A Appendix

A.1 Additional tables and figures – Institutional context

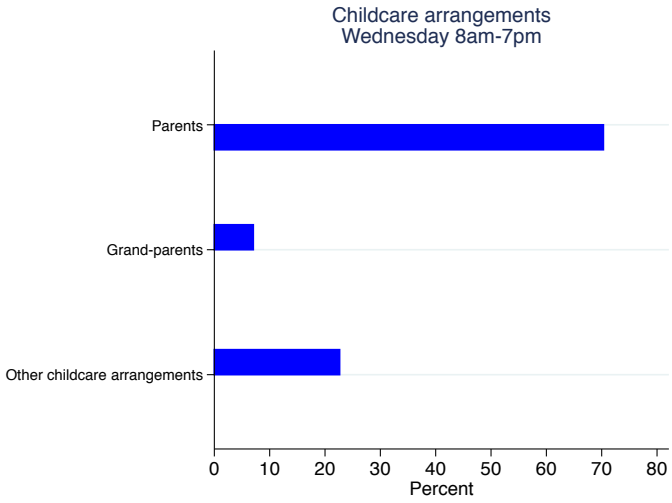


Figure A.1. Childcare arrangements for children between 0 and 6 - 2002/2013

Notes: The figure shows the childcare arrangements families adopt prior to the introduction of the reform, to take care of their children when these are not in school on Wednesday. The sample comprises 8461 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.

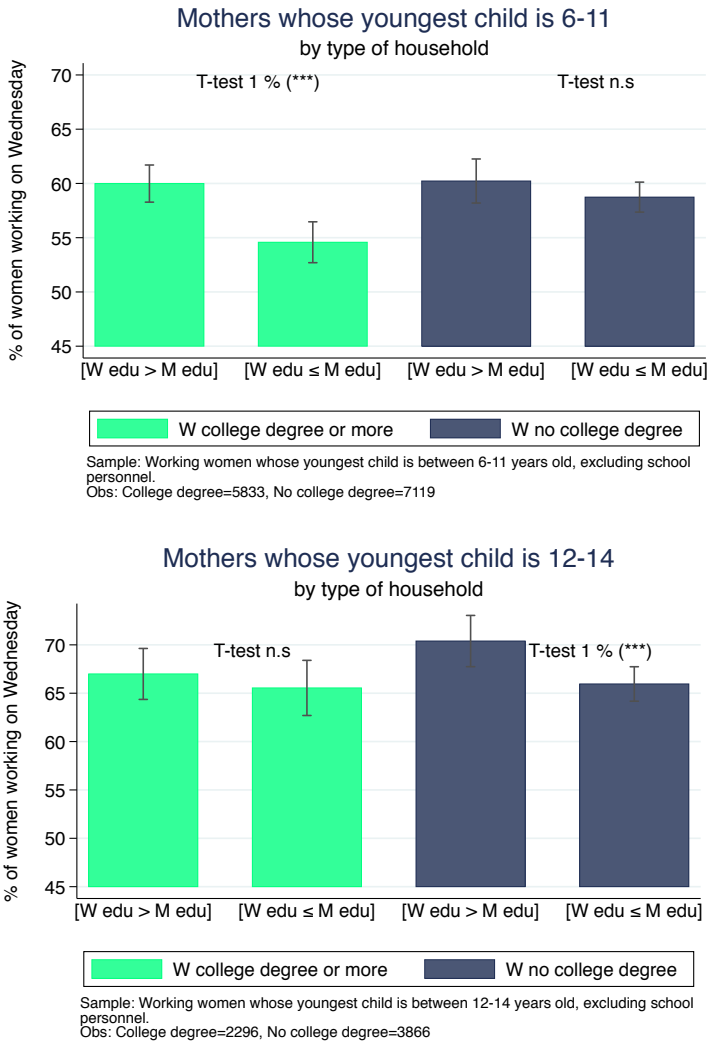


FIGURE A.2. PROPORTION OF WOMEN WORKING ON WEDNESDAY BY TYPE OF HOUSEHOLD - PRE-REFORM PERIOD

Notes: The figures report bar graphs representing the percentage of women working on Wednesday among mothers whose youngest child is between six and eleven, at the top, and mothers whose youngest child is between twelve and fourteen, at the bottom. In each graph, we consider women with at least a college degree separately from those without college degree. Within each of these two groups, we compare women whose educational level is strictly higher than their partner's, labelled "W edu $>$ M edu", with women whose educational level is at most equal to their partner's, called "W edu $\leq$ M edu". All figures refer to the pre-reform period, and we exclude mothers working in schools when computing them. On each bar, we also report 95 percent-confidence intervals. Finally, for each educational level, we indicate the results of T-tests for the difference in means between the two types of household.

Source: French Labor force Survey 2009-2013.

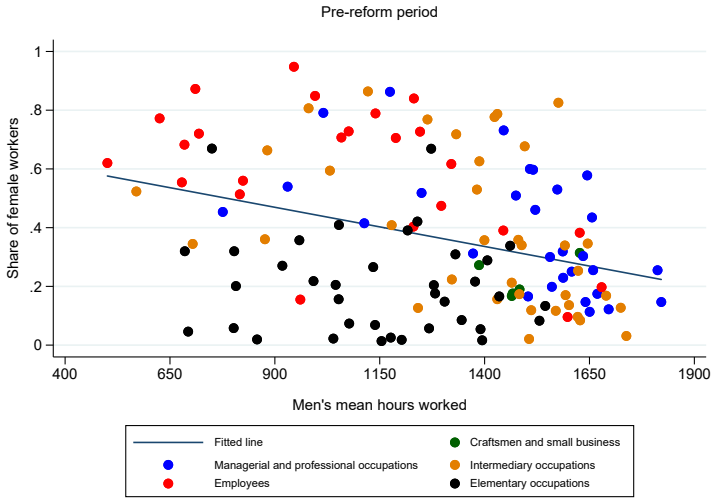


FIGURE A.3. WOMEN REPRESENTATION ALONG THE MALE HOURS DISTRIBUTION

Notes: The figure reports the relationship between the share of female workers and the average number of hours worked by occupation (3-digit classification). The graph is constructed using a representative sample of the French matched-employer-employee data set for the period 2009-2012.

Source: French matched-employer-employee database 2009-2012 (DADS).

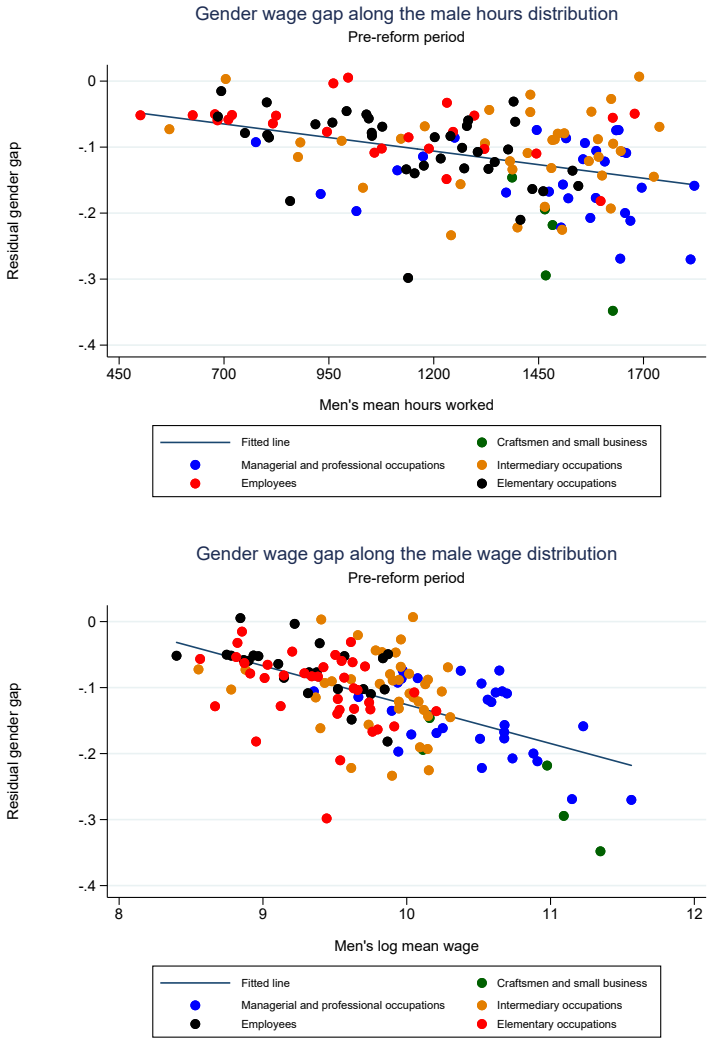


FIGURE A.4. GENDER WAGE GAP BY OCCUPATION

Notes: The graph depicts the gender wage gap by occupation (3-digit classification). The top graph reports the relationship between the residual gender wage gap and the average number of hours worked by occupation. The bottom graph reports the relationship between the residual gender wage gap and (log) male average annual earnings by occupation. The residual gender wage gap corresponds to the female coefficient in a regression of (log) annual earnings on (log) annual hours worked, age, age squared, level of education and a female dummy, estimated separately for each 3-digit occupation. The graph is constructed using a representative sample of the French matched-employer-employee data set for the period 2009-2012.

Source: French matched-employer-employee database 2009-2012 (DADS).

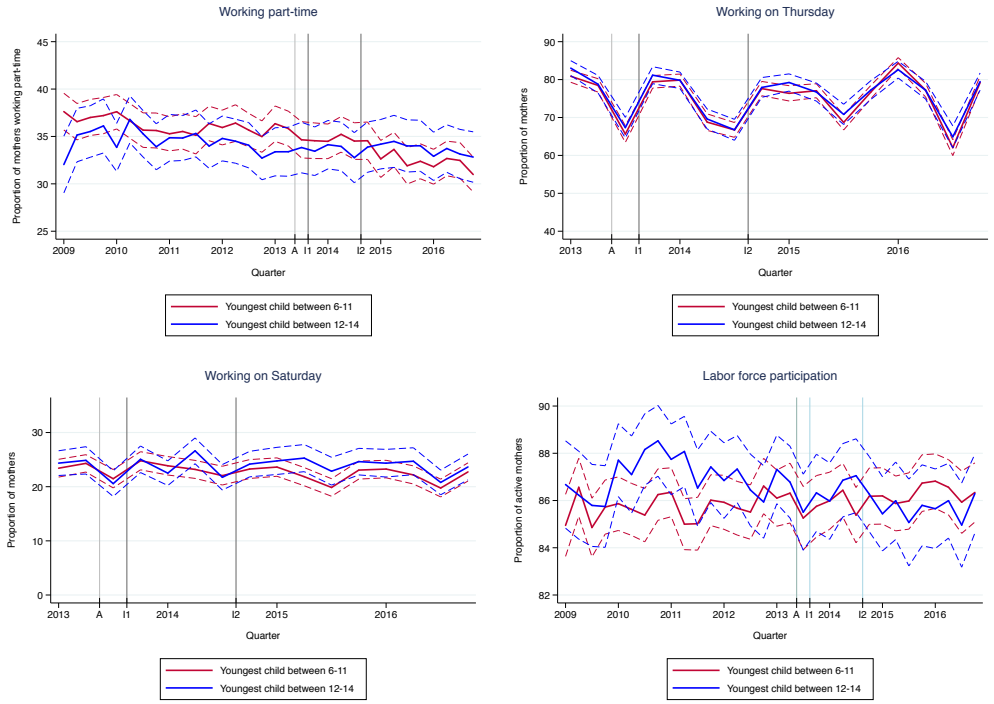


FIGURE A.5. TRENDS IN MOTHERS' LABOR SUPPLY MEASURES BY AGE OF THE YOUNGEST CHILD

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 the age of six and fourteen, with the exception of those working in schools. We represent in red treated mothers, that is, those whose youngest child is between six and eleven years old. Mothers whose youngest child is of middle-school age, or control mothers, are represented in blue. The vertical bar named "A" corresponds to April 2013, when municipalities announce in which year they will introduce the reform. The bar called "I1" corresponds to September 2013, when 20 percent of municipalities implement the reform. The bar labelled "I2" corresponds to September 2014, when the rest of municipalities implement the reform. Finally, we report 95-percent confidence intervals.

Source: French Labor Force Survey 2009-2016.

Table A.1 – Descriptive statistics - Youngest child between 6-11

	No college degree	*N*	College degree or more	*N*	P-value T-test
Hours worked per week	33.26	40,491	36.28	24,625	0.00
Part-time	38.52	42,936	32,07	24,625	0.00
Days worked per week	4.74	40,491	4.63	24,625	0.00
Work on Wednesday	59.33	9,043	58.23	6,927	0.16
Work on Saturday	29.05	9,043	15.99	6,927	0.00
Monthly wages	1,277	13,181	2,110	7,674	0.00
	Non-managerial occupations	*N*	Managerial occupations	*N*	P-value T-test
Hours worked per week	33.70	55,179	38.3	9,894	0.00
Days worked per week	4.7	55,179	4.66	9,894	0.24
Part-time	37.72	55,179	26.94	9,894	0.00
Work on Wednesday	59.23	13,211	57.27	2,716	0.06
Work on Saturday	26.12	13,211	10.16	2,716	0.00
Monthly wages	1,369	17,746	2,811	3,098	0.00
	Low W High M	*N*	High W Low M	*N*	P-value T-test
Hours worked per week	33.98	31,779	35.16	23,235	0.00
Part-time	40.06	31,779	33.23	23,235	0.00
Days worked per week	4.66	31,779	4.7	23,235	0.00
Work on Wednesday	56.26	7,571	60.09	5,383	0.00
Work on Saturday	24.25	7,571	22.16	5,383	0.00
Monthly wages	1,553	10021	1,666	6560	0.00
	Firm size ≤ 20	*N*	Firm size >20	*N*	P-value T-test T-test
Hours worked per week	34.86	12,824	34.29	52,292	0.00
Part-time	35.17	12,824	36.3	52,292	0.02
Days worked per week	4.78	12,824	4.68	52,292	0.00
Work on Wednesday	60.34	3,577	58.42	12,393	0.00
Work on Saturday	27.84	3,577	22.1	12,393	0.00
Monthly wages	1,502	3,868	1,602	16,987	0.00
	Public sector	*N*	Private sector	*N*	P-value
Hours worked per week	34.59	15,495	33.26	43,628	0.00
Part-time	36.43	15,495	37.82	43,628	0.00
Days worked per week	4.56	15,495	4.68	43,628	0.00
Work on Wednesday	53.41	3,326	59.3	10,933	0.00
Work on Saturday	15.27	3,326	21.09	10,933	0.00
Monthly wages	1,703	5,396	1,539	15,370	0.00

Notes: The table reports pre-reform summary statistics for mothers whose youngest child is between six and eleven. The figures are reported separately for the subgroups indicated on top of each table section. In the last column of the table, we report the p-value of the T-tests for the difference in means between the two subgroups.

Source: French Labor Force Survey 2009-2013.

Table A.2 – Descriptive statistics - Youngest child between 12-14

	No college degree	*N*	College degree or more	*N*	P-value T-test
Hours worked per week	33.69	21,435	37.55	9,423	0.00
Part-time	37.43	21,435	27.29	9,423	0.00
Days worked per week	4.81	21,435	4.73	9,423	0.00
Work on Wednesday	66.94	5,026	66.83	2,815	0.92
Work on Saturday	28	5,026	15.59	2,815	0.00
Monthly wages	1,322	6,938	2,344	2,864	0.00
	Non-managerial occupations	*N*	Managerial occupations	*N*	P-value T-test
Hours worked per week	34.06	26,357	39.65	4,475	0.00
Part-time	36.44	26,357	22	4,475	0.00
Days worked per week	4.79	26,357	4.78	4,475	0.67
Work on Wednesday	66.88	6,563	66.88	1,252	0.99
Work on Saturday	25.93	6,563	11.01	1,252	0.00
Monthly wages	1,396	8,412	2,979	1,384	0.00
	Low W High M	*N*	High W Low M	*N*	P-value T-test
Hours worked per week	34.49	15,167	35.60	8,931	0.00
Part-time	38.66	15,167	32.32	8,931	0.00
Days worked per week	4,77	15,167	4,78	8,931	0.25
Work on Wednesday	65.84	3,793	68.63	2,371	0.02
Work on Saturday	24.51	3,793	22.51	2,371	0.07
Monthly wages	1,564	4,747	1,741	2,829	0.00
	Firm size ≤ 20	*N*	Firm size >20	*N*	P-value T-test T-test
Hours worked per week	35.43	6,212	34.73	24,646	0.00
Part-time	35.05	6,212	34.15	24,646	0.18
Days worked per week	4.86	6,212	4.76	24,646	0.00
Work on Wednesday	66.99	1,756	64.47	6,085	0.00
Work on Saturday	30.62	1,756	21.51	6,085	0.00
Monthly wages	1,849	2,309	1,642	7,953	0.00
	Public sector	*N*	Private sector	*N*	P-value
Hours worked per week	35.07	7,542	33.48	20,509	0.00
Part-time	31.83	7,542	37.2	20,509	0.00
Days worked per week	4.68	7,542	4.75	20,509	0.00
Work on Wednesday	58.83	1,789	68.60	5,331	0.00
Work on Saturday	16.76	1,789	21.23	5,331	0.00
Monthly wages	1,786	2,603	1,555	7,165	0.00

Notes: The table reports pre-reform summary statistics for mothers whose youngest child is between twelve and fourteen. The figures are reported separately for the subgroups indicated on top of each table section. In the last column of the table, we report the p-value of the T-tests for the difference in means between the two subgroups.

Source: French Labor Force Survey 2009-2013.

A.2 Alternative samples

Table A.3 – Labor supply response to the reform - Including school personnel

	(1) Labor force participation	(2) Part-time	(3) Hours worked per week	(4) Days worked per week
Treatment	0.00628	-0.0194**	0.344*	0.0401**
	(0.00552)	(0.00916)	(0.208)	(0.0178)
Youngest child between 6-11	-0.0144***	0.0351***	-0.775***	-0.0940***
	(0.00380)	(0.00642)	(0.152)	(0.0115)
Observations	193614	152052	152052	152052
R^2	0.162	0.143	0.149	0.131
F	38.92	20.77	23.81	10.04
Pre-treatment means	0.858	0.356	34.39	4.666

Notes: This table shows the coefficients capturing the effect of the reform, obtained from the estimation of regression 1. The different columns refer to the outcome considered, being respectively labor force participation, column 1, the decision to work part-time, column 2, number of hours worked per week, column 3, and number of days worked per week, column 4. 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 fourteen years old, including school personnel. In column 2, 3, and 4, we only consider mothers who are employed at the time of the interview.

*** 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 A.4 – Daily labor supply response to the reform - Including school personnel

	(1) Monday	(2) Tuesday	(3) Wednesday	(4) Thursday	(5) Friday	(6) Saturday	(7) Sunday
Treatment	-0.00196	0.000698	0.0328***	0.000935	0.00229	-0.0147*	-0.00273
	(0.00792)	(0.00692)	(0.00882)	(0.00716)	(0.00719)	(0.00768)	(0.00491)
Ygst child btw 6-11	-0.000755	-0.00865	-0.0677***	-0.00965	-0.00837	-0.00214	-0.00243
	(0.00695)	(0.00603)	(0.00829)	(0.00607)	(0.00630)	(0.00716)	(0.00465)
Observations	75684	75684	75684	75684	75684	75684	75684
R^2	0.079	0.086	0.090	0.085	0.082	0.115	0.098
F	23.49	45.93	32.02	37.31	36.67	19.42	5.030
Pre-treatment means	0.700	0.769	0.573	0.741	0.742	0.207	0.0761

Notes: This table shows the coefficients capturing the effect of the reform, obtained from the estimation of regression 1. The different columns refer to the outcome considered, corresponding to the decision of working each 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. The estimation sample comprises all mothers whose youngest child is between six and fourteen years old who are employed at the time of the interview, including school personnel. 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 women 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 A.5 – Labor supply response to the reform - Youngest child between 2 and 11

	(1) Part-time	(2) Hours worked per week	(3) Days worked per week	(4) Work on Wednesday	(5) Work on Saturday
Youngest child btw 2-11*PostSept13	-0.00916	0.138	0.0354***	0.0288***	-0.00605
	(0.00686)	(0.148)	(0.0128)	(0.00656)	(0.00589)
Youngest child btw 2-11	0.0324***	-0.644***	-0.0710***	-0.0512***	-0.00276
	(0.00475)	(0.112)	(0.00887)	(0.00648)	(0.00582)
Observations	278352	278352	278352	130082	130082
R^2	0.105	0.118	0.087	0.068	0.094
F	41.27	44.89	21.01	62.25	47.51
Pre-treatment means	0.375	34.12	4.648	0.565	0.227

Source: French Labor Force Survey 2009-2016.

Note: this Table shows the coefficients capturing the effect of the reform, obtained from the estimation of regression 1. The different columns refer to the outcome considered, being, respectively the decision to work part-time, number of hours per week, number of days worked per week, and decision to work on Wednesday and Saturday. 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 two and fourteen years old, who are employed at the time of the interview, excluding school personnel

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

A.3 Alternative mechanisms

Table A.6 – Labor supply response to the reform - Tenure and training

	(1) Tenure in the company	(2) Contract duration	(3) On the job training
Treatment	0.318*	0.120	0.0106
	(0.174)	(0.134)	(0.0069)
Youngest child between 6-11	-0.403***	-0.161	-0.0022
	(0.129)	(0.142)	(0.0037)
Observation	132,824	10,433	133,979
R^2	0.247	0.573	0.167
F	126.9	20.75	80.47
Pre-treatment mean	9.949	1.178	0.163

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of regression 1 on tenure and training. The first column refer to the tenure in the company, the second to contract tenure, both measured in years, the last outcome measures on-the-job training. 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 fourteen 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 A.7 – Labor supply response to the reform by educational level - Tenure and training

	Tenure in the company		**Contract duration**		**On the job training**	
	Estimate	Pre-treatment mean	Estimate	Pre-treatment mean	Estimate	Pre-treatment mean
No college degree	0.462*	9.421	0.033	1.153	-0.013	0.116
	(0.245)		(0.119)		(0.0114)	
College degree or more	0.343	10.81	1.007	1.25	0.0405*	0.239
	(0.170)		(0.151)		(0.0015)	
P-value difference	0.373		0.251		0.0601	
N	132,822		10,433		133,979	

Notes: The table reports the impact of the reform on labor supply decisions of different subgroups. To conduct this analysis, we choose to estimate a regression on the entire sample, and interact all regressors with the subgroups considered, except for municipality fixed effects. Otherwise, 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. For each subgroup, we present the coefficient of the treatment interacted with the subgroup considered. We also report the p-value of the test on the equality of the impact of the reform across the two subgroups. The estimation sample includes all mothers, aged 18 to 55, whose youngest child is between six and fourteen, 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 A.8 – 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) Employees	(6) Elementary occupations
Treatment	0.002	-0.007*	-0.0006	0.006	0.00388	-0.005
	(0.002)	(0.003)	(0.006)	(0.008)	(0.008)	(0.005)
Youngest child between 6-11	-0.0048***	0.006***	0.007*	-0.002	-0.0014	-0.0052
	(0.0014)	(0.0027)	(0.004)	(0.005)	(0.006)	(0.0037)
Observation	166,178	166,178	166,178	166,178	166,178	166,178
Pre-treatment mean	0.008	0.044	0.129	0.254	0.470	0.0913

Notes: The table reports the impact of the reform on changes in occupations. 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 fourteen 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.

*** 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.4 Multiple outcomes and subgroup analysis

Measuring the impact of the reform on multiple outcomes, as well as heterogeneous treatment effects by subgroup can raise the probability of a Type I error. We take a number of steps to ensure that our results are not just the result of data mining. We first present estimates of the different outcomes with adjusted p-values to account for multiple hypothesis testing. We also use modern machine learning tools and provide a non-standard approach to treatment heterogeneity building on recent applications in the context of randomized controlled experiments (Davis and Heller 2017, Bertrand et al. 2017).

A.4.1 Multiple hypothesis testing

Table A.9 and Table A.10 present estimates of the effect of the reform on labor supply outcomes obtained from the estimation of regression 1 for which we further provide adjusted p-values to account for multiple hypothesis testing.

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).

Table A.9 – Robustness checks - P-value adjusted for multiple hypothesis testing

	(1) Labor force participation	(2) Part-time	(3) Hours worked per week	(4) Days worked per week	(5) Work on Wednesday	(6) Work on Saturday	(7) Log net hourly wages
Treatment	0.00842	-0.0215	0.328	0.0404	0.0335	-0.0201	0.0151
Adjusted P-value	0.176	0.06	0.156	0.061	0.004	0.061	0.114
Observations	175,528	133,979	133,979	133,979	61,816	61,816	43,012
R^2	0.169	0.155	0.169	0.140	0.097	0.136	0.342
F	38.81	19.77	24.38	7.840	22.35	19.85	112.0
Pre-treatment mean	0.85	0.36	34.4	4.7	0.59	0.23	11.5

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of regression 1. The different columns refer to the outcome considered with adjusted p-values to account for multiple hypothesis testing. 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 fourteen years old, with the exception of those working in schools. In columns 2 to 7, we only consider mothers who are employed at the time of the interview. The sample size falls in columns 5 and 6, as in the French Labor Force Survey the decision to work on each day of the week is measured only from 2013 onward. The sample size further shrinks in the last column, as respondents report their monthly wages only once out of the five times their are interviewed.

Source: French Labor Force Survey 2009-2016.

Table A.10 – Robustness checks - P-value adjusted for multiple hypothesis testing - Daily labor supply

	(1) Monday	(2) Tuesday	(3) Wednesday	(4) Thursday	(5) Friday	(6) Saturday	(7) Sunday
Treatment	-0.00188	0.00125	0.0335	0.00158	0.00073	-0.0201	-0.00533
Adjusted P-value	0.926	0.926	0.004	0.926	0.926	0.084	0.815
Observations	61,816	61,816	61,816	61,816	61,816	61,816	61,816
R^2	0.085	0.087	0.097	0.088	0.083	0.136	0.112
F	20.38	35.92	22.35	30.82	28.27	19.85	5.536
Pre-treatment mean	0.70	0.77	0.59	0.75	0.75	0.23	0.09

Notes: The table shows the coefficients capturing the effect of the reform, obtained from the estimation of regression 1. The different columns refer to the outcome considered, corresponding to the decision to work each specific day of the week, with adjusted p-values to account for multiple hypothesis testing. 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 employed mothers whose youngest child is between six and fourteen years old, with the exception of those working in schools. 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 women interviewed between 2013 and 2016.

Source: French Labor Force Survey 2009-2016.

A.4.2 Subgroup analysis using machine learning

The goal of this analysis is to confirm differences in predicted impacts of the reform across occupations and educational levels. We build upon recent applications of machine learning techniques in the context of randomized control trial studies (Davis and Heller 2017, Bertrand et al. 2017) to go one step further in analyzing heterogeneity in the treatment effect of the reform. We follow the causal forest algorithm of Athey and Imbens (2016) and Wager and Athey (2018) in order to identify expected impact of the reform conditional on a set of covariates.[36] Causal forest can be particularly useful, relative to some other machine learning algorithms, such as a lasso, because it allows for non-linearities and automatic detection of interactions.

We follow Bertrand et al. (2017) and set the parameters as displayed in Table A.13. We apply our model on the sample of mothers whose youngest child is between 6 and 14, who are employed at the time of the interview, and for whom wages are reported, with non-missing values for baseline covariates and outcomes of interest (N=21,561). Given our sample size, we choose $\alpha = 50\%$ for the share of the sample used to construct the model (the *training* sample) and the one used for inference (the *test* sample). We adapt the algorithm so that the determination of the *training* sample is stratified by our treatment variable and by municipality (*treatment*municipality*). Features included in the model are presented in Table A.14.

The general idea is that we first use the model in order to predict a women's expected treatment effect for each outcome based on her covariates. Following the methodology applied by Davis and Heller (2017) and Bertrand et al. (2017), we then investigate whether predictions of the model do capture treatment heterogeneity in our data. We create a dummy variable equal to one if the mother has a predicted treatment effect on labor market outcome in the top 50% or the bottom 50% of predictions. We then compare the sociodemographic characteristics of *treated* mothers in the top and the bottom 50% of the distribution of predicted effect, and we see which dimension stands out. Therefore the descriptive statistics are computed on the

[36] We use the `R` function `causal_forest` from the packages `causalTree`, `randomForestCI`, `hte` and `ElasticSynth` (Athey and Imbens 2016, Wager and Athey 2018).

restricted sample of mothers whose youngest child is between 6 and 11.

Results of this balancing test for the conditional average treatment effect on part-time rate and the log real net hourly wage are presented in Table A.11 and Table A.12 respectively. We provide P-value adjusted for multiple hypothesis testing. Note that for Table A.11, given that the impact of the reform on the probability of working part-time is negative, belonging to the bottom 50% of the effects means experiencing the highest decrease. Overall, these results are consistent with the heterogenous effects described in Section 3. The share of mothers with at least a college degree is significantly higher in the bottom 50% of the distribution of predicted conditional effects on part-time (higher effects) than in the top 50%. We observe the reversed pattern for high school graduates: they are less likely to be part of the group most affected by the reform. Single women are less likely to experience a high decrease in part-time rate as well, although they work on average more hours than married mothers in the baseline. Finally, we do not observe sharp geographic differences across these groups: the share of mothers living in cities located in urban areas, or where the reform was implemented in 2013 rather than 2014n does not differ significantly between the two groups.

Turning to the impact on hourly wage in Table A.12, we observe again that mothers with at least a college degree are significantly more represented in the top 50% of the distribution of predicted conditional effects on hourly wage (higher effects) than in the bottom 50%. We observe another pattern of differences across occupations: women working in managerial occupations and intermediary occupations are more likely to be in the top 50% of the distribution of predicted conditional effects on hourly wage, while employees and elementary occupations are overrepresented at the bottom 50% of the conditional average treatment effects.

Overall, this approach confirms qualitatively the patterns of heterogeneity we observed by educational levels and across occupations.

Table A.11 – Conditional Average Treatment Effect - Part-time

	Bottom 50% of predicted effects	Top 50% of predicted effects	Difference	P-value
Age	41.21	40.54	-0.668	0.001
College degree or more	0.665	0.283	-0.382	0.001
High school graduates	0.261	0.564	0.303	0.001
Single	0.040	0.171	0.131	0.001
Immigrant	0.123	0.073	-0.050	0.001
Farmers	0.002	0.000	-0.002	0.137
Craftsmen, small business	0.000	0.000	0.000	0.397
Managerial occupations	0.003	0.003	-0.000	0.869
Intermediary occupations	0.369	0.031	-0.338	0.001
Employees	0.247	0.246	-0.001	0.973
Elementary occupations	0.285	0.615	0.330	0.001
Reform in 2013	0.289	0.290	0.000	0.973
Urban area	0.683	0.739	0.056	0.001
N	2,091	2,091	Total for estimation = 21,561	

Notes: The table shows the descriptive statistics of treated mothers' characteristics according to the predicted effect the reform has on the probability of working part-time. The conditional average treatment effect is computed using the `R` function `causal_forest` (Athey and Imbens 2016, Wager and Athey 2018). The estimation sample comprises mothers whose youngest child is between 6 and 14, who are employed at the time of the interview, and for whom wages are reported, with non-missing values for baseline covariates and outcomes of interest. Parameters and features of the model are presented in Table A.13 and Table A.14 respectively. The descriptive statistics are then computed on the restricted sample of mothers whose youngest child is between 6 and 11. We report the P-value of the T-test adjusted for multiple hypothesis testing. Note that given that the effect on the probability of working part-time is negative, belonging to the bottom 50% of the effects means experiencing the highest decrease.

Source: French Labor Force Survey 2009-2016.

Table A.12 – Conditional Average Treatment Effect - Log real hourly wage

	Bottom 50% of predicted effects	Top 50% of predicted effects	Difference	P-value
Age	41.04	40.72	-0.317	0.063
College degree or more	0.311	0.637	0.327	0.001
High school graduates	0.542	0.283	-0.259	0.001
Single	0.090	0.120	0.030	0.004
Immigrant	0.112	0.084	-0.028	0.005
Farmers	0.000	0.002	0.002	0.128
Craftsmen, small business	0.000	0.000	0.000	0.353
Managerial occupations	0.001	0.005	0.004	0.021
Intermediary occupations	0.028	0.372	0.343	0.001
Employees	0.298	0.196	-0.102	0.001
Elementary occupations	0.604	0.296	-0.308	0.001
Reform in 2013	0.302	0.277	-0.025	0.095
Urban area	0.721	0.701	-0.020	0.191
N	2,091	2,091	Total for estimation = 21,561	

Notes: The table shows the descriptive statistics of treated mothers' characteristics according to the predicted effect the reform has on their hourly wage. The conditional average treatment effect is computed using the `R` function `causal_forest` (Athey and Imbens 2016, Wager and Athey 2018). The estimation sample comprises mothers whose youngest child is between 6 and 14, who are employed at the time of the interview, and for whom wages are reported, with non-missing values for baseline covariates and outcomes of interest. Parameters and features of the model are presented in Table A.13 and Table A.14 respectively. The descriptive statistics are then computed on the restricted sample of mothers whose youngest child is between 6 and 11. We report the P-value of the T-test adjusted for multiple hypothesis testing.

Source: French Labor Force Survey 2009-2016.

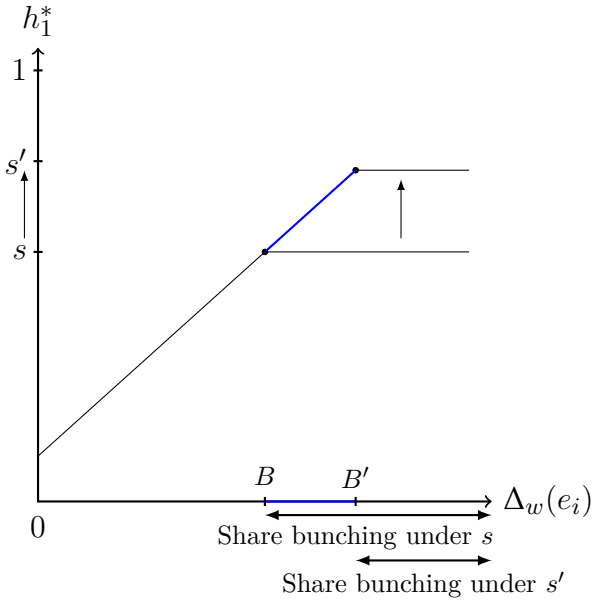
Table A.13 – Parameters for Causal Forest

Parameter	Value
Number of trees in the forest B	10,000
Minimum number of treatment and control units per leaf	10
Fraction of the sample used to build each tree β	0.5
Fraction of the subsample used for training δ	0.5

Table A.14 – Features for Causal Forest

Variable	Type
Age	Continuous
Age square	Continuous
Marital status	Binary
Number of children (2, 3 or more)	Binary
Immigration status	Binary
Municipality fixed effects	Binary
Wave on interview fixed effects	Binary
Level of education (3 categories)	Binary
Type of occupations (6 categories)	Binary
Presence of other young members in the household	Binary
Presence of other older members in the household	Binary
Urban area	Binary

A.5 Visualisation of the impact of the reform



This diagram plots the relationship between a change in the time the child spends at school s and period 1's optimal labor supply according to the mother's level of education. Δ_w is a mapping of e_i (continuous and increasing) therefore Δ_w is rank-preserving of e_i. B represents the mother with the lowest level of education e_i who is working s rather than her optimal h_1^* in the first period. With the reform, the constraint moves from s to s'. This shift translate into $B \to B'$: the level of education of the least educated mother working s' rather than her optimal h_1^* in the first period has increased. The line in blue represents the share of mothers who were bunching under s and who can work their optimal h_1^* under s'. We can then characterize the welfare gains associated to the reform according to mothers' level of education.

Welfare gains The gain in welfare can be characterized by:[37]

$$WG = \underbrace{(B' - B)\frac{dh_1^*}{d\Delta_w}[V_1(h_1^*) - V_1(s)]}_{\text{Mothers bunching under } s} + \underbrace{(1 - B')\frac{dh_1^*}{d\Delta_w}[V_1(s') - V_1(s)]}_{\text{Remaining bunchers under } s'}$$

where $V_1(.)$ is the indirect utility function in period 1.

[37] Again here we do not make any assumption on the value the mother attributes to the time spent with her child.

A.6 Proofs of the theoretical model

A.6.1 Optimal labor supply

The maximization problem in period 2 is straightforward. Given optimal labor supply in period 2 ($h_2^* = \alpha$), we can substitute period 2's indirect utility functions into the maximization problem of period 1. Recall that the two indirect utility functions in period 2 for state H and state L write:

$$\begin{cases} V_2(w_2^H, \alpha) &= \alpha \log(w_2^H) + \alpha \log(\alpha) + (1-\alpha)\log(1-\alpha) \\ V_2(w_2^L, \alpha) &= \alpha \log(w_2^L) + \alpha \log(\alpha) + (1-\alpha)\log(1-\alpha) \end{cases}$$

Substituting the constraints into the expression, the problem writes:

$$\alpha \log(h_1 w_1) + (1-\alpha)\log(1-h_1) + \beta[f(h_1)V_2^H + (1-f(h_1))V_2^L]$$

We differentiate with respect to h_1

$$\frac{\partial}{\partial h_1} = 0 \iff \frac{\alpha}{h_1} - \frac{1-\alpha}{1-h_1} + \beta V_2^H - \beta V_2^L = 0$$

Rearranging this expression, we find:

$$\alpha + h_1(-1 + \beta V_2^H - \beta V_2^L) + h_1^2(-\beta V_2^H + \beta V_2^L) = 0 \tag{5}$$

For simplicity, let's write:

$$V_2^H - V_2^L = \alpha \log(w_2^H) - \alpha \log(w_2^L) = \alpha \log\left(\frac{w_2^H}{w_2^L}\right) = \alpha K$$

By construction, K is strictly positive. We can compare the optimal labor supply across the two periods, as shown in (3). The optimal labor supply in period 1, h_1^*, solves

$$h_1 = \alpha + \underbrace{\beta \alpha K h_1 - \beta \alpha K h_1^2}$$

which incorporates future gains in earning due to promotion. We can rewrite (5) as a polynomial of h_1 and solve it:

$$\alpha + (\beta\alpha K - 1)h_1 - \beta\alpha K h_1^2 = 0 \tag{6}$$

$$\Delta = \beta^2\alpha^2K^2 + 1 + (4\alpha - 2)\beta\alpha K$$

For $1 > \alpha > 0$ and $1 > \beta > 0$, $\Delta > 0$ and the system (6) has two solutions:

$$\begin{cases} h_1'^* &= \frac{1-\beta\alpha K+\sqrt{\beta^2\alpha^2K^2+1+(4\alpha-2)\beta\alpha K}}{-2\beta\alpha K} \\ \\ h_1''^* &= \frac{1-\beta\alpha K-\sqrt{\beta^2\alpha^2K^2+1+(4\alpha-2)\beta\alpha K}}{-2\beta\alpha K} \end{cases} \tag{7}$$

$h_1''^*$ is the only positive root. Moreover, $\lim_{K\to+\infty} h_1''^* = 1$, therefore $h_1''^*$ is the interior solution to the maximization problem in period 1.

A.6.2 Comparative statics

Assuming $\beta > 0$ and $\alpha > 0$, we can rewrite h_1^* to derive some comparative statics.

$$h_1^* = \frac{1}{2} - \frac{1}{2\beta\alpha K} + \underbrace{\frac{\sqrt{\beta^2\alpha^2K^2 + 1 + (4\alpha - 2)\beta\alpha K}}{2\beta\alpha K}}_{A}$$

$$\begin{aligned}
\frac{dh_1^*}{dK} &= \frac{1}{2\beta\alpha K^2} + A' \\
A' &= \frac{\frac{2\beta\alpha K}{2\sqrt{\Delta}}[2\beta^2\alpha^2 K + (4\alpha - 2)\beta\alpha] - 2\beta\alpha\sqrt{\Delta}}{(2\beta\alpha K)^2} \\
&= \frac{2\beta\alpha K + (4\alpha - 2)}{4K\sqrt{\Delta}} - \frac{\sqrt{\Delta}}{2\beta\alpha K^2} \\
&= \frac{K^2\beta^2\alpha^2 + (2\alpha - 1)\beta\alpha K - \Delta}{2\beta^2\alpha^2 K\sqrt{\Delta}} \\
&= \frac{-1 - \beta\alpha K(2\alpha - 1)}{2\beta^2\alpha^2 K\sqrt{\Delta}} \\
\frac{dh_1^*}{dK} &= \frac{1}{2\beta\alpha K^2} - \frac{1 + \beta\alpha K(2\alpha - 1)}{2\beta^2\alpha^2 K\sqrt{\Delta}} \\
&= \frac{\sqrt{\Delta} - 1 - \beta\alpha K(2\alpha - 1)}{2\beta^2\alpha^2 K\sqrt{\Delta}}
\end{aligned}$$

Given that

$$2\beta^2\alpha^2 K\sqrt{\Delta} > 0$$

for $\beta > 0$ and $\alpha > 0$, then

$$\frac{dh_1^*}{dK} > 0 \Leftrightarrow g(K) = \sqrt{\Delta} - 1 - \beta\alpha K(2\alpha - 1) > 0$$

which is true for $K > 0$, $\beta > 0$ and $\alpha > 0$.

As Δ_w is the exponential transformation of K, we can write:

$$\frac{dh_1^*}{d\Delta_w} > 0$$

The problem is symmetric for $\frac{dh_1^*}{d\beta}$.