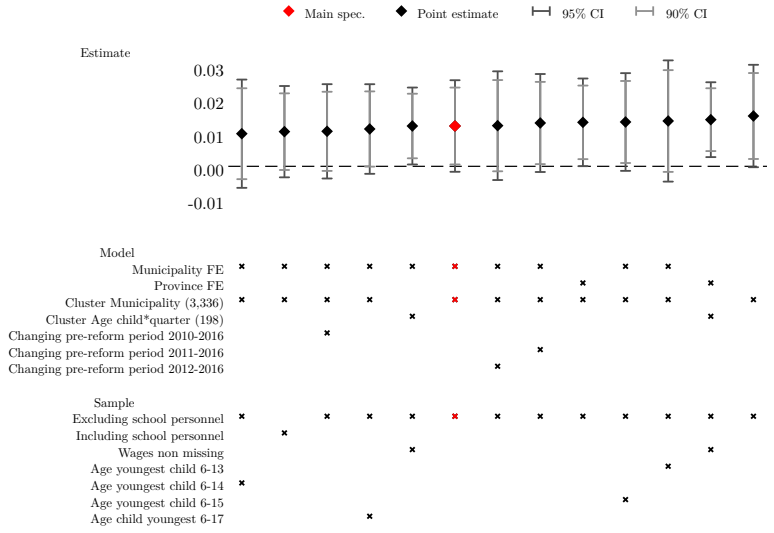
FIGURE 6 – ROBUSTNESS CHECKS – WOMEN

Notes: The figure presents coefficients capturing the effect of the reform, obtained from the estimation of Equation (1) on the decision to work part-time (Panel A) and the number of hours worked per week (Panel B) for the sample of mothers. All regressions include age and age squared, marital status, number of children, a dummy for immigration status, wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. We compare the estimate of our preferred specification (in red) with alternative specifications (cluster at the age of youngest child×quarter-level, inclusion of province fixed effects, change in the size of pre-treatment period), and alternative samples (excluding 2013, change in the size of control group, including mothers working in schools, including only waves when mothers report their wages). The corresponding regression tables are presented in Tables B2, B3, B5 and B7.

Source: French Labor Force Survey 2009-2016.



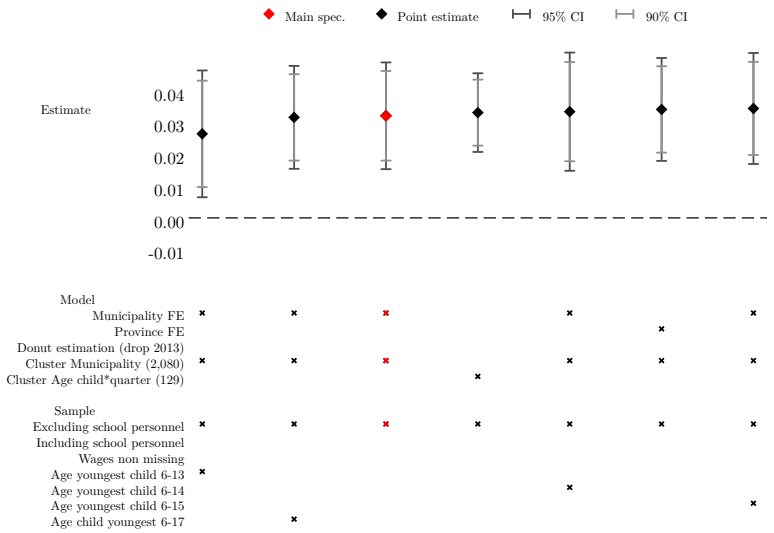
(A) Monthly Wage



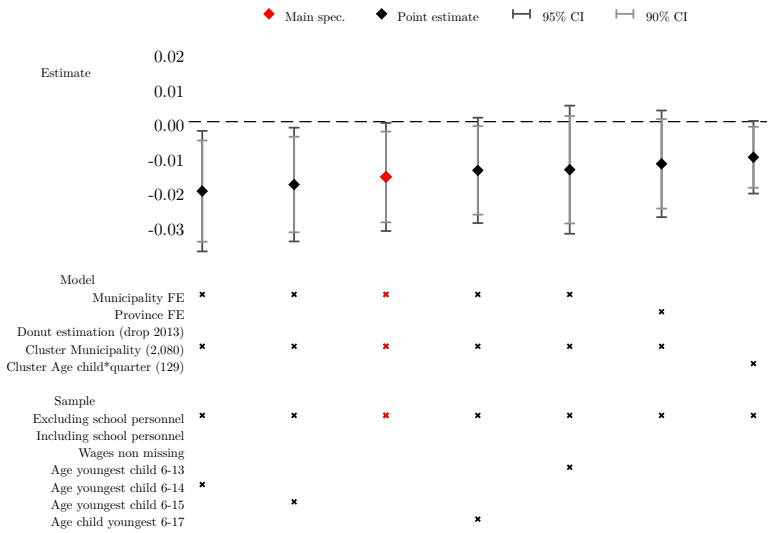
(B) Hourly Wage

FIGURE 7 – ROBUSTNESS CHECKS – WOMEN

Notes: The figure presents coefficients capturing the effect of the reform, obtained from the estimation of Equation (1) on the (log) real monthly wage (Panel A) and the (log) real hourly wage (Panel B) for the sample of mothers. All regressions include age and age squared, marital status, number of children, a dummy for immigration status, wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. We compare the estimate of our preferred specification (in red) with alternative specifications (cluster at the age of youngest child×quarter-level, inclusion of province fixed effects, change in the size of pre-treatment period), and alternative samples (excluding 2013, change in the size of control group, including mothers working in schools, including only waves when mothers report their wages). The corresponding regression tables are presented in Tables B2, B3, B5 and B7.
Source: French Labor Force Survey 2009-2016.



(A) Work on Wednesday



(B) Work on Saturday

FIGURE 8 – ROBUSTNESS CHECKS – WOMEN

Notes: The figure presents coefficients capturing the effect of the reform, obtained from the estimation of Equation (1) on decision to work on Wednesday (Panel A) and Saturday (Panel B) for the sample of mothers. As the French LFS only includes questions on the allocation of working time over the week from 2013 onward, the samples only comprise parents interviewed in 2013-2016. All regressions include age and age squared, marital status, number of children, a dummy for immigration status, wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. We compare the estimate of our preferred specification (in red) with alternative specifications (cluster at the age of youngest child×quarter-level, inclusion of province fixed effects), and alternative samples (excluding 2013, change in the size of control group, including mothers working in schools, including only waves when mothers report their wages). The corresponding regression tables are reported in Tables B4, B6 and B8.

Source: French Labor Force Survey 2013-2016.

Table 1 – Descriptive statistics of mothers' characteristics by age of the youngest child

	Youngest child aged between				
	0-1	2-5	6-11	12-16	15-18
Panel A: Sociodemographic Characteristics					
Age	31.14	34.61	40.51	45.44	46.88
	(5.29)	(5.52)	(5.29)	(4.57)	(4.24)
Married	0.92	0.87	0.81	0.79	0.78
	(0.27)	(0.34)	(0.39)	(0.41)	(0.41)
Immigrant	0.17	0.15	0.12	0.11	0.11
	(0.37)	(0.36)	(0.33)	(0.32)	(0.32)
College degree or more	0.40	0.38	0.33	0.26	0.24
	(0.49)	(0.49)	(0.47)	(0.44)	(0.43)
No college degree	0.59	0.62	0.67	0.74	0.76
	(0.49)	(0.49)	(0.47)	(0.44)	(0.43)
Number of children	1.94	2.02	1.94	1.37	1.10
	(1.03)	(0.93)	(0.79)	(0.54)	(0.32)
Panel B: Labor Market Outcomes					
Labor force participation	0.61	0.77	0.85	0.85	0.84
	(0.49)	(0.42)	(0.36)	(0.35)	(0.36)
Private sector	0.75	0.76	0.74	0.74	0.74
	(0.43)	(0.43)	(0.44)	(0.44)	(0.44)
Intermediary occupations	0.28	0.23	0.21	0.21	0.21
	(0.45)	(0.42)	(0.41)	(0.41)	(0.41)
Clerical occupations	0.42	0.47	0.49	0.49	0.49
	(0.49)	(0.50)	(0.50)	(0.50)	(0.50)
Plant and machine operatives	0.08	0.10	0.10	0.11	0.11
	(0.27)	(0.30)	(0.30)	(0.31)	(0.32)
Craftmen, Shopkeepers, Business owners	0.03	0.04	0.05	0.04	0.04
	(0.16)	(0.19)	(0.22)	(0.20)	(0.20)
Managerial and professional occupations	0.19	0.16	0.14	0.13	0.13
	(0.39)	(0.37)	(0.35)	(0.34)	(0.33)
Days worked per week	4.61	4.63	4.70	4.79	4.79
	(0.88)	(0.89)	(0.90)	(0.88)	(0.90)
Hours worked per week	34.23	33.87	34.28	34.74	34.84
	(9.40)	(10.22)	(10.93)	(11.44)	(11.57)
Part-time work	0.35	0.37	0.36	0.34	0.32
	(0.48)	(0.48)	(0.48)	(0.47)	(0.47)
Work on Monday	0.55	0.68	0.70	0.71	0.70
	(0.50)	(0.47)	(0.46)	(0.46)	(0.46)
Work on Tuesday	0.63	0.75	0.77	0.78	0.77
	(0.48)	(0.43)	(0.42)	(0.41)	(0.42)
Work on Wednesday	0.51	0.57	0.59	0.68	0.69
	(0.50)	(0.49)	(0.49)	(0.47)	(0.46)
Work on Thursday	0.61	0.72	0.74	0.75	0.74
	(0.49)	(0.45)	(0.44)	(0.43)	(0.44)
Work on Friday	0.59	0.72	0.75	0.75	0.74
	(0.49)	(0.45)	(0.44)	(0.43)	(0.44)
Work on Saturday	0.21	0.23	0.23	0.23	0.23
	(0.41)	(0.42)	(0.42)	(0.42)	(0.42)
Work on Sunday	0.08	0.08	0.09	0.09	0.09
	(0.28)	(0.28)	(0.28)	(0.29)	(0.29)
Real hourly wage (in Euros)	12.05	11.99	12.06	12.11	12.06
	(5.75)	(8.40)	(8.21)	(6.89)	(6.15)
Real monthly wage (in Euros)	1,641.51	1,598.88	1,612.52	1,647.92	1,645.39
	(900.79)	(947.24)	(1,064.84)	(1,075.69)	(982.41)
Observations	50,508	77,179	85,663	63,587	31,664

Notes: The table presents summary statistics for mothers' characteristics, computed for each age-interval of their youngest child living in the household. The studied sample comprises all French mothers aged between 18 and 55, and interviewed in the French Labor Force Survey before the implementation of the reform. Mothers working in schools are not included when computing these figures.

Source: French Labor Force Survey 2009-2014.

Table 2 – Descriptive statistics of fathers' characteristics by age of the youngest child

	Youngest child aged between				
	0-1	2-5	6-11	12-16	15-18
Panel A: Sociodemographic Characteristics					
Age	33.99	37.41	42.65	46.84	48.06
	(6.05)	(5.97)	(5.38)	(4.44)	(4.14)
Married	1.00	0.98	0.96	0.94	0.94
	(0.07)	(0.13)	(0.20)	(0.24)	(0.24)
Immigrant	0.16	0.15	0.11	0.09	0.09
	(0.37)	(0.36)	(0.31)	(0.29)	(0.29)
College degree or more	0.34	0.33	0.30	0.24	0.22
	(0.47)	(0.47)	(0.46)	(0.43)	(0.42)
No college degree	0.65	0.66	0.70	0.76	0.77
	(0.48)	(0.47)	(0.46)	(0.43)	(0.42)
Number of children	1.92	2.04	2.00	1.40	1.11
	(1.01)	(0.92)	(0.77)	(0.56)	(0.33)
Panel B: Labor Market Outcomes					
Labor force participation	0.95	0.96	0.96	0.96	0.95
	(0.21)	(0.20)	(0.20)	(0.20)	(0.21)
Private sector	0.86	0.84	0.83	0.83	0.83
	(0.34)	(0.36)	(0.38)	(0.37)	(0.38)
Intermediary occupations	0.20	0.21	0.21	0.22	0.23
	(0.40)	(0.41)	(0.41)	(0.41)	(0.42)
Clerical occupations	0.13	0.11	0.10	0.09	0.09
	(0.33)	(0.32)	(0.30)	(0.29)	(0.29)
Plant and machine operatives	0.38	0.35	0.32	0.32	0.32
	(0.49)	(0.48)	(0.47)	(0.47)	(0.47)
Craftmen, Shopkeepers, Business owners	0.08	0.10	0.11	0.12	0.12
	(0.27)	(0.29)	(0.32)	(0.32)	(0.32)
Managerial and professional occupations	0.20	0.21	0.22	0.22	0.21
	(0.40)	(0.40)	(0.42)	(0.41)	(0.41)
Days worked per week	5.03	5.05	5.09	5.10	5.10
	(0.64)	(0.65)	(0.65)	(0.65)	(0.64)
Hours worked per week	41.13	41.88	42.66	43.08	42.97
	(10.27)	(10.74)	(11.12)	(11.28)	(11.21)
Part-time work	0.05	0.04	0.03	0.03	0.03
	(0.21)	(0.20)	(0.18)	(0.17)	(0.18)
Work on Monday	0.74	0.75	0.76	0.77	0.77
	(0.44)	(0.43)	(0.43)	(0.42)	(0.42)
Work on Tuesday	0.81	0.82	0.82	0.83	0.83
	(0.39)	(0.39)	(0.38)	(0.37)	(0.37)
Work on Wednesday	0.78	0.78	0.78	0.80	0.81
	(0.41)	(0.41)	(0.41)	(0.40)	(0.40)
Work on Thursday	0.79	0.79	0.79	0.80	0.80
	(0.41)	(0.41)	(0.41)	(0.40)	(0.40)
Work on Friday	0.78	0.79	0.79	0.79	0.79
	(0.41)	(0.41)	(0.41)	(0.40)	(0.41)
Work on Saturday	0.21	0.21	0.22	0.21	0.22
	(0.41)	(0.41)	(0.41)	(0.41)	(0.41)
Work on Sunday	0.09	0.08	0.09	0.08	0.08
	(0.28)	(0.27)	(0.28)	(0.27)	(0.27)
Real hourly wage (in Euros)	13.20	13.73	14.76	15.10	15.08
	(12.85)	(9.79)	(10.73)	(9.15)	(9.47)
Real monthly wage (in Euros)	2,098.70	2,196.80	2,398.13	2,471.14	2,465.82
	(1,931.6)	(1,370.97)	(1,894.60)	(1,758.33)	(1,873.14)
Observations	47,837	69,575	72,577	50,600	24,383

Notes: The table presents summary statistics for fathers' characteristics, computed for each age-interval of their youngest child living in the household. The studied sample comprises all French fathers aged between 18 and 55, and interviewed in the French Labor Force Survey before the implementation of the reform. Fathers working in schools are not included when computing these figures.

Source: French Labor Force Survey 2009-2014.

Table 3 – Labor supply response to the reform by gender

	(1) Labor force participation	(2) Part-time	(3) Hours worked per week	(4) Days worked per week	(5) Log net monthly wages	(6) Log net hourly wages
Panel A. Women						
Treatment × Post	0.002	-0.022**	0.387*	0.049***	0.031***	0.012*
	(0.005)	(0.009)	(0.207)	(0.017)	(0.010)	(0.007)
$p-$value	0.7631	0.0152	0.0615	0.0048	0.0027	0.0843
[q-value]	[0.764]	[0.031]	[0.093]	[0.015]	[0.015]	[0.102]
Observations	210,090	160,838	160,838	160,838	51,585	51,585
Adjusted R-squared	0.146	0.138	0.123	0.105	0.294	0.294
Pre-treatment mean	0.85	0.36	34.30	4.70	7.23	2.39
Panel B. Men						
Treatment × Post	-0.006	-0.002	0.079	0.012	-0.008	0.005
	(0.004)	(0.004)	(0.209)	(0.012)	(0.009)	(0.008)
$p-$value	0.109	0.642	0.706	0.353	0.378	0.530
[q-value]	[0.654]	[0.707]	[0.707]	[0.707]	[0.707]	[0.707]
Observations	176,955	159,750	159,750	159,750	46,636	46,636
Adjusted R-squared	0.077	0.144	0.076	0.108	0.339	0.293
Pre-treatment mean	0.96	0.03	42.70	5.09	7.65	2.59
p-value diff. M-W	0.335	0.034	0.231	0.059	0.002	0.385

Notes: The table shows the coefficients capturing the effect of the reform. The different columns refer to the outcome considered. The effects for women (Panel A) and men (Panel B) are obtained by estimating Equation (1) separately on each gender. All regressions include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. The estimation sample comprises all mothers (fathers) whose youngest child is between six and sixteen years old, with the exception of those working in schools. In columns 2 to 6, we only consider parents who are employed at the time of the interview and in the last two columns those who reported their monthly wages (only once out of the five times they are interviewed). Standard errors in parentheses are adjusted for clustering at the municipality-level. We report the cluster-robust $p-$value of the estimated treatment effect and, in square brackets, the $p-$value ($q-$value) adjusted for multiple hypotheses testing across outcomes, using the False Discovery Rate (FDR) control method. Specifically, we use the sharpened two-stage q-values introduced in Benjamini, Krieger and Yekutieli (2006) and described in Anderson (2008).

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table 4 – Daily labor supply response to the reform by gender

	(1) Monday	(2) Tuesday	(3) Wednesday	(4) Thursday	(5) Friday	(6) Saturday	(7) Sunday
Panel A. Women							
Treatment × Post	-0.002	-0.000	0.032***	-0.003	-0.001	-0.016**	0.001
	(0.008)	(0.007)	(0.009)	(0.007)	(0.007)	(0.008)	(0.005)
$p-$value	0.780	0.993	0.000	0.663	0.907	0.045	0.888
[q-value]	[0.994]	[0.994]	[0.002]	[0.994]	[0.994]	[0.158]	[0.994]
Observations	74,615	74,615	74,615	74,615	74,615	74,615	74,615
Adjusted R-squared	0.050	0.053	0.060	0.054	0.048	0.095	0.075
Pre-treatment mean	0.701	0.773	0.589	0.745	0.745	0.234	0.0856
Panel B. Men							
Treatment × Post	0.008	0.002	0.008	0.006	0.004	-0.001	0.002
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.005)
$p-$value	0.246	0.678	0.168	0.366	0.517	0.930	0.714
[q-value]	[0.833]	[0.833]	[0.833]	[0.833]	[0.833]	[0.930]	[0.833]
Observations	78,555	78,555	78,555	78,555	78,555	78,555	78,555
Adjusted R-squared	0.052	0.058	0.053	0.056	0.057	0.077	0.083
Pre-treatment mean	0.755	0.823	0.785	0.791	0.792	0.217	0.0868
p-value diff. M-W	0.267	0.762	0.012	0.296	0.580	0.172	0.860

Notes: The table shows the coefficients capturing the effect of the reform for the sample of mothers (fathers) whose youngest child is between six and sixteen years old who are employed at the time of the interview, with the exception of those working in schools. The effects for women (Panel A) and men (Panel B) are obtained by estimating Equation (1) separately on each gender. The different columns refer to the decision to work each specific day of the week. All regressions include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. As the French Labor Force Survey starts including questions on the allocation of working time along the week only in 2013, the sample considered here only comprises mothers (in Panel A.) and fathers (in Panel B.) interviewed between 2013 and 2016. Standard errors (shown in parentheses) are adjusted for clustering at the municipality-level. We report the cluster-robust $p-$value of the estimated treatment effect and, in square brackets, the $p-$value ($q-$value) adjusted for multiple hypotheses testing across outcomes, using the False Discovery Rate (FDR) control method. Specifically, we use the sharpened two-stage q-values introduced in Benjamini, Krieger and Yekutieli (2006) and described in Anderson (2008).

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Appendix to

School Schedule and the Gender Pay Gap

Emma Duchini

Clémentine Van Effenterre

October 2020

List of Appendices

A Institutional Details

In this section, we present institutional details related to the implementation of the reform. First, we provide descriptive statistics on the pre-reform childcare arrangements of parents of slightly younger children using the CNAF survey on childcare arrangements. Then, we describe children's school schedule pre- and post-reform, and describe how private schools implemented the reform.

A.1 Pre-reform Childcare Arrangements

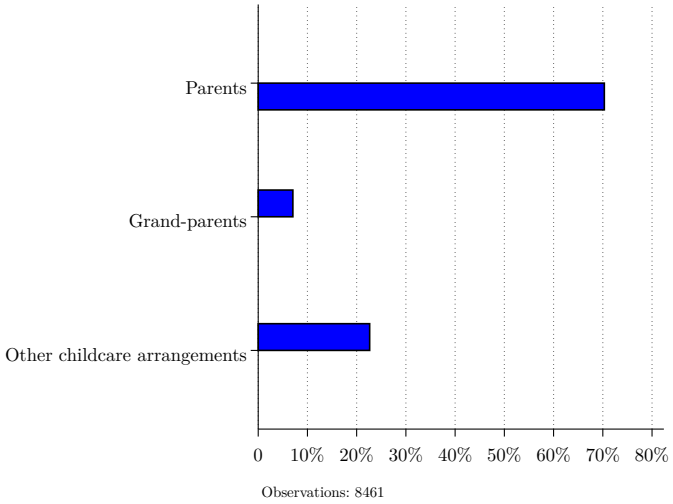


Figure A1 – Childcare arrangements on Wednesdays (8am- 7pm) for children between 0 and 6

Notes: The figure shows the childcare arrangements families adopted prior to the introduction of the reform, to take care of their children when they are not in school on Wednesday. The sample comprises 8,461 parents with children aged 0 to 6 interviewed in 2002, 2007, and 2013 - prior to the introduction of the reform.
Source: CNAF survey on childcare arrangements.

A.2 The 2013 School Schedule Reform – Implementation Details

Private schools. Private schools had the freedom whether or not to implement the 2013 reform. By the end of the academic year 2014-2015, only fifteen percent of them, comprising 13.5 percent of French pupils attending a private school, had adopted the new schedule. Although in our data we cannot tell whether families send their children to public or private schools, we check that the aggregate proportions of students enrolled in public and private schools remains stable over the years of implementation of the reform (MENJ-DEPP 2015*b*). Parents are not moving their children from one type of school to the other because of the reform. If anything, this implies that our estimates can be seen as ITT instead of ATE, as around twelve percent of the families in our sample are not affected by the reform (corresponding to 87 percent of the 14 percent of children attending private schools.).

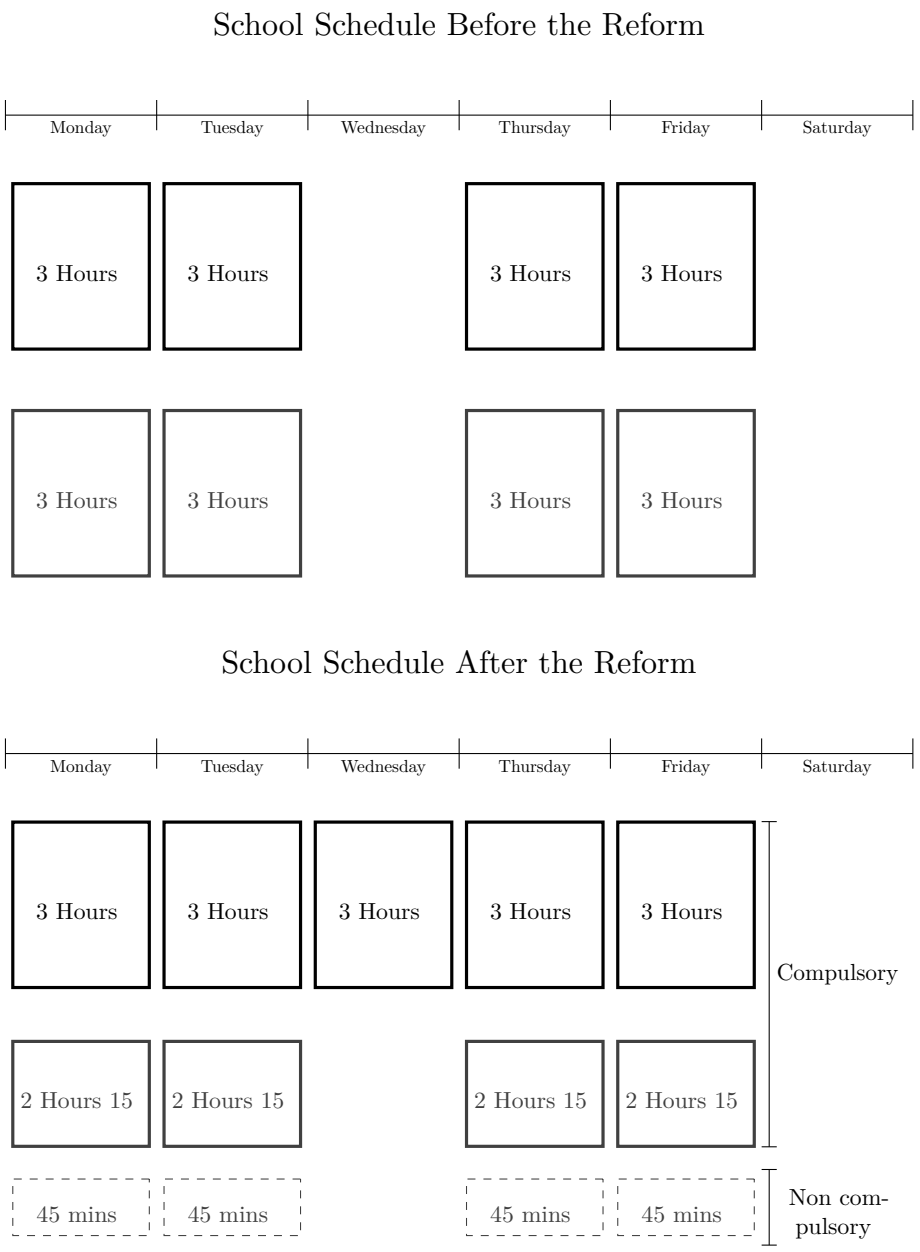


FIGURE A2 – Impact of the Reform on Children's School Schedule

Notes: The diagram presents the changes of the school schedule for primary school children before and after the school schedule reform. The reform shortened the school day by an average of 45 minutes and, to maintain the total number of weekly hours, it added half a day, usually on Wednesday mornings, and exceptionally on Saturdays (3 percent of schools). Moreover, to compensate for the reduction in daily teaching time, the government asked municipalities to provide free extra-curricular activities for children, for a total of three weekly hours.

Source: Enrysco database and CNAF-AMF survey on extra-curricular activities.

B Additional Results and Robustness Checks

In this section, we present event-study graphs for all outcomes (not presented in the main text) for fathers and mothers. We also present all tables of robustness checks for women and figures summarising the results of these robustness checks for men. Finally, we present the raw trends of labor supply measures for mothers in the treated and control groups.

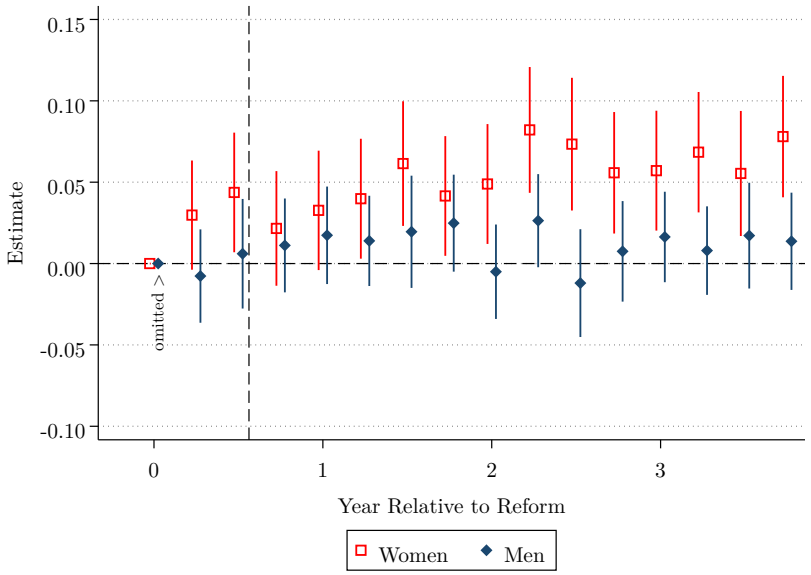
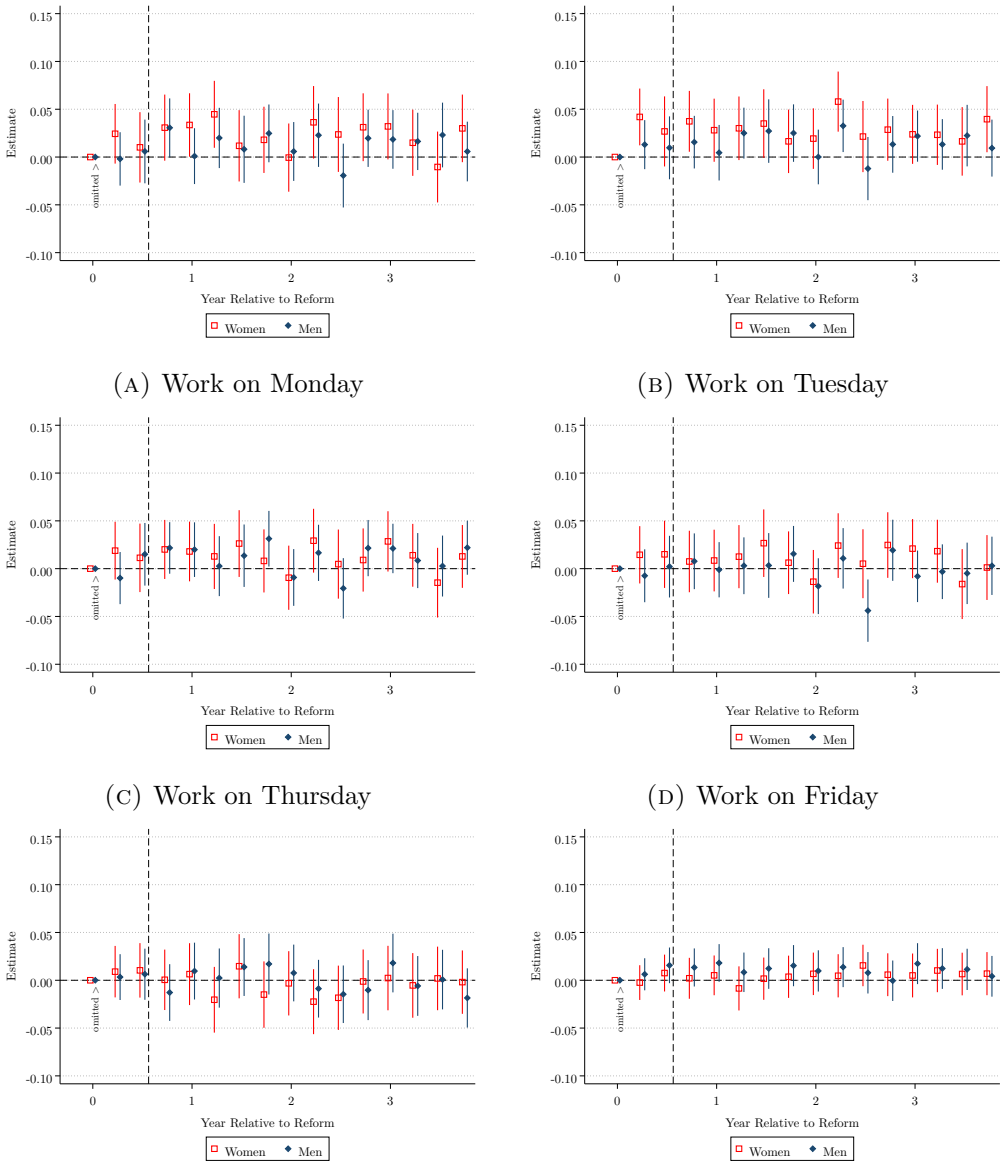


Figure B3 – Event study – Work on Wednesday

Notes: These graphs show the dynamic response to the reform on the decision to work on Wednesday, separately by gender. The coefficients are obtained from the estimation of Equation (2), where t refers to a quarter. As the French LFS only includes questions on the allocation of working time over the week from 2013 onward, the sample only comprises mothers and fathers interviewed between 2013 and 2016. The reference quarter is Q1 2013, the first quarter of the year when the reform was approved. The vertical dashed line corresponds to the date the reform started to be implemented. The 95 percent confidence intervals shown are based on standard errors clustered by municipality. The analysis controls for municipality and waves-of-interview fixed effects, and individual controls. The estimation sample includes all working parents, aged 18 to 55, whose youngest child is between six and sixteen, with the exception of those employed in schools.
Source: French Labor Force Survey 2013-2016.



(A) Work on Monday

(B) Work on Tuesday

(C) Work on Thursday

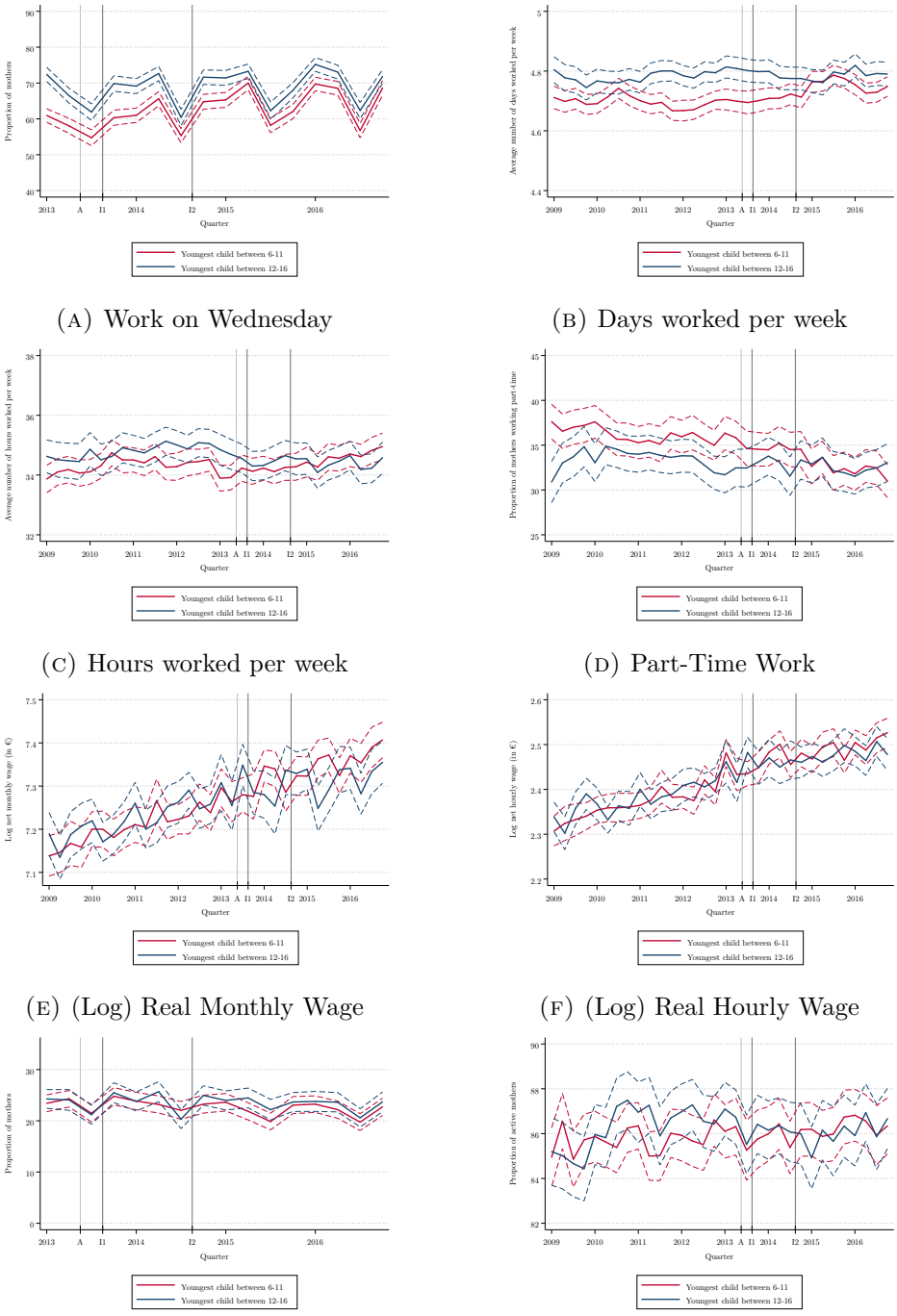
(D) Work on Friday

(E) Work on Saturday

(F) Work on Sunday

FIGURE B4 – EVENT STUDY – ALLOCATION OF WORKING TIME

Notes: The graphs reports the dynamic response to the reform on the allocation working time, separately for mothers and fathers. The coefficients are obtained from the estimation of Equation (2) on the decision to work each day of the week, on separate samples by gender for the years 2013-2016. The reference quarter is Q1 2013, the first quarter of the year when the reform was approved. The vertical dashed line corresponds to the date the reform started to be implemented. The 95 percent confidence intervals shown are based on standard errors clustered by municipality. The analysis controls for municipality and waves of interview fixed effects, and individual controls. The estimation sample includes all working parents, aged 18 to 55, whose youngest child is between six and sixteen with the exception of those employed in schools.
Source: French Labor Force Survey 2013-2016.



(A) Work on Wednesday

(B) Days worked per week

(C) Hours worked per week

(D) Part-Time Work

(E) (Log) Real Monthly Wage

(F) (Log) Real Hourly Wage

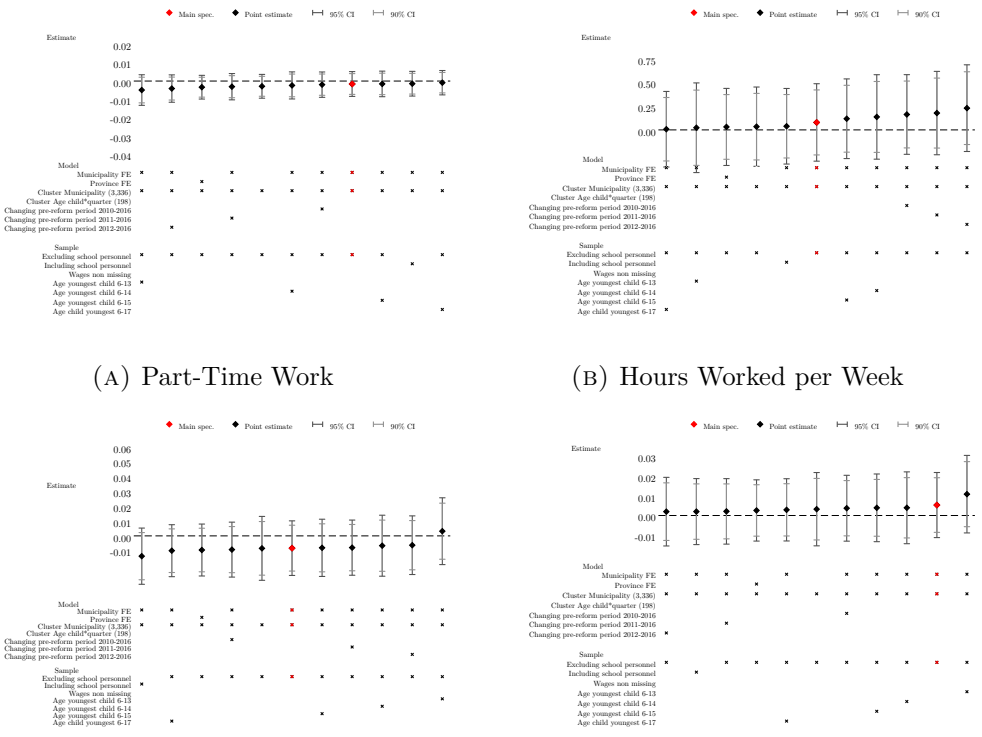
(G) Work on Saturday

(H) Labor Force Participation

FIGURE B5 – TRENDS IN MOTHERS' LABOR SUPPLY MEASURES BY AGE OF THE YOUNGEST CHILD

Notes: The graphs show the evolution of different labor supply measures over the period 2009-2016. The sample includes all mothers aged 18-55 whose youngest child is between 6-16, with the exception of those working in schools. We represent in red treated mothers, whose youngest child is 6-11. Mothers whose youngest child is 12-16 are represented in blue. The bar "A" corresponds to April 2013, when municipalities announced in which year they would introduce the reform. The bar "I1" corresponds to September 2013, when 20 percent of municipalities implement the reform. The bar "I2" corresponds to September 2014, when all municipalities implement the reform. 95 percent confidence intervals are also reported.

Source: French Labor Force Survey 2009-2016.



(A) Part-Time Work

(B) Hours Worked per Week

(C) (Log) Real Monthly Wage

(D) (Log) Real Hourly Wage

FIGURE B6 – ROBUSTNESS CHECKS – MEN

Notes: The figure presents coefficients capturing the effect of the reform, obtained from the estimation of Equation (1) on the decision to work part-time, the number of hours worked per week, the (log) of the real net monthly and hourly wage, for the sample of fathers. The different columns refer to the outcome considered. All regressions include age and age squared, marital status, number of children, a dummy for immigration status, wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. We compare the estimate of our preferred specification (in red) with alternative specifications (cluster at the age of youngest child×quarter-level, inclusion of province fixed effects), and alternative samples (change in the size of pre-treatment period, change in the size of control group, including fathers working in schools, including only waves when fathers report their wages).
Source: French Labor Force Survey 2009-2016.

Table B1 – Test of joint significance of the leads of the reform

	(1) Labor force participation	(2) Hours worked per week	(3) Part-time	(4) Days worked per week	(5) Log net monthly wages	(6) Log net hourly wages
p-value Women	0.385	0.877	0.991	0.253	0.279	0.229
p-value Men	0.188	0.330	0.218	0.546	0.796	0.322
Observations	386,980	320,501	320,501	320,501	97,891	97,891

Notes: The table shows the p-values of the test of joint significance of the leads of the reform, estimated from regression (2). The different columns refer to the outcome considered. All regressions include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. The estimation sample comprises all mothers (fathers) whose youngest child is between six and sixteen years old, with the exception of those working in schools. In columns 2 to 6, we only consider parents who are employed at the time of the interview. The sample size further falls in the last two columns, as respondents in the French Labor Force Survey report their monthly wages only once out of the five times they are interviewed.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B2 – Robustness checks — Mothers' labor supply response to the reform

	(1) Labor force participation	(2) Hours worked per week	(3) Part-time	(4) Days worked per week	(5) Log net monthly wages	(6) Log net hourly wages
Panel A. Sample 2010-2016						
Treatment × Post	0.002	0.411*	-0.021**	0.053***	0.029***	0.010
	(0.005)	(0.212)	(0.009)	(0.018)	(0.011)	(0.007)
Observations	206,769	142,642	142,642	142,642	45,612	45,612
Adjusted R-squared	0.140	0.136	0.123	0.103	0.292	0.290
Pre-treatment means	0.859	34.34	0.359	4.696	7.245	2.404
Panel B. Sample 2011-2016						
Treatment × Post	0.002	0.403*	-0.020**	0.057***	0.030***	0.013*
	(0.005)	(0.215)	(0.009)	(0.018)	(0.011)	(0.007)
Observations	177,104	120,761	120,761	120,761	38,845	38,845
Adjusted R-squared	0.140	0.133	0.117	0.097	0.290	0.289
Pre-treatment means	0.859	34.31	0.357	4.690	7.258	2.417
Panel C. Sample 2012-2016						
Treatment × Post	0.002	0.338	-0.019**	0.053***	0.027**	0.012
	(0.005)	(0.218)	(0.010)	(0.019)	(0.012)	(0.008)
Observations	146,011	97,747	97,747	97,747	31,505	31,505
Adjusted R-squared	0.144	0.145	0.125	0.102	0.297	0.290
Pre-treatment means	0.861	34.23	0.356	4.691	7.273	2.433
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Municipality	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of Equation (1). The different columns refer to the outcome considered. All regressions include age and age square, marital status, number of children, a dummy for immigration status, wave and municipality fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. Standard errors (shown in parentheses) are adjusted for clustering at the municipality-level. The estimation sample comprises all mothers whose youngest child is between six and sixteen years old, with the exception of those working in schools. In columns 2 to 6, we only consider parents who are employed at the time of the interview and in the last two columns those who reported their monthly wages (only once out of the five times they are interviewed). In Panel A, we exclude the year 2013 from the estimation sample. In Panel B to D, we progressively reduce the size of the pre-treatment period, excluding the year 2009, 2010 and 2011 from the estimation sample.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B3 – Robustness checks — Mothers' labor supply response to the reform

	(1) Labor force participation	(2) Hours worked per week	(3) Part-time	(4) Days worked per week	(5) Log net monthly wages	(6) Log net hourly wages
Panel A. with Municipality FE, Cluster Age of the Youngest Child × Quarter						
Treatment × Post	0.003	0.387***	-0.021***	0.049***	0.031***	0.012**
	(0.003)	(0.100)	(0.004)	(0.009)	(0.009)	(0.006)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Age of the Youngest Child × Quarter (198)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	210,090	160,838	160,838	160,838	51,585	51,585
Adjusted R-squared	0.146	0.138	0.123	0.105	0.294	0.294
Pre-treatment means	0.847	34.30	0.361	4.697	1612.8	11.84
Panel B. without Municipality FE, Cluster Age of the Youngest Child × Quarter						
Treatment × Post	0.002	0.391***	-0.022***	0.045***	0.032***	0.014**
	(0.003)	(0.106)	(0.004)	(0.009)	(0.009)	(0.006)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	No	No	No	No	No	No
Cluster Age of the Youngest Child × Quarter (198)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	210,090	160,838	160,838	160,838	51,585	51,585
Adjusted R-squared	0.084	0.045	0.027	0.012	0.225	0.237
Pre-treatment means	0.847	34.30	0.361	4.697	1612.8	11.84
Panel C. with Province FE						
Treatment × Post	-0.002	0.403**	-0.023***	0.044***	0.033***	0.013**
	(0.005)	(0.203)	(0.009)	(0.017)	(0.010)	(0.007)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Municipality (3,336)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	210,090	160,838	160,838	160,838	51,585	51,585
Adjusted R-squared	0.096	0.059	0.047	0.022	0.260	0.264
Pre-treatment means	0.847	34.30	0.361	4.697	7.230	2.392

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of Equation (1). The different columns refer to the outcome considered. All regressions include age and age square, marital status, number of children, a dummy for immigration status, wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. The estimation sample comprises all mothers whose youngest child is between six and sixteen years old, with the exception of those working in schools. In columns 2 to 6, we only consider parents who are employed at the time of the interview and in the last two columns those who reported their monthly wages (only once out of the five times they are interviewed). In Panel A and B, we cluster standard errors at the age of the youngest child × quarter-level, and we exclude municipality fixed effects in Panel B. In Panel C, we replace municipality fixed effects by province fixed effects, and cluster standard errors at the municipality-level.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B4 – Robustness checks — Mothers' daily labor supply response to the reform

	(1) Monday	(2) Tuesday	(3) Wednesday	(4) Thursday	(5) Friday	(6) Saturday	(7) Sunday
Panel A. with Municipality FE, Cluster Age of the Youngest Child × Quarter							
Treatment × Post	-0.002	-0.000	0.032***	-0.003	-0.001	-0.016***	0.001
	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.004)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Age of the Youngest Child × Quarter (129)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	74,615	74,615	74,615	74,615	74,615	74,615	74,615
Adjusted R-squared	0.05	0.05	0.06	0.05	0.05	0.09	0.07
Pre-treatment means	0.701	0.773	0.589	0.745	0.745	0.234	0.086
Panel B. without Municipality FE, Cluster Age of the Youngest Child × Quarter							
Treatment × Post	-0.003	-0.001	0.033***	-0.004	0.001	-0.010*	0.003
	(0.006)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.004)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	No	No	No	No	No	No	No
Cluster Age of the Youngest Child × Quarter (129)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	74,615	74,615	74,615	74,615	74,615	74,615	74,615
Adjusted R-squared	0.016	0.024	0.017	0.020	0.016	0.026	0.007
Pre-treatment means	0.701	0.773	0.589	0.745	0.745	0.234	0.086
Panel C. with Province FE							
Treatment × Post	-0.004	0.000	0.034***	-0.004	-0.000	-0.012	0.000
	(0.008)	(0.006)	(0.008)	(0.007)	(0.007)	(0.008)	(0.005)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Municipality (2,080)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	74,615	74,615	74,615	74,615	74,615	74,615	74,615
Adjusted R-squared	0.019	0.027	0.022	0.024	0.019	0.037	0.018
Pre-treatment means	0.701	0.773	0.589	0.745	0.745	0.234	0.086

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of Equation (1) for the sample of mothers whose youngest child is between six and sixteen years old who are employed at the time of the interview, with the exception of those working in schools. The different columns refer to the decision to work each specific day of the week. All regressions include age and age square, marital status, number of children, a dummy for immigration status, wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. As the French LFS starts including questions on the allocation of working time along the week only in 2013, the sample considered here only comprises mothers interviewed after 2013 and 2016. In Panel A and B, we cluster standard errors at the age of the youngest child × quarter-level, and we exclude municipality fixed effects in Panel B. In Panel C, we replace municipality fixed effects by province fixed effects, and cluster standard errors at the municipality-level.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B5 – Robustness checks — Mothers' labor supply response to the reform

	(1) Hours worked per week	(2) Part-time	(3) Days worked per week	(4) Log net monthly wages	(5) Log net hourly wages
Panel A. Age youngest child 6-13					
Treatment × Post	0.393*	-0.0174*	0.039*	0.032**	0.014
	(0.237)	(0.010)	(0.020)	(0.013)	(0.009)
Observations	119,532	119,532	119,532	38,421	38,421
Adjusted R-squared	0.156	0.141	0.124	0.307	0.299
Panel B. Age youngest child 6-14					
Treatment × Post	0.420*	-0.021**	0.040**	0.032***	0.010
	(0.226)	(0.010)	(0.019)	(0.012)	(0.008)
Observations	133,979	133,979	133,979	43,012	43,012
Adjusted R-squared	0.150	0.134	0.119	0.302	0.297
Panel C. Age youngest child 6-15					
Treatment × Post	0.467**	-0.025***	0.049***	0.033***	0.013*
	(0.212)	(0.009)	(0.018)	(0.011)	(0.007)
Observations	147,637	147,637	147,637	47,285	47,285
Adjusted R-squared	0.144	0.129	0.112	0.298	0.296
Panel D. Age youngest child 6-17					
Treatment × Post	0.369*	-0.021**	0.051***	0.029***	0.011
	(0.204)	(0.009)	(0.017)	(0.010)	(0.007)
Observations	170,231	170,231	170,231	54,527	54,527
Adjusted R-squared	0.134	0.119	0.102	0.292	0.294
Additional controls	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes
Cluster Municipality	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of Equation (1), where controls include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. Standard errors (shown in parentheses) are adjusted for clustering at the municipality-level. The different columns refer to different measures of labor supply. In Panel A, the sample comprises only mothers whose youngest child is between six and thirteen years old. We progressively enlarge the control group. Mothers working in schools are always excluded from the estimation sample. In columns 2 to 6, we only consider parents who are employed at the time of the interview and in the last two columns those who reported their monthly wages (only once out of the five times they are interviewed).

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B6 – Robustness checks — Mothers' daily labor supply response to the reform

	(1) Monday	(2) Tuesday	(3) Wednesday	(4) Thursday	(5) Friday	(6) Saturday	(7) Sunday
Panel A. Age youngest child 6-13							
Treatment × Post	-0.001	0.003	0.026***	0.003	0.006	-0.014	-0.007
	(0.009)	(0.008)	(0.010)	(0.008)	(0.009)	(0.009)	(0.006)
Observations	54,973	54,973	54,973	54,973	54,973	54,973	54,973
Adjusted R-squared	0.056	0.057	0.068	0.057	0.112	0.087	
Panel B. Age youngest child 6-14							
Treatment × Post	-0.002	0.001	0.033***	0.002	0.001	-0.020**	-0.005
	(0.009)	(0.008)	(0.010)	(0.008)	(0.008)	(0.009)	(0.006)
Observations	61,816	61,816	61,816	61,816	61,816	61,816	61,816
Adjusted R-squared	0.053	0.055	0.065	0.056	0.051	0.106	0.081
Panel C. Age youngest child 6-15							
Treatment × Post	-0.004	-0.000	0.034***	-0.001	-0.003	-0.018**	0.000
	(0.008)	(0.007)	(0.009)	(0.007)	(0.007)	(0.008)	(0.005)
Observations	68,244	68,244	68,244	68,244	68,244	68,244	68,244
Adjusted R-squared	0.052	0.054	0.063	0.055	0.049	0.100	0.077
Panel D. Age youngest child 6-17							
Treatment × Post	-0.002	-0.003	0.032***	-0.004	-0.001	-0.014*	-0.000
	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.008)	(0.005)
Observations	80,500	80,500	80,500	80,500	80,500	80,500	80,500
Adjusted R-squared	0.049	0.052	0.059	0.053	0.047	0.091	0.072
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Municipality	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of Equation (1), where controls include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. Standard errors (shown in parentheses) are adjusted for clustering at the municipality-level. The different columns refer to the decision to work each specific day of the week. In Panel A, the sample comprises only mothers whose youngest child is between six and thirteen years old. We progressively enlarge the control group. Mothers working in schools are always excluded from the estimation sample. As the French LFS starts including questions on the allocation of working time along the week only in 2013, the sample considered here only comprises mothers interviewed between 2013 and 2016.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B7 – Robustness checks — Mothers' labor supply response to the reform

	(1) Hours worked per week	(2) Part-time	(3) Days worked per week	(4) Log net monthly wages	(5) Log net hourly wages
Panel A. Including school personnel					
Treatment × Post	0.342*	-0.019*	0.049*	0.024**	0.010
	(0.194)	(0.008)	(0.016)	(0.009)	(0.007)
Observations	182,265	182,265	182,265	58,960	58,960
Adjusted R-squared	0.121	0.114	0.100	0.276	0.274
Pre-treatment mean	34.27	0.356	4.666	7.232	2.392
Panel B. Wage reported					
Treatment × Post	0.281	-0.019**	0.055***	0.024***	0.010
	(0.193)	(0.009)	(0.016)	(0.009)	(0.007)
Observations	58,968	58,968	58,968	58,960	58,960
Adjusted R-squared	0.100	0.089	0.069	0.276	0.274
Pre-treatment mean	34.27	0.356	4.666	7.232	2.392
Additional controls	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes
Cluster Municipality	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of Equation (1). The different columns refer to the outcome considered. All regressions include age and age square, marital status, number of children, a dummy for immigration status, wave and municipality fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. Standard errors (shown in parentheses) are adjusted for clustering at the municipality-level. In Panel A, the estimation sample comprises all mothers whose youngest child is between six and sixteen years old, including those working in schools. In Panel B, we only consider mothers who reported their monthly wages (only once out of the five times they are interviewed).

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B8 – Robustness checks — Mothers' daily labor supply response to the reform

	(1) Monday	(2) Tuesday	(3) Wednesday	(4) Thursday	(5) Friday	(6) Saturday	(7) Sunday
Panel A. Including school personnel							
Treatment × Post	-0.002	-0.000	0.0336***	-0.003	0.001	-0.011	0.003
	(0.007)	(0.006)	(0.008)	(0.006)	(0.006)	(0.007)	(0.004)
Observations	91,097	91,097	91,097	91,097	91,097	91,097	91,097
Adjusted R-squared	0.051	0.057	0.060	0.057	0.053	0.081	0.067
Pre-treatment mean	0.700	0.769	0.573	0.741	0.742	0.207	0.076
Panel B. Wage reported							
Treatment × Post	-0.003	0.013	0.049***	0.019*	0.016	0.001	0.005
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.009)	(0.006)
Observations	29,805	29,805	29,805	29,805	29,805	29,805	29,805
Adjusted R-squared	0.053	0.059	0.052	0.058	0.059	0.055	0.034
Pre-treatment mean	0.700	0.769	0.573	0.741	0.742	0.207	0.076
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Municipality	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of regression 1 for the sample of mothers whose youngest child is between six and sixteen years. In Panel A, the estimation sample comprises all mothers whose youngest child is between six and sixteen years old, including those working in schools. In Panel B, we only consider mothers who reported their monthly wages (only once out of the five times they are interviewed). The different columns refer to the decision to work each specific day of the week. All regressions include age and age square, marital status, number of children, a dummy for immigration status, wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. Standard errors (shown in parentheses) are adjusted for clustering at the municipality-level. As the French LFS starts including questions on the allocation of working time along the week only in 2013, the sample considered here only comprises mothers interviewed between 2013 and 2016.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B9 – Mothers' labor supply response to the reform by year of adoption

	Work on Wednesday		Hours worked per week		Part-time work		Log real monthly wage		Log real hourly wage	
	Early adopters	Late adopters	Early adopters	Late adopters	Early adopters	Late adopters	Early adopters	Late adopters	Early adopters	Late adopters
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment × Post	0.044**	0.037***	1.126**	0.265	-0.033*	-0.020*	0.047**	0.039***	-0.006	0.020**
	(0.019)	(0.010)	(0.436)	(0.256)	(0.018)	(0.011)	(0.020)	(0.013)	(0.014)	(0.009)
p-value	0.021	0.000	0.010	0.301	0.067	0.069	0.019	0.003	0.668	0.026
[q-value]	[0.021]	[0.001]	[0.020]	[0.301]	[0.070]	[0.070]	[0.019]	[0.006]	[0.669]	[0.053]
R-squared	0.076	0.090	0.132	0.163	0.120	0.147	0.339	0.336	0.330	0.340
Observations	16,408	58,207	35,906	124,932	35,906	124,932	11,530	40,055	11,530	40,055
Pre-treatment mean	0.597	0.588	34.71	34.19	0.351	0.363	7.228	7.239	2.386	2.393
p-value difference	0.609		0.973		0.417		0.266		0.143	
Observations	74,615		160,838		160,838		51,585		51,585	

Notes: The table reports the impact of the reform on mothers' labor supply decisions according to the year of adoption of the reform by their municipality of residence. Municipalities in the early adopters implemented the reform in September 2013, while the others implemented it in September 2014. We report the cluster-robust $p-$value of the estimated treatment effect and, in square brackets, the $p-$value ($q-$value) adjusted for multiple hypotheses testing across subgroups, using the False Discovery Rate (FDR) control method. Specifically, we use the sharpened two-stage q-values introduced in Benjamini, Krieger and Yekutieli (2006) and described in Anderson (2008). All regressions include the standard covariates, namely age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. We also report the p-value of the test on the equality of the impact of the reform across the two groups of municipalities estimated on the whole sample of mothers, aged 18 to 55, whose youngest child is between six and sixteen, with the exception of those working in schools.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B10 – Robustness checks — Mothers' labor supply response to the reform— Treatment definition

	(1) Labor force participation	(2) Part-time	(3) Hours worked per week	(4) Days worked per week	(5) Log net monthly wages	(6) Log net hourly wages
Treatment × Post	0.002	-0.019**	0.453**	0.042**	0.041***	0.017*
	(0.005)	(0.009)	(0.217)	(0.017)	(0.012)	(0.008)
$p-$value	0.689	0.035	0.037	0.0135	0.001	0.0336
[q-value]	[0.69]	[0.045]	[0.045]	[0.041]	[0.004]	[0.045]
Observations	210,090	160,838	160,838	160,838	51,585	51,585
Adjusted R-squared	0.146	0.138	0.123	0.105	0.294	0.294
Pre-treatment mean	0.85	0.36	34.32	4.70	7.22	2.38

Notes: The table shows the coefficients capturing the effect of the reform on mothers' labor supply decisions, where we assume that the reform was implemented in the entire country in 2013. The different columns refer to the outcome considered. All regressions include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. The estimation sample comprises all mothers whose youngest child is between six and sixteen years old, with the exception of those working in schools. In columns 2 to 6, we only consider mothers who are employed at the time of the interview and in the last two columns those who reported their monthly wages (only once out of the five times they are interviewed). Standard errors in parentheses are adjusted for clustering at the municipality-level. We report the cluster-robust $p-$value of the estimated treatment effect and, in square brackets, the $p-$value ($q-$value) adjusted for multiple hypotheses testing across outcomes, using the False Discovery Rate (FDR) control method. Specifically, we use the sharpened two-stage q-values introduced in Benjamini, Krieger and Yekutieli (2006) and described in Anderson (2008).

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table B11 – Robustness checks — Mothers' daily labor supply response to the reform — Treatment definition

	(1) Monday	(2) Tuesday	(3) Wednesday	(4) Thursday	(5) Friday	(6) Saturday	(7) Sunday
Treatment × Post	0.014	0.009	0.033***	0.004	0.001	-0.014	0.002
	(0.008)	(0.007)	(0.009)	(0.007)	(0.007)	(0.008)	(0.005)
$p-$value	0.155	0.325	0.002	0.603	0.932	0.157	0.702
[q-value]	[0.366]	[0.569]	[0.013]	[0.82]	[0.932]	[0.366]	[0.82]
Observations	74,615	74,615	74,615	74,615	74,615	74,615	74,615
Adjusted R-squared	0.051	0.053	0.060	0.054	0.048	0.095	0.075
Pre-treatment mean	0.70	0.77	0.58	0.75	0.75	0.23	0.083

Notes: The table shows the coefficients capturing the effect of the reform for the sample of mothers whose youngest child is between six and sixteen years old who are employed at the time of the interview, with the exception of those working in schools, where we assume that the reform was implemented in the entire country in 2013. The different columns refer to the decision to work each specific day of the week. All regressions include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. As the French Labor Force Survey starts including questions on the allocation of working time along the week only in 2013, the sample considered here only comprises mothers interviewed between 2013 and 2016. Standard errors (shown in parentheses) are adjusted for clustering at the municipality-level. We report the cluster-robust $p-$value of the estimated treatment effect and, in square brackets, the $p-$value ($q-$value) adjusted for multiple hypotheses testing across outcomes, using the False Discovery Rate (FDR) control method. Specifically, we use the sharpened two-stage q-values introduced in Benjamini, Krieger and Yekutieli (2006) and described in Anderson (2008).

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

C Mechanisms

In this section, we conduct an analysis of the potential channels behind the main results. First, Figure C7 shows the results of a text analysis of main business newspapers, aimed to provide descriptive evidence that employers most likely knew about the reform when it was implemented. Next, we report a series of tables estimating the impact of the school schedule reform on additional outcomes such as occupational choice, employer's characteristics, tenure on the job, human capital investment decisions and fertility decisions.

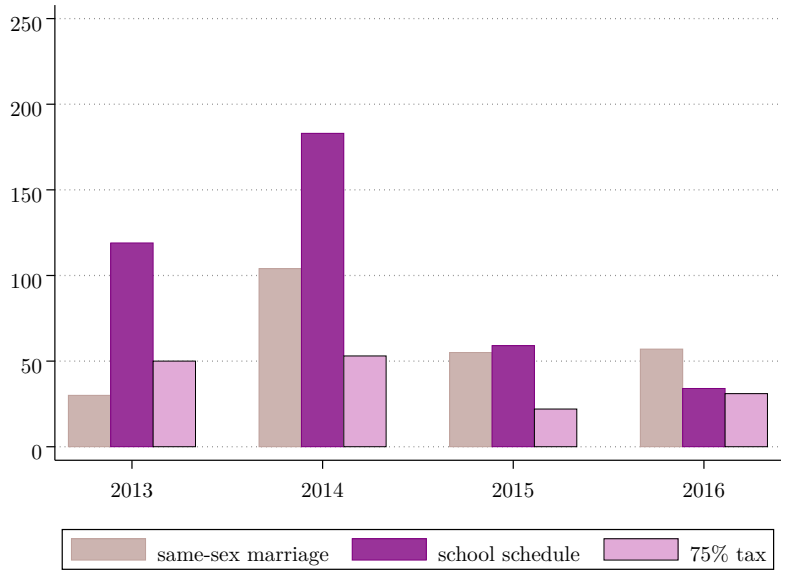


Figure C7 – Occurrences of words in business news

Notes: The graph provides the occurrences of each phrase ("same-sex marriage", "school schedule" and "75%-tax") found in the main business outlets over the period 2013 to 2016. Same-sex marriage has been legal since 18 May 2013 in France. The bill granting same-sex couples the right to marry was introduced to the National Assembly by the Socialist Government on 7 November 2012 after months of intense political debate. The term "school schedule" refers to the 2013 reform of children's school schedule. Finally, the 75% "supertax" introduced by President Hollande was subsequently modified after being rejected by the Council of State, implemented in 2014 and discontinued in 2015.
Source: Factiva - Les Echos & Challenges 2013-2016.

Table C12 – Mothers' labor supply response to the reform — Mechanisms

	(1) Tenure in the company	(2) Contract duration	(3) Firm size ≥ 50	(4) Low part-time occupation	(5) Private sector
Treatment × Post	0.229	0.092	-0.004	-0.007	-0.014
	(0.162)	(0.131)	(0.010)	(0.009)	(0.009)
p-value	0.157	0.482	0.640	0.439	0.121
[q-value]	[0.393]	[0.603]	[0.640]	[0.603]	[0.393]
Observations	159,483	12,153	160,838	160,611	145,807
Pre-treatment mean	9.949	1.178	0.733	0.523	0.738

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of regression 1 on the outcomes shown on top of each column. The first column refer to the tenure in the company, the second to contract tenure, both measured in years, the last three columns measure the probability that a woman works, respectively, in a firm with more than fifty employees, in an occupation with low prevalence of part-time work, and in the private sector. We present the results for the sample of all mothers, aged 18 to 55, employed at the time of the interview whose youngest child is between six and sixteen years old, with the exception of those working in schools. Regressions include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table C13 – Mothers' labor supply response to the reform - Change in occupation

	(1) Farmers	(2) Craftsmen and small business	(3) Managerial and professional occupations	(4) Intermediary occupations	(5) Clerical occupations	(6) Elementary occupations
Treatment × Post	0.003	-0.007**	0.000	0.006	-0.001	-0.001
	(0.002)	(0.006)	(0.006)	(0.008)	(0.008)	(0.005)
p-value	0.135	0.045	0.929	0.462	0.887	0.886
[q-value]	[0.406]	[0.270]	[0.930]	[0.935]	[0.930]	[0.930]
Observation	182,038	182,038	182,038	182,038	182,038	182,038
Pre-treatment mean	0.009	0.046	0.139	0.266	0.464	0.075

Notes: The table reports the impact of the reform on the probability of working in each 1-digit occupation group. Each outcome corresponds to a dummy variable equal to one if the mother works in the occupation. We present the results for the sample of all mothers, aged 18 to 55, employed at the time of the interview whose youngest child is between six and sixteen years old. Regressions include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. We report the cluster-robust $p-$value of the estimated treatment effect and, in square brackets, the $p-$value ($q-$value) adjusted for multiple hypotheses testing across outcomes, using the False Discovery Rate (FDR) control method. Specifically, we use the sharpened two-stage q-values introduced in Benjamini, Krieger and Yekutieli (2006) and described in Anderson (2008).

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table C14 – Mothers' labor supply response to the reform — Other economic decisions

	(1) On-the-job training	(2) College degree or more	(3) Number of children
Treatment × Post	0.007	-0.010	-0.014
	(0.006)	(0.010)	0.012
p-value	0.243	0.307	0.267
[q-value]	0.308	0.308	0.308
Observations	110,300	160,838	182,093
Pre-treatment mean	0.163	0.378	1.903

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of regression 1 on different economic decisions such as human capital investment and fertility decisions. The first column measures the probability of engaging in on-the-job training, the second column measures the probability of having a college degree or more, and the third column measures the impact of the reform on women's number of children. We present the results for the sample of all mothers, aged 18 to 55, employed at the time of the interview whose youngest child is between six and sixteen years old, with the exception of those working in schools. Regressions include age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education—except for model (2)—and a dummy for the presence of other members in the household.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table C15 – Mothers' labor supply response to the reform by level of education

	Work on Wednesday		Hours worked per week		Part-time work		Log real monthly wage		Log real hourly wage	
	Non college degree (1)	College deg. or more (2)	Non college degree (3)	College deg. or more (4)	Non college degree (5)	College deg. or more (6)	Non college degree (7)	College deg. or more (8)	Non college degree (9)	College deg. or more (10)
Treatment × Post	0.025**	0.027*	0.059	0.508	-0.008	-0.040***	0.027*	0.029*	0.004	0.0203*
	(0.011)	(0.014)	(0.270)	(0.328)	(0.011)	(0.014)	(0.014)	(0.016)	(0.009)	(0.012)
p-value	0.028	0.058	0.826	0.121	0.506	0.004	0.050	0.065	0,650	0.098
[q-value]	[0.057]	[0.059]	[0.825]	[0.242]	[0.507]	[0.009]	[0.066]	[0.066]	[0.650]	[0.196]
R-squared	0.118	0.154	0.184	0.220	0.173	0.236	0.209	0.251	0.196	0.256
Observations	43,242	31,373	101,638	59,200	101,638	59,200	33,122	18,463	33,122	18,463
Pre-treatment mean	0.593	0.582	33.14	36.19	0.385	0.321	7.043	7.552	2.252	2.632
p-value difference	0.913		0.294		0.0699		0.924		0.308	
Observations	74,615		160,838		160,838		51,585		51,585	

Notes: The table reports the impact of the reform on mothers' labor supply decisions according to mothers' level of education. We report the cluster-robust $p-$value of the estimated treatment effect and, in square brackets, the $p-$value ($q-$value) adjusted for multiple hypotheses testing across subgroups, using the False Discovery Rate (FDR) control method. Specifically, we use the sharpened two-stage q-values introduced in Benjamini, Krieger and Yekutieli (2006) and described in Anderson (2008). All regressions include the standard covariates, namely age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. We also report the p-value of the test on the equality of the impact of the reform across the two groups of women estimated on the whole sample of mothers, aged 18 to 55, whose youngest child is between six and sixteen, with the exception of those working in schools.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

Table C16 – Mothers' labor supply response to the reform by relative level of education in the household

	Work on Wednesday		Hours worked per week		Part-time work		Log real monthly wage		Log real hourly wage	
	Low W High M (1)	High W Low M (2)	Low W High M (3)	High W Low M (4)	Low W High M (5)	High W Low M (6)	Low W High M (7)	High W Low M (8)	Low W High M (9)	High W Low M (10)
Treatment × Post	0.040***	0.010	0.302	-0.055	-0.020	-0.004	0.019	0.008	-0.000	0.014
	(0.013)	(0.015)	(0.321)	(0.376)	(0.014)	(0.017)	(0.018)	(0.018)	(0.012)	(0.013)
p-value	0.002	0.504	0.347	0.883	0.143	0.785	0.286	0.657	0.100	0.292
[q-value]	[0.004]	[0.504]	[0.694]	[0.883]	[0.287]	[0.786]	[0.572]	[0.657]	[0.990]	[0.586]
R-squared	0.143	0.186	0.208	0.288	0.202	0.273	0.282	0.330	0.282	0.326
Observations	35,456	23,739	78,068	49,544	78,068	49,544	24,702	15,656	24,702	15,656
Pre-treatment mean	0.573	0.601	33.88	35.04	0.401	0.332	7.191	7.312	2.378	2.437
p-value difference	0.139		0.463		0.460		0.679		0.446	
Observations	59,195		127,612		127,612		40,358		40,358	

Notes: The table reports the impact of the reform on mothers' labor supply decisions according to the relative level of education of each member of the couple. Uneven columns refer to mothers who have the same or a lower level of education than their partner, even columns to mothers who have a strictly higher level of education than their partner. We report the cluster-robust $p-$value of the estimated treatment effect and, in square brackets, the $p-$value ($q-$value) adjusted for multiple hypotheses testing across subgroups, using the False Discovery Rate (FDR) control method. Specifically, we use the sharpened two-stage q-values introduced in Benjamini, Krieger and Yekutieli (2006) and described in Anderson (2008). All regressions include the standard covariates, namely age and age square, marital status, number of children, a dummy for immigration status, municipality and wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household. We also report the p-value of the test on the equality of the impact of the reform across the two groups of households estimated on the whole sample of mothers, aged 18 to 55, whose youngest child is between six and sixteen, with the exception of those working in schools.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.

D Welfare Analysis — Details

This appendix describes the administrative data that we use to complement the welfare analysis (D.1), discusses the importance of other economic effects (D.2), and provides details about the calculation of the Marginal Value of Public Funds (D.3).

D.1 Data Sources

For the purpose of the empirical analysis, we rely on the estimation of childcare costs pre- and post-reform from both survey data and causal estimates of the 2013 reform on municipal public spendings.

Childcare Cost Data. Measures of childcare costs are obtained from the survey *Modes de garde et d'accueil des jeunes enfants* from 2013. This survey of childcare arrangements, conducted by the *Direction de la recherche, des études, de l'évaluation et des statistiques* (DREES) in partnership with the French Ministry of Social Affairs and Health and the National Fund for Family Allowances (CNAF), is the third edition of the operation after those carried out in 2002 and 2007. It is intended for households living in metropolitan France with at least one child under the age of 6. Its main objective is to provide an overview of the solutions adopted by parents for the care of their children. During the interview, the parent responding to the survey is asked to provide a child's childcare schedule on a reference week. For each day, from the first minute to midnight, each worker (parent, nursery assistant, early childhood care facility, etc.) who has provided custody of the child is indicated, with the start and end times of his care. The survey provides the list all childcare options used for children over a reference week of care as well as the costs of each foster solution adopted by parents. We use the survey to identify the main modes of care used since the birth of their children (registered childminder, extra-curricular activities, municipal day nursery, private day nursery, leisure centre). It is a particular suitable dataset for our analysis because the cost estimates are from before 2013, i.e., precisely before the implementation of the reform. However, we take these estimates as an upper bound for the effective cost that families of our sample were facing in 2013, given that their children were older than 6. Descriptive statistics are presented in Table D20. The monthly cost varies substantially across different childcare arrangements, from 59 to over 400 euros per month, so we choose to adopt both lower and upper bounds as well as the mean costs for our analysis.

Economic Effect of the 2013 Reform on Local Public Finance. We rely on the analysis by Cassette and Farvaque (2019) who use local public finance accounts and detailed school schedule at the municipality level. The authors use a difference-in-differences strategy comparing the evolution of the public spendings-by-student ratio before and after the implementation of the reform in municipalities who implemented the reform in 2013 (G1) versus 2014 (G2) and a "pure" control group (G0) where intermunicipal cooperation is in charge of these spendings via the intermunicipal community (see Tricaud 2019). In France, the central government remains the leading contributor to education, spending up to 54.6 percent, mostly in the form of teachers' pay.[A.1] Local jurisdictions contribute up to 23.8 percent (MENJ-DEPP 2018). Among local jurisdictions, municipalities are the main contributors and contribute to over half of these local educational expenses (MENJ-DEPP 2015*a*). Cassette and Farvaque (2019)'s sample includes all French municipalities with more than 3,500 inhabitants (excluding Corsica) for the years 2009

[A.1] Using our empirical strategy on the separate sample of parents working in school, we find that the reform did not increase teachers' pay, see Appendix Table D17.

to 2017. The use of the 3,500 resident-threshold is justified because there are no schools in most municipalities below the threshold, and students in these small municipalities attend schools managed at the intermunicipal community level. The cost of the reform represents a jump in local expenditure ranging between €177.05 (S.D 22.82) and €211.55 (S.D 33.30) per pupil of the public schools of the municipality, without the year of implementation of the reform (2013 or 2014) having a significant impact on the total amount.

D.2 Other economic effects

Long-Term Impacts on Children. Unfortunately, we cannot use direct causal estimates of the policy on children. To our knowledge, the only attempt to estimate its impact on children's performance has been conducted by MENJ-DEPP (2017). The authors compare students' cognitive skills across different teaching schedules using a panel of 15,200 students across 4,000 schools and find limited effects. However, the authors clearly state that this study is only a comparison between different schedules and does not constitute a causal estimation of the change in school schedules implemented in 2013. The absence of measures of the impact on children is an important caveat of our setting, but it is reasonable to assume that in the presence of positive effects on children's health and development—as suggested by the work of chronobiologists from the French National Academy of Medicine (see Touitou et al. 2010)—our MVPF is likely to be a lower bound.

Other Labor Market Effects. In principle, while the reform did expand the opportunity set of working mothers whose youngest child is aged six to eleven, this labor supply response could have been at the expense of other categories of workers, assuming fixed labor demand in the short-run. If other workers' earnings are negatively affected, this could reduce the positive fiscal externality on public finances if other workers' earnings are negatively affected. In order to investigate whether the 2013 reform has any general equilibrium effects, we conduct the following analysis using the French Labor Force Survey (2009-2016). We rely on the implicit assumption that workers who are close substitutes to the treated mothers are other female workers, and that the labor supply of men will be unaffected. This assumption seems credible given that the labor supply decisions of fathers who could be directly affected by the reform (because their youngest child aged between 6 and 11) did not change after the reform according to our analysis. We select three groups of women who could be close substitutes to the treated women. First we consider women who are not treated at large (either have no children or their youngest child is older than 12), among them we consider separately the control mothers (youngest child aged between 12 and 16) and those who do not have children at all, and among childless mothers those who are older than 40. The graphical analysis of trends in the labor supply measures of these different groups is displayed in Appendix Figure D8. Only the labor supply of treated mothers (mothers whose youngest child is 6-11, represented by the round-dot continuous line) changes after the reform, while labor supply decisions of other groups do not seem to be affected.

Table D17 – Effect on school personnel's salary

	(1) All	(2) Women	(3) Men
Treatment × Post	0.012	0.020	0.061
	(0.023)	(0.027)	(0.111)
Observations	9,008	7,375	1,633
Adjusted R-squared	0.276	0.281	0.096
Pre-treatment mean	1,667	1,558	2,093
Control for gender	Yes	No	No
Additional controls	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Cluster city	Yes	Yes	Yes

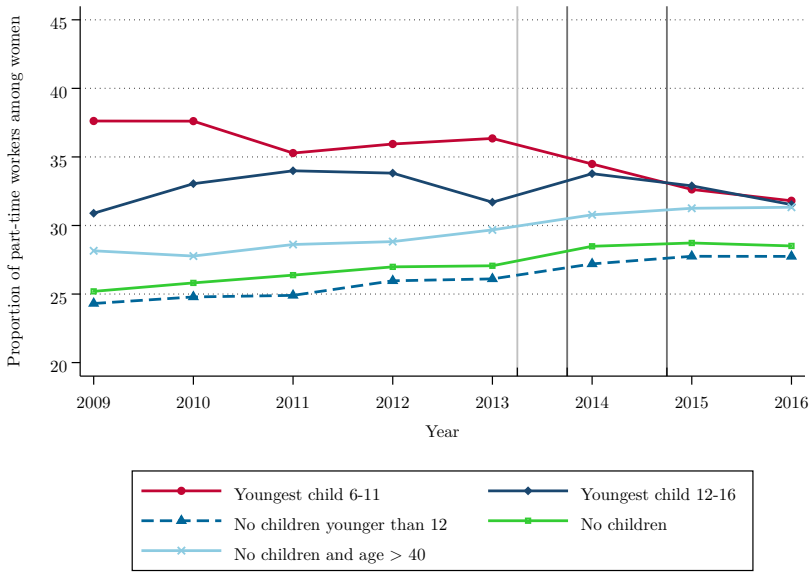
Notes: The table shows the coefficients capturing the effect of the reform on teachers' monthly wage, obtained from the estimation of regression 1, obtained on the sample of school personnel. The different columns refer the sample considered. All regressions include age and age square, marital status, number of children, a dummy for immigration status, wave fixed effects, dummies for the level of education, and a dummy for the presence of other members in the household.

*** Significant at the 1 percent level.

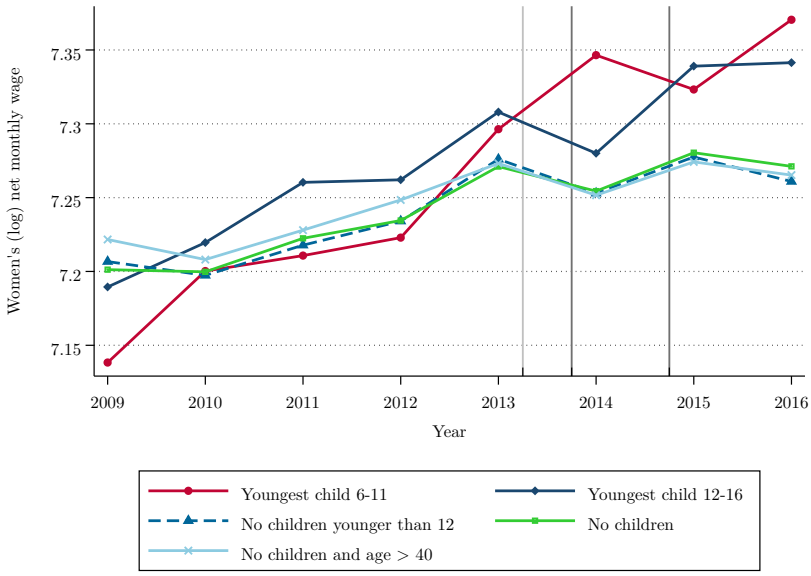
** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: French Labor Force Survey 2009-2016.



(A) Part-Time Work



(B) (Log) Real Monthly Wage

FIGURE D8 – DISPLACEMENT EFFECT – PART-TIME WORK AND MONTHLY WAGES

Notes: The figure shows the evolution of the share of women working part-time (Panel A) and the (log) real monthly wage (Panel B) for several groups of women. The red line with round dots shows the trend for mothers in the treated group (their youngest child is 6-11). We then consider mothers whose youngest child is 12-16 (control group), mothers with children older than 12, women without children and, among them, those who are older than 40.
Source: French Labor Force Survey 2009-2016.

Table D18 – Tax Rate Estimates

	Bins of earnings (in euros)	Marginal tax rate
Bin 1	0.00	0.00
Bin 2	9,710	14.00
Bin 3	26,818	30.00
Bin 4	71,898	41.00
Bin 5	152,260	45.00

Notes: This table reports estimates of marginal tax rates as of 2016. Effective date is January 1st, 2016 for earnings reported in 2017.

Source: Thresholds and tax rates, Income Tax Legislation (1945-) `https://www.ipp.eu/baremes-ipp/impot-sur-le-revenu/bareme_ir_depuis_1945/bareme_ir/`, see Piketty (2001).

Table D19 – Tax Rate Estimates

	Married	Single	All
Real annual salary pre-reform (in euros)	20,089	19,112	19,908
Number of children	2.01	1.66	1.94
Number of shares	3.13	2.66	3.04
Household taxable income pre-reform	14,227	6,802	12,474
Household taxable income post-reform	14,410	7,013	12,663
Average marginal tax rate	0.116	0.023	0.094
CSG rate	0.068	0.068	0.068
Tax base CSG pre-reform (in euros)	0.9825	0.9825	0.9825

Notes: This table reports estimates of marginal tax rates for the sample of households affected by the reform.

Source: French Labor Force Survey 2009-2013.

Table D20 – Childcare costs pre-2013

	Share (in %)	Mean monthly cost (in euros)	N
Registered childminder	28.42	448.238 (211.63)	1,447
Extracurricular activities	19.03	59.27 (68.55)	611
Municipal day nursery	9.63	264.92 (206.47)	472
Private day nursery	9.20	95.37 (102.22)	373
Leisure centre	9.07	73.10 (72.29)	254
Average monthly cost		278.32 (272.72)	3,829
Estimate of annual cost (11 month-average)		3,061.53	

Notes: This table reports estimates of monthly costs of the four most used forms of care in 2013.

Source: 2013 CNAF survey on childcare arrangements.

D.3 MVPF Calculation

We present here alternative calculations of the MPVF. In particular, we vary parameters of the cost of the current policy and of the past childcare cost. Finally, we perform a sensitivity analysis for the computation of 95 percent confidence intervals, by varying the correlation between the cost of the program and the fiscal externality.

D.3.1 Computing the Net Cost of the Policy

To compute the net cost of the reform, we assume that it had a uniform wage effect, corresponding to our point estimate on monthly wages presented in Table 3, column 5. The fiscal externality is the sum of the government revenues from the income tax (IT) and of revenues from the *Contribution Sociale Généralisée* (CSG), a flat tax that goes towards funding health care in France.

Income Tax. To compute revenues from the income tax, we need to take into account the fact that France has a joint-filing tax system. Let us call Y_{kj} the annual income, where $k = i, h$ with i denoting the individual and h the household, and $j = gross, net$. The term *gross* denotes the gross wage or posted wage (excluding employers' Social Security contributions) and *net* refers to the net wage, equal to the gross wage minus employees' Social Security contributions. By definition, the net wage is gross of the income tax. Each household h has a number of fiscal shares n which depends on the number of household members. A single person has a share of one, a married couple two, each additional child gives the right to an additional half share for the first two children, then one full share from the third child onwards. For single-parent family, each child corresponds to one share starting with the first child. The income tax is then calculated by applying the tax schedule f to the household taxable income, divided by the number of shares. In theory, the taxable income of the household should be equal to the sum of all capital and labor income of the household after corresponding tax rebates and reductions. In practice, we only consider labor income of the spouses, due to data limitations. This assumption is strong, but serves well our purpose as we use it to compare the impact of the tax schedule on labor income before and after the reform. Income tax rates are presented in Appendix Table D18.[A.2] With progressive taxation, $n \times f(Y_{htaxable}/n) \leq f(Y_{htaxable})$. The revenue from the income tax R_{IT} is given by:

$$R_{IT} = n \times f\left(\frac{Y_{htaxable}}{n}\right) = n \times f\left(\frac{Y_{hnet} \times 0.9}{n}\right)$$

to account for the 10 percent-tax allowance (*abattement fiscal*) applied to the tax base.

We empirically reconstruct marginal tax rates by applying this formula to our sample, to account for the marital status, the presence of children and the partners' income of mothers in our sample. We find an average marginal tax rate of 0.094, which is less than the tax rate mothers would have paid under an individualized tax system (0.15). Details of the estimated tax rates for our sample are presented in Appendix Table D19. We estimate that the reform generates on average €54.01 of revenues from the income tax.

Flat Income Tax. Additionally, individuals have to pay a flat income tax, called the *Contribution Sociale Généralisée* (CSG) which supplements the progressive income tax since 1990. The CSG rate is flat (at 6.8 percent) and there is a 1.25 percent tax allowance on gross wages

[A.2] For a more comprehensive presentation of the income tax legislation, see `https://www.ipp.eu/en/ipp-tax-and-benefit-tables/income-tax/`.

below 4×Social Security Thresholds. The revenue from the flat income tax R_{FIT} is equal to:

$$R_{FIT} = 0.068 \times 0.9825 \times Y_{igross}$$

We compute the gross salary $Y_{igross} = 1.28 \times Y_{inet}$, given that we do not measure Y_{igross} directly in our dataset. We estimate that the reform generates on average €51.28 of revenues from the flat income tax. In total, the fiscal externality from the income tax and the flat income tax is estimated at €105.29.

Finally, in alternative specifications, we also use the lower bound estimates of the cost of the school schedule reform (€177). Results are presented in Appendix Figure D9.

D.3.2 Willingness to Pay

In our preferred specification, we assume that the willingness to pay can be proxied by the pre-reform cost of childcare, for which we choose the lower bound estimate. Furthermore, we assume that the public provision of extracurricular activities crowded out private options for the fraction of mothers who were already working on Wednesdays before the reform—approximately 59 percent of our population of interest. In alternative computations, we relax the crowding-out assumption, and opt for the mean and the upper bound value of the pre-reform childcare cost (see Appendix Table D20). Relaxing these assumptions consistently increases our estimate of the MVPF (see Appendix Figure D9). The most conservative approach would be to assume that the willingness to pay is equal to the cost of the current policy. This is not a realistic assumption, as we see empirically that the cost of public childcare provision is much lower than those of private options. However, even under this assumption, we still find a MVPF of 1.99, which means that the policy pays for itself.

D.3.3 Confidence Intervals

To construct 95 percent confidence intervals, we follow the approach of Hendren and Sprung-Keyser (2020) by bootstrapping the sampling distribution of the MVPF estimate. This object includes in the numerator a calibrated WTP from the 2013 survey on childcare arrangements, while the net cost C of the reform at the denominator comprises two estimated parameters for the cost of the program and the fiscal externality. As the WTP is given by the pre-reform childcare cost scaled by the crowding out parameter, we know that it is positive, WTP> 0. Next, we assume that the estimate of the net cost C is normally distributed, centered at the true cost value, with a standard deviation corresponding to the standard error. To compute the standard errors, we use the formula for calculating the standard deviation of the sum of two random variables X and Y:

$$\sigma_{X+Y} = \sqrt{\sigma_X^2 + \sigma_Y^2 + 2\rho_{X,Y} \times \sigma_X \times \sigma_Y}$$

To account for the fact that a more costly reform—such as one extending teaching time to the entire day of Wednesday—could generate larger wage effects and hence a larger fiscal externality, it seems reasonable to assume some degree of positive correlation between the cost of the program and the fiscal externality. In our preferred specification, we assume that $\rho_{X,Y}$ is equal to one. However, in Appendix Figure D10we also perform a sensitivity analysis to show how the estimate change when varying $\rho_{X,Y}$ within the interval [0.1-1]. Except for low values of correlation (under 0.3), all estimates are statistically significant. To account for the fact that in finite samples we might have some regions of the sampling distribution for which $C < 0$, we assign ∞ when the bootstrap draw (C^*) is smaller than 0.

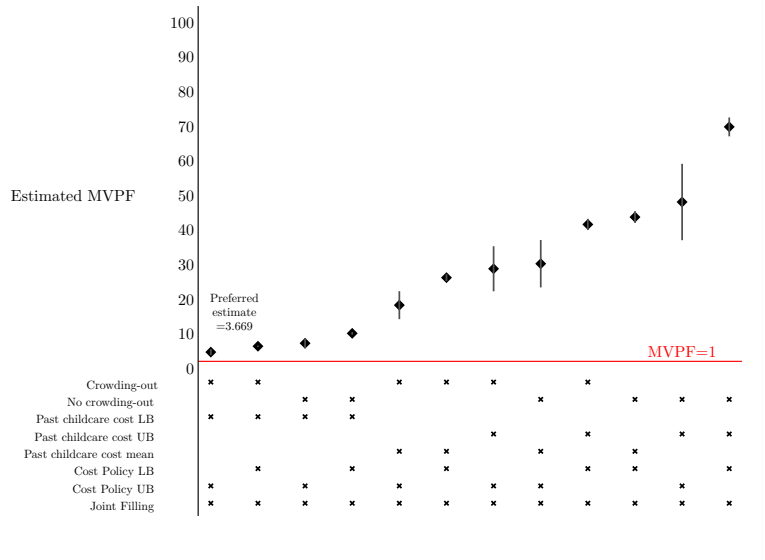


FIGURE D9 – ALTERNATIVE COMPUTATIONS

Notes: This graph displays alternative computations of MVPFs of the school schedule reform. We consider various values for the cost of the policy, for the pre-reform childcare cost, and we also rule out crowding-out effects.
Source: See Section D.1.

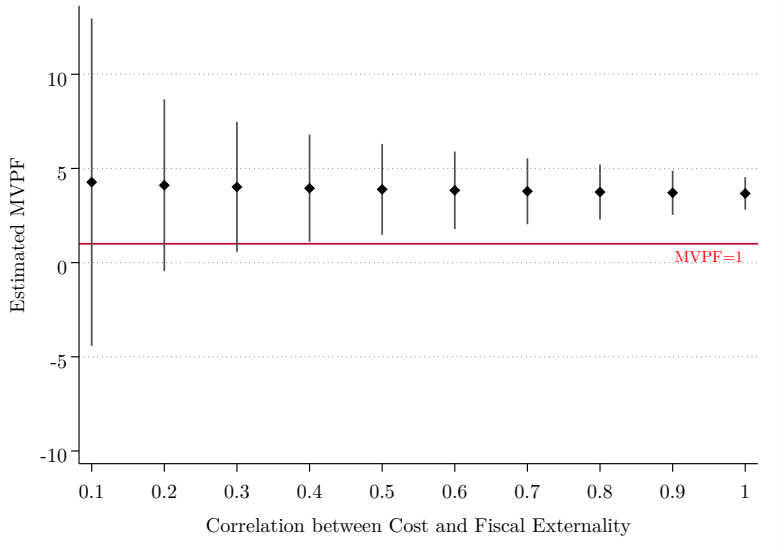


FIGURE D10 – SENSITIVITY ANALYSIS

Notes: This graph displays a sensitivity analysis of the MVPF and its 95 percent confidence intervals across various values of the correlation parameter between the total cost of the program and the fiscal externality.

Source: See Section D.1.