A thesis submitted in fulfilment of the requirements for the degree of Doctor of philosophy

Women Labour Supply and Country-Specific Institutions.

Marc Jourdain de Muizon

University College London (UCL)
Department of Economics

To Yehui, Ele and Sp

Declaration of Authorship

I, Marc Jourdain de Muizon, declare that this thesis titled "Women Labour Supply and Country-Specific Institutions.", and the work presented are my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Abstract

In this thesis, I study the influence of country-specific institutions on the labour supply decision of prime-aged women.

In chapter 1, I use reduced-form methods, to evaluate the impact of wide changes to the benefit system and childcare subsidies targeted at households with pre-school age children in France. I estimate strong responses to maternity leave type benefits, and a positive impact of childcare subsidies on mothers employment rates in the long-run.

In chapter 2, I develop and estimate a static labour supply model with part-time wage equations as well as demand-side constraints. I can compare the elasticities estimates and predictions from tax reform simulations to those of models assuming a unique hourly productivity and the absence of any employment constraint. The structural model also enables me to clearly simulate the impact of each component of the wide policy reform studied in the first chapter.

In chapter 3, I try to understand why the number of hours worked by British married women is lower than that of French married women. I find that in the presence of children, British mothers are far more responsive to financial incentives. Husbands' earnings and their interaction with childcare prices seem to play an important role. Nevertheless, the fall in hours worked in the British households with children, despite facing lower taxes than in France, remains somewhat puzzling. It could be mainly attributed (in the framework used) to different preferences.

In the final chapter, I study the impact of joint-taxation on the labour supply choices of married women with working husbands in France. I simulate a revenue-neutral reform that would cancel the tax penalty or gain associated with being married. I find that the overall labour supply of these women would increase by 1.2%.

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Introduction

This thesis is interested in understanding how certain country-specific institutions such as the benefits offered to mothers following a birth, childcare prices and infrastructures, or specificities of the tax system (joint taxation for instance) influence the labour supply decision of prime-aged women.

In the first chapter, I use Regression-Discontinuity, Differences-in-Differences and Triple-Differences methods, to evaluate the impact of the 2004 Paje reform in France. The reform included wide changes to the benefit system and childcare subsidies targeted at households with pre-school age children. The design of the reform allows me to differentiate between short-run and long-run effects. To identify the impact of each policy component, I exploit the variability in eligibility rules according to household demographics. I estimate strong responses to incentives to care for a child at home after a birth, and a positive impact of childcare subsidies on mothers employment rates in the long-run. The analysis reveals the existence of crowding-out of childcare places among working mothers as well as continuation and possible peer-effects or changes in societal attitudes. Such mechanisms, combined with a slow adjustment of the childcare market appear critical to understand the magnitude of the overall employment changes induced by the policies. The results suggest that subsidies to private carers are most efficient at inducing mothers to join the labour force, in groups where the employment rates are neither very high nor very low. Generous income transfers for maternal leave motivate women to take-up the program for their first child but does not impact their decision to take it up for subsequent children.

In the second chapter, I develop and estimate a static labour supply model with part-time and full-time wage equations as well as demand-side constraints. This allows me to understand to what extent the common assumption in the literature of a unique hourly productivity and the absence of any difficulties to find work may

affect the elasticities estimates and the predictions from tax reform simulations. I can also simulate the overall reform studied in the first chapter to check which model specification predicts the Differences-in-Differences evaluations most accurately. The structural model finally allows me to clearly simulate the impact of each component of the wide policy reform studied in the first chapter. This additional robustness check confirms the main results of chapter 1 that were obtained using reduced-form methods and exploiting variation in eligibility rules.

In the third chapter, I use the model of chapter 2, to understand why the number of hours worked by British married women is lower than that of French married women. Interestingly, the labour supply of married women differs a lot along the intensive margin when their children are young. Using this structural approach, I am able to control for differences in tax rates, childcare prices, part-time wage penalties and rationing on the labour market. I find that in the presence of children, British mothers are far more responsive to financial incentives. Husbands' earnings and their interaction with childcare prices seem to play an important role in explaining the cross-country hours of work. Nevertheless, the fall in hours worked in the British households with children, despite facing lower taxes than in France, remains somewhat puzzling in the light of conventional explanations. It could be mainly attributed to different preferences. The framework used cannot differentiate whether it is the preferences or the cost of work technologies that differ across the two countries.

In the final chapter, I study the impact of joint-taxation on the labour supply choices of married women with working husbands in France. Using the model estimated in the previous chapters, I simulate a revenue-neutral reform that would cancel the tax penalty or gain associated with being married. I find that the particpation rate of these women would increase by 0.7 percentage point and their overall labour supply would increase by 1.2%. As expected, the changes would be larger for highly educated women and those married to a high-earner.

1 Maternity Leave and Childcare Subsidies in France: the Paje Reform

1.1 Overview

Using Regression-Discontinuity and Differences-in-Differences methods, I evaluate the impact of wide changes to the benefit system and childcare subsidies targeted at households with pre-school age children in France. The design of the reform allows me to differentiate between short-run and long-run effects. I estimate strong responses to incentives to care for a child at home after a birth, and a positive impact of childcare subsidies on mothers employment rates in the long-run. The analysis reveals the existence of crowding-out of childcare places among working mothers as well as continuation and possible peer-effects. Such mechanisms, combined with a slow adjustment of the childcare market appear critical to understand the magnitude of the overall employment changes induced by the policies. The results suggest that subsidies to private carers are most efficient at inducing mothers to join the labour force, in groups where the employment rates are neither very high nor very low. Generous income transfers for maternal leave motivate women to take-up the program for their first child but does not impact their decision to take it up for subsequent children.

1.2 Introduction:

On January 1st 2004, the French government modified significantly the structure of benefits and childcare subsidies targeted at households with children of pre-school age (three years old in France). Every child born after that date pushed the household under the new "Paje" regime. Other families remained eligible to the old "APE" regime only. This specific design allows for a particularly nice identification strategy. I can evaluate the impact of the reform on a treated and eligible group, while the outcomes of a treated and non-eligible group can still be observed nationwide.

The reform comprised two big changes. On the one hand, mothers who just had their first child became eligible to a non means-tested "stay-home" subsidy. They could extend their maternity leave by up to six months. On the other hand, the eligibility thresholds to a monthly income transfers were strongly increased and the generosity of childcare subsidies significantly increased. For reasons explained later in the text, I focus on households with pre-school age children with one or two children only. These households represent about four-fifths of all the households with pre-school children. To identify the impact of each policy change, I will exploit the variability in eligibility rules according to household demographics, and estimate the same specifications on samples of households where the youngest is less than one year old and between the age of one to three.

In 1994, the French government extended the stay-home benefits (APE) to mothers of two children and that reform is studied in Piketty (2005). He finds a strong direct negative impact on employment rates for this group of women. He also finds a negative impact on women who have a third child and previously claimed the benefit following the birth of the second child (what I will call "habit" effects). In Norway in 1999, a similar "cash-for-care" transfer was implemented. Schole (2004) estimates strong negative effects on maternal employment rates induced by the reform. Looking at the introduction of paternity leave in Norway in 1993, Dahl et al (2013) find evidence of strong take-up immediately after the policy introduction. They also highlight the importance of peer-effects that amplify the program take-up rates in the long-run. While parents respond strongly to the incentives to stay home when children are of pre-school age, many papers also estimate the impact of childcare availability

and prices on mothers' labour supply decisions. Using discontinuities in the price of childcare for households with different incomes in Norway, Black et al (2013) find very little impact of childcare subsidies on care utilization and parental labour force participation. Hardoy & Schone (2010) evaluate the impact of decreasing the price of childcare and increasing coverage in Norway in 2006. While mothers' labour supply was already high, they find a positive impact on the extensive margin but none on the hours of work decision. In Sweden, Lundin et al (2008) find that cheaper childcare prices in the context of universal childcare cannot stimulate an already high female labour supply. The Canadian reform in Quebec in 1997 that decreased substantially the price of childcare while increasing the provision of childcare slots was evaluated in Lefebvre and Merrigan (2008) and Baker,Gruber and Milligan (2008). Both papers report a strong increase in maternal employment rates and hours of work. Baker et al find some evidence of crowding-out in childcare modes. Overall, it appears that increasing childcare coverage and decreasing its prices has positive effects on maternal labour supply. But in a context of high labour supply, simply decreasing the price of childcare may not significantly increase the labour supply of mothers.

This paper brings further evidence to this body of literature. On the one hand, I identify negative effects of "stay-home" subsidies similar to Schone(2004) and Piketty(2005). Their impact is accentuated in the long-run through possible peer effects as in Dahl et al (2013) but not by habit effects as in Piketty (2005). On the other hand, I find evidence of childcare subsidies having a positive impact on mothers' employment rates, and particularly for groups who did not have a very high (nor very low) employment rate prior to the reform. The short-run and long-run impact of these subsidies differ strongly in magnitude and across demographic groups. Availability of childcare places and crowding-out among working mothers seem to prevent the impact of these subsidies to fully materialise in the immediate aftermath of the policy change. The overall net gains in employment appear modest relative to the costs of the reform. All these results suggest that subsidies to private carers may not be a very cost-efficient way to incentivise mothers of young children to join the labour force.

Piketty (2005) estimates a small impact of the "cash-for-care" program on fertility. The data available does not allow me to study the response of natality choices to the policy with precision. Overall, fertility seems to follow its pre-policy trend. The

policy might have had a small impact on the decision of mothers to have a second or third child, but I cannot assert this with strong confidence. I discuss the evolution of fertility in France throughout the first decade of the 21st Century below.

1.3 Preliminary evidence:

1.3.1 Childcare availability in the period under study:

In France, children are allowed to go to school from the age of three. Prior to that, there exists two main types of formal care: the "creches" or public kindergarten and the "assistantes maternelles" or private carers[1]. These private carers are allowed to look after up to three children. Their cost is subsidised by the government and was decreased by the 2004 reform.

Figure 1.1 shows that the assistantes maternelles have been an increasingly popular mode of care in the first decade of the 21st Century in France. Their number kept rising after the policy was implemented. The growth rate was similar to the years prior to the policy change. A slight modification in the data methodology between 2001 and 2002 explains the apparent stagnation in the number of carers around that time. Figure 1.2 represents the number of places available per 100 children aged between one and three years old in the two main types of care. The number of places available in kindergarten rose very slowly from about 14 to 15 per 100 children within 5 years after the reform. The increase in number of places available was far more significant in the private-carers market. We just saw that the number of Assistantes maternelles kept increasing which would explain the increase in that ratio. Fertility was not falling in that period, so it could not be explained by a drop in the number of children in that age category.[2]

[1]There also exists "Gardes a domicile". These private carers look after the household's children in the household's home. They are more expensive and the subsidies for this type of care were affected by the reform. Only 2% of the children are cared for by these private carers.

[2]An assistante maternelle is "accreditated" (allowed) to look after a certain number of children by the local authorities. The number of children to care for increases with seniority and other criteria.

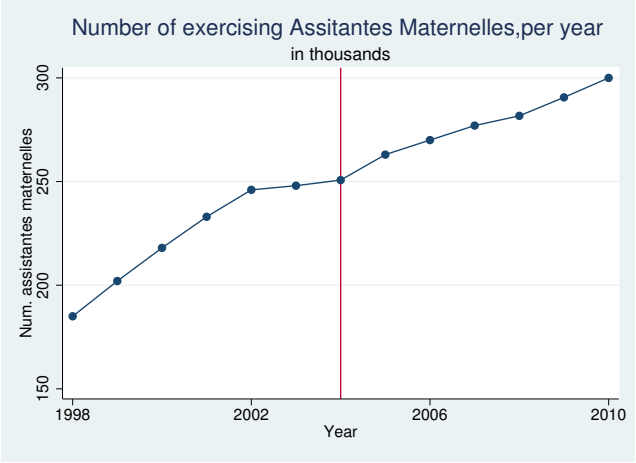

Figure 1.1: Number of Assistantes Maternelles (nannies)

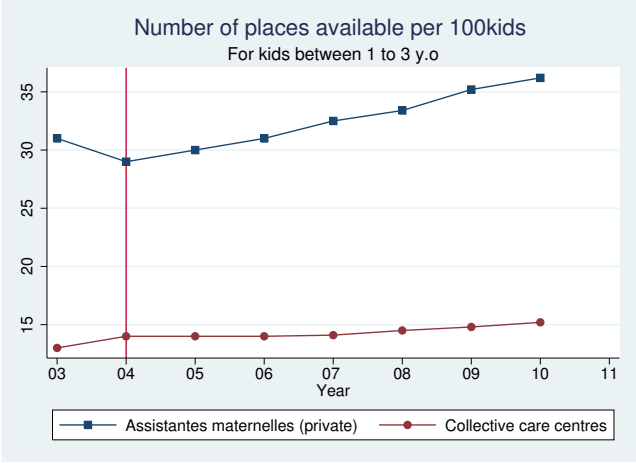

Figure 1.2: Number of places available per 100 kids

The hourly wage of nannies reported in the Labour Force Surveys is displayed in Figure 1.3. It increased at the same long-run pace as that of other women. It stagnated for a few years around the time of the reform but started increasing again from 2006 onwards.

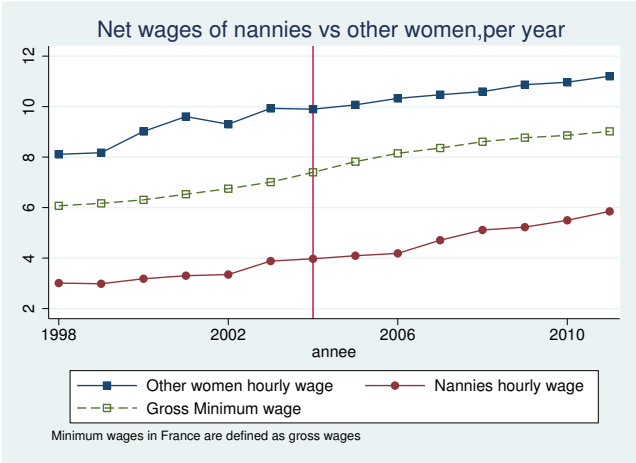

Figure 1.3: Wages of nannies per year

The hourly rate paid to a nanny cannot fall below a threshold defined as a proportion of the national minimum wage. In 2005, this threshold was increased from .225 to .281 of the minimum wage (that could explain the apparent increase the hourly wages

from 2006 onwards). There also exists an upper limit to the hourly rate a nanny could charge. The childcare subsidies can be claimed by the parents only if the nanny charges less than .63 of the hourly minimum wage. So the price paid to a nanny is the result of a bargaining process between parents and the carer, where the agreed hourly price is set between these two bounds. The price being bounded, it is likely that the allocation of places in the market is not simply the result of price adjustments. Priority rules for siblings, friends networks, or previous employment history between the parents and the nanny may play an important role in the allocation of scarce childcare places. It should also be noted that the average wage of nannies varies across regions, and appears to be weakly correlated with the number of available places for young children in the region (Figure 1.4), suggesting that other factors than the price per hour paid explain the allocation of childcare places.

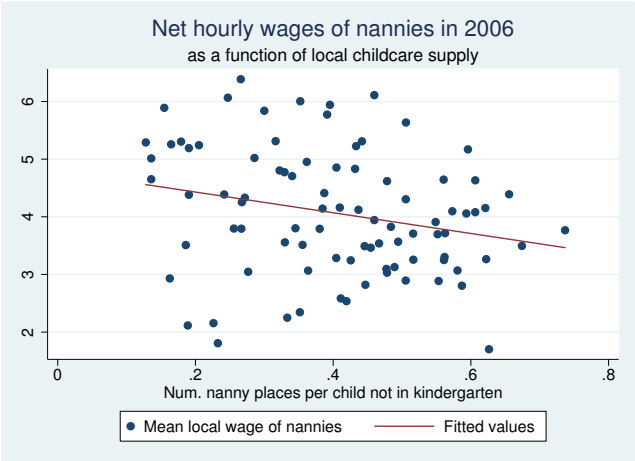

Figure 1.4: Hourly price of nannies and regional supply of care places

1.3.2 Benefit take-ups:

Prior to the reform, the female labour supply was generally increasing in France, and as a result, Figure 1.5 shows that the number of claimants to childcare subsidies for private carers was increasing. A break is still apparent around the time of the reform. While at first sight, the trend may not have changed much, it appears that an extra forty to fifty thousand households claimed these new childcare subsidies. It is interesting to note that this occurred while no apparent jump in the number of

carers occurred. This suggests that some parents who would have been using private carers but not claiming the benefits (probably because of high utility costs relative to low monetary gains) would now claim the benefits post-2004.

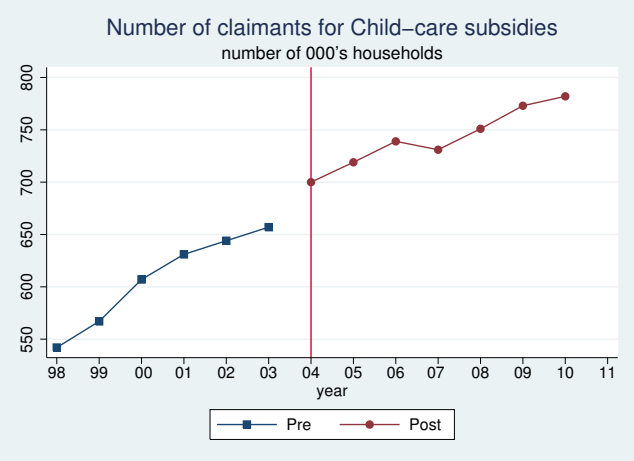

Figure 1.5: Number of childcare subsidies claimants

Figure 1.6 focuses on the evolution of the total number of claimants for the income transfer payments (called "Allocation de base") that were modified by the reform. An increase in the eligibility thresholds, resulted in about half a million households of pre-school children to receive the monthly income transfer. The apparent delay in the picture is explained by the small number of the households with children of pre-school age who woul be eligible to the new policy (the date of birth of the youngest child is what allocates households to the new system). The proportion of households claiming that benefit (among all households with young children) increased by around 15 to 20 percentage points.

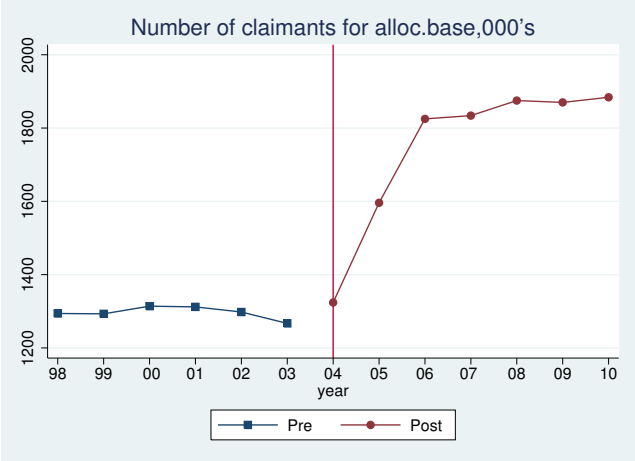

Figure 1.6: Number of claimants to the income transfer

Figures 1.7 and 1.8 report the number of claimants in France to the "stay-home" or "cash-for-care" subsidies. These income transfers are not conditional on household income but conditional on past-work experience. Should a mother of a pre-school child decide to stop work, or decrease her hours of work to part-time, she is eligible to a monthly benefit. Mothers of one child were not eligible previously. The increase in the number of claimants in 2004 and 2005 by about 80,000 could mainly be attributed to this population (each year about 300 000 women have their first child, about two-third of them worked full-time in 2003, so that another hundred thousand became eligible to the benefit). When splitting further the claimants in the fourth graph, it appears at first sight that a lot of the increase was driven by women claiming the benefit while working part-time. More surprisingly the number of mothers claiming the benefit to leave employment fell after 2005. This picture might suggest that many women entered the labour market to work part-time as a result of the policy change. Nevertheless, we will see that this story is incomplete. My analysis reveals that the hours of work where not affected by the policy. Overall, many women were encouraged to enter the labour market (thanks to childcare subsidies), but the prevalence of part-time work among the employed did not increase. So the correct interpretation of that picture, is as follows: immediately after the policy, new mothers became eligible and increased the total number of claimants. After the policy implementation, more mothers of pre-school children re-entered slowly the labour market (as a result of

the childcare subsidy). Those that chose to work part-time became eligible for the part-time income benefit, but those that chose full-time jobs, did not claim any of those income transfers. So there are two dynamics at work behind that graph: on the one hand, an increase in the number of eligible households pushing up the number of claimants immediately after 2004, and an overall fall in the non-employment of households whose eligibility was not affected by the policy change that materialises slowly over the years. This last effect was explained by childcare subsidies and not incentives to work part-time of these "cash-for-care" transfers[3].

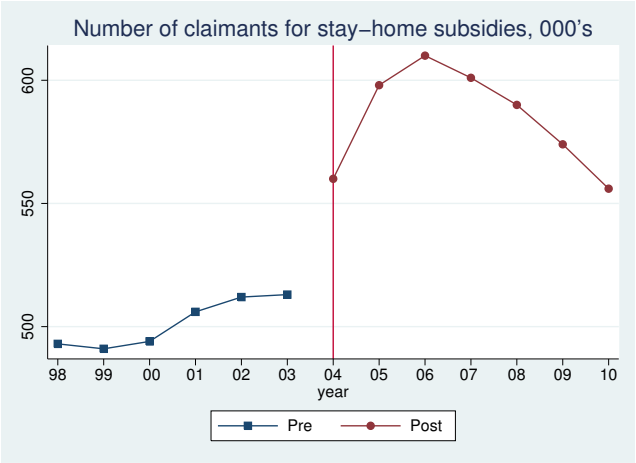

Figure 1.7: Number of claimants to the CLCA

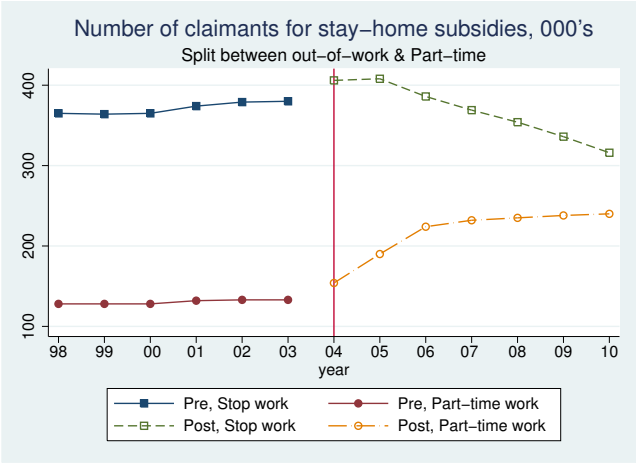

Figure 1.8: Number of claimants per component of CLCA

1.3.3 Labour supply of mothers:

Figures 1.9 to 1.12 should illustrate the points discussed above more clearly. They represent the employment rates and working hours of the demographic groups that responded most strongly. For each age/family size group I report the employment rates of mothers as a function of the timing of birth of the youngest child. We do observe an immediate fall in the employment of mothers who became eligible to the generous stay-home subsidies, and that drop was accentuated over time. The

[3]The increase by 15% in the amount transferred for the part-time work "stay-home" subsidies may also have pushed some mothers who were employed part-time but not claiming it, to take-up the income transfer without affecting their working hours.

employment rates of mothers of two children with the youngest aged between one and three years old responded to the policy with a certain delay. In neither groups, was the intensive margin of work affected. Similar graphs for the other demographic groups are reported in the appendix.

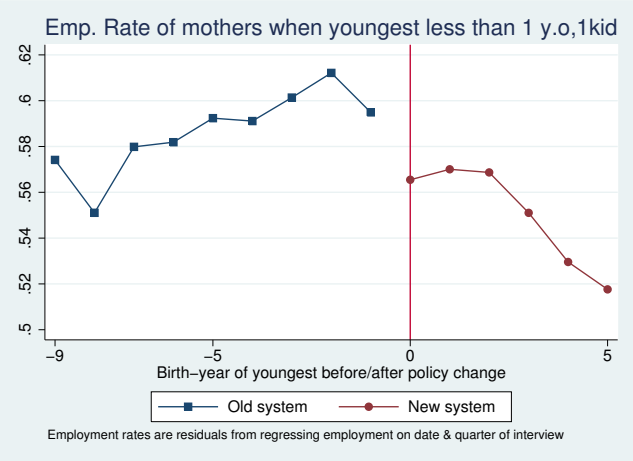

Figure 1.9: Employment rates for mothers of a first child (under one year old)

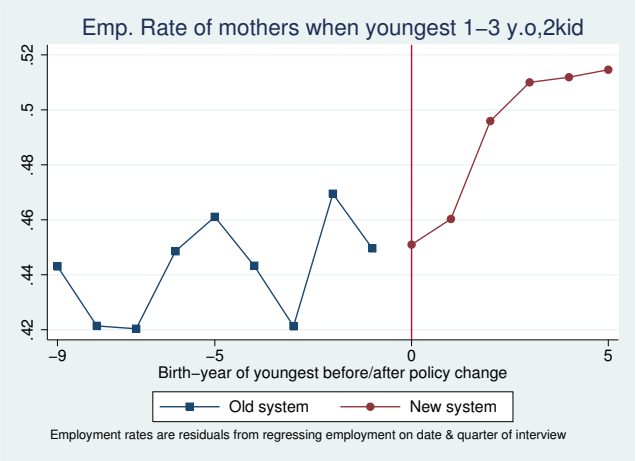

Figure 1.10: Employment rates for mothers of a second child (one to three years old)

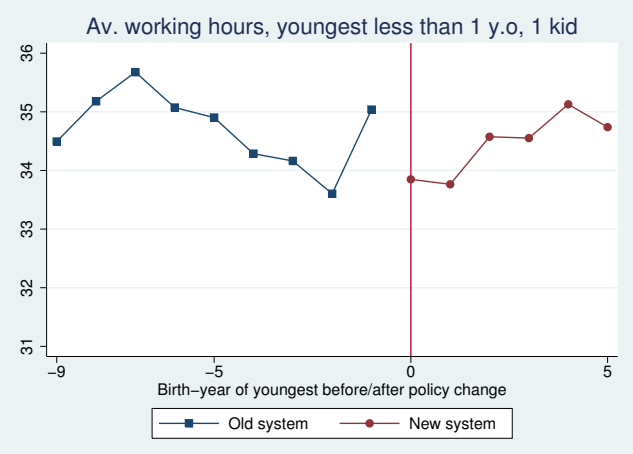

Figure 1.11: Working hours for mothers of a first child (under one year old)

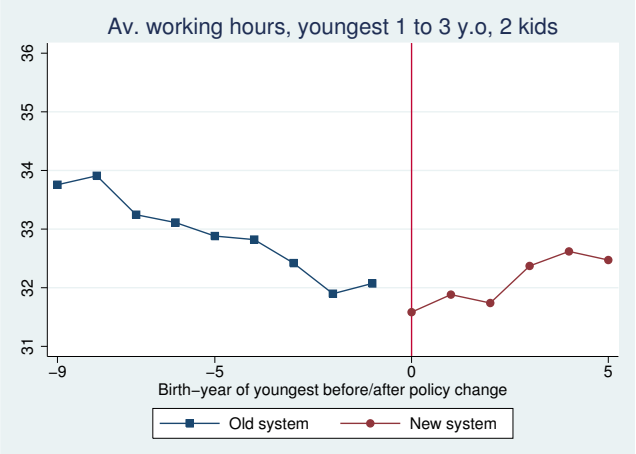

Figure 1.12: Working hours for mothers of a second child (one to three years old)

1.3.4 Fertility:

I use the population statistics from the INSEE to construct the indicators reported in this section. Unfortunately, the Enquete Emploi surveys are not precise enough to recover any interesting pattern[4]. The number of children born per 100 women aged 15 to 49 has been constantly rising between 1998 and 2010 in France (as shown in Figure 1.13).

This is particularly true for the number of first births per woman. The "stay-home" subsidies that now became available to this group of women may not have had any impact on their decision to start a family. The difference with the results in Piketty (2005) could be due to the much shorter duration of the program here (6 months versus three years in Piketty (2005)).

The picture is different for households with two or more children (Figure 1.15 and 16). The probability of having a second child was declining before 2004 and the trend was completely inverted after 2004. This also appears true (to a smaller extent) for the probability of having more than two children. It would be interesting to pursue a careful econometric study and highlight the statistical significance of the changes and the possible mechanisms at work, but this seems very challenging with the data at hand. The policy increased the number of middle-class eligible households to a birth-bonus and a monthly income transfer for the first three years of the child[5]. A few channels could explain a change in the attitude towards fertility of these mothers and might be identified with more information. For instance, the increase in second child births may be explained by women who took-up the "stay-home" subsidies with their first-child. Having experienced a long maternity leave, these women may not be worried about the prospects of longer time out of the labour force following the birth of another child. If that is the case, lower educated and poorer women would be the ones explaining that apparent change in natality. Another possibility would be a direct income effect. The newly eligible households experienced an increase in their potential

[4]The change in the data collection process from annually in February or March of each year to quarterly in 2003, makes it also difficult to build an exact and comparable measure of fertility indicators pre and post 2004.

[5]For example in 2007, this birth bonus was worth €855 and the monthly income transfer €172. As discussed above, the number of eligible households increased by about 15 percentage points due to a large increase in the income thresholds for claimants.

disposable income should they have more children than previously desired. The jump in natality should then be observed in the middle of the income distribution. Finally, the reform made it easier to combine work with different care arrangements. I show below that this was particularly true for mothers of two children. That could also have increased the probability of women to conceive a second (or third) child. That hypothesis may influence the fertility decisions of households along all the income distribution.

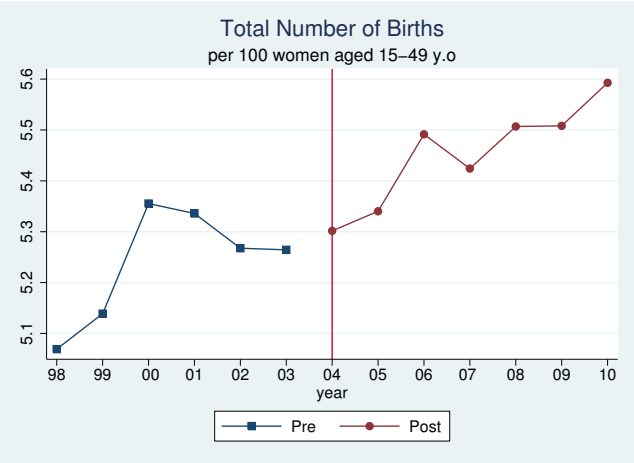

Figure 1.13: Number of births per 100 women aged 15 to 49

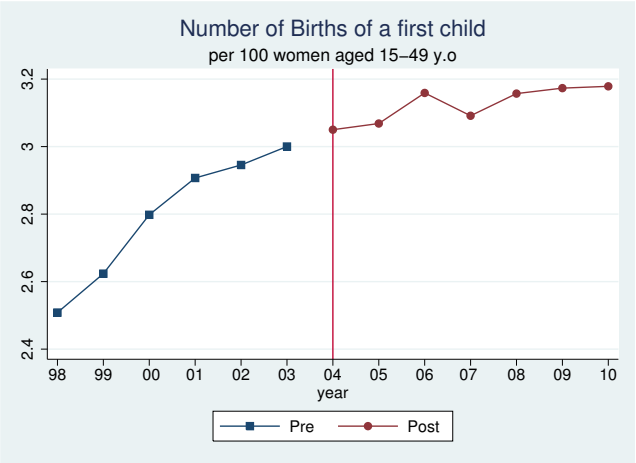

Figure 1.14: Number of first births per 100 women aged 15 to 49

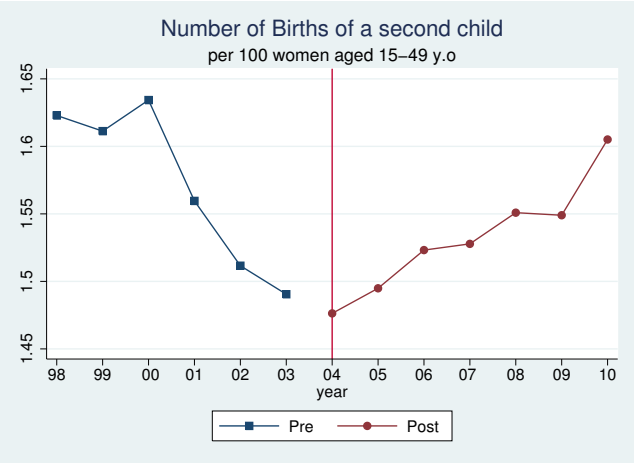

Figure 1.15: Number of second births per 100 women aged 15 to 49

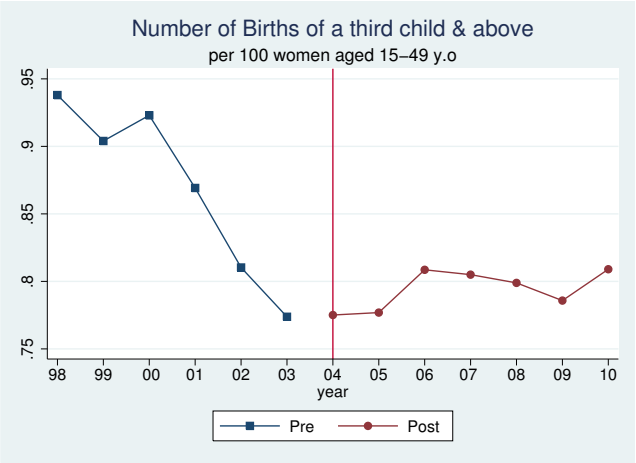

Figure 1.16: Number of third births per 100 women aged 15 to 49

1.4 The French subsidy system for pre-school aged children and reform details:

1.4.1 General presentation.

In France, children can enter school from the age of three, where they can be cared for all day. Households with dependent children generally receive a tax rebate called the "Quotient Familial" and unconditional children benefits (for families of two children and more). This chapter focuses particularly on the changes that occurred in 2004 to the benefits and childcare subsidies system for pre-school children. In France, mothers can take up to three months of maternity leave after a child's birth [6]. After that if they do not wish to go back to go work, they can stay out of work until the child (if he is not the first one) turns three years old (while being guaranteed by their employer a position when they decide to come back). They can claim a stay-home benefit in that case. While the child is too young to go to school, different care options are available. Around one in eight children is cared for in a kindergarten, about a third are looked after by professional nannies and the rest are using informal modes of care (usually family). The benefits directed at households with pre-school children (known as PAJE) are mainly composed of three elements:

1. A fixed income transfer that is means-tested but not tapered away (the "Allocation de base").
2. A stay-home benefit that is not means-tested (the CLCA or "Complement de Libre Choix d'Activite"). If the mother decides to stop work completely or to reduce her hours of work in order to look after the child, she would receive a fixed benefit every month (the benefit is higher if she stops work completely) unconditional of the household resources. In order to claim it, she needs to have been in employment for a minimum duration in the past.
3. Childcare subsidies to cover some of the costs incurred by using a professional nanny (CMG or " Complement du Mode de Garde") these are means-tested and

[6] The maternity leave is normally 6 weeks pre-birth and 10 weeks post-birth, but three weeks pre-birth can be substituted for 3 weeks post-birth, bringing the maximum duration to 13 weeks post-birth.

their generosity depends on the household's income bracket. They are slightly different if the nanny looks after the children in the family home ("Garde a domicile", only about 2% of children concerned) or the nanny cares for children for different families in her own home ("Assistante Maternelle", more than 30% of children concerned)[7].

Table 1.1 summarises how households were affected by the changes according to their demographics:

		Youngest child born			
		Before 2003: Old system		**2004 & After: New system**	
		3-11 months	*1-3 y.o*	*3-11 months*	*1-3 y.o*
1 child	*Stay-home benefits*	No	No	Yes	No
	Childcare subsidies	Yes	Yes	Yes, increased generosity	Yes,increased generosity
2 children	*Stay-home benefits*	Yes	Yes	Yes	Yes
	Childcare subsidies	Yes	Yes	Yes,increased generosity	Yes,increased generosity

Table 1.1: Summary of the policy changes on different household groups

1.4.2 The details of the reform.

On April 29th 2003, the government announced the changes to the system that would affect every child born after January 1st 2004. Mothers could not delay a pregnancy in order to enter the new system. The government modified all the benefits directed to households with pre-school children. The main changes could be summarised as follows: an increase in the generosity of the childcare subsidies that became conditional

[7]These childcare subsidies are also available for children between the age of three and six but are about half the value of those for children below three years old. Most of these children go to school, so these subsidies are less popular anyway. I have looked at this group, but did not find any significant impact of the subsidies'changes so I decided to focus only on pre-school children. The results for this group are available upon request.

on working, an increase in the number of eligible households to each type of benefit, and an increase in the amount transferred when a mother decreases her hours of work from full-time to part-time post-birth. I will now focus more specifically on each one of them. I also provide in the appendix two tables putting into perspective each aspect of the benefits and how they were modified [8].

1.4.2.1 Income transfer ("Allocation de base"):

Eligible families receive 171 € per month until the child's third birthday. Only households whose income is below a (household composition) specific threshold are eligible. For instance in 2006, the basic threshold (a couple with one child and one worker) was 32,328€ under the new system while it was 23,598€ in the old system. This increase in the "thresholds" augmented the percentage of eligible families by 15 percentage points in the population of interest. This change in thresholds affected mothers differently. For mothers of one child aged one to three, this may result in a shift out of the budget constraint resulting in a pure income effect. For mothers of two children, the effect is more subtle. I reproduce and discuss different budget constraints in the appendix (figures 1.29 to 1.36).

1.4.2.2 Stay-home benefits ("CLCA"):

Prior to the reform, these benefits were not available to women who had their first child. These transfers are not means-tested. Piketty (2005) studied the extension of these subsidies to mothers of two in 1994. In 2004, women who had their first child became eligible, but only for six months after the end of maternity leave. If the mother decreases her hours worked to 80% of full-time (28 hours a week), 50% of Full-time or stops work completely, she receives a monthly benefit of respectively 305, 404, 531€ (if she does not receive the income transfer "Allocation de base", if she does than 171 Euros are deducted from these transfers). The part-time payments were increased by 15% under the new system. The conditions on past work experience became more

[8] Note that in 2006, families where the youngest child is below three years old but born before January 2004 would still be on the old system. 2006 is the last year where such a situation would occur, and it is the reason why I choose to report the changes in thresholds and benefits for that particular year.

stringent (having worked for two years prior to the child's birth, within a time-frame that depends on the number of children already born).

1.4.2.3 Childcare subsidies:

First of all, the childcare subsidies were renamed the Complement de Libre Choix du mode de garde (Cmg). They became available exclusively to working parents (in 2006, to be eligible, you needed to work and have a monthly salary of at least 374 Euros for lone parents and 748 Euros if in couple). If your child is being cared for by a private carer (either "assistante maternelle" or "garde a domicile"), part of her salary is paid by the government (depending on household income), and 100% of the employer contributions are paid by the government if an "assistante maternelle" is used (only 50% of the employer contributions if "garde a domicile" used). A minimum of 15% of the employee's salary is paid by the household in any case. The daily salary of an "assistante maternelle" needs to be below 42,20Eur. per child. In the old system, the government would not pay part of the "garde a domicile"'s salary and the subsidies could be claimed by non-working households. The generosity of the subsidy paying a portion of the carer's wage varies according to three income thresholds and the number of children that are being cared for. Table 1.2 summarizes the thresholds and benefits in 2006 for couples with two incomes under the old and the new system:

Number of children		1		2	
System		Old	New	Old	New
First threshold	Income <	17,593	19,225	21,653	22,135
	Max.benefit per child	*218.62*	*374.75*	*218.62*	*374.75*
Second threshold	Income <	24,190	42,722	29,773	49,188
	Max.benefit per child	*172.87*	*267.69*	*172.87*	*267.69*
Third threshold	Income >	24,190	42,722	29,773	49,188
	Max.benefit per child	*143.24*	*160.60*	*143.24*	*160.60*
Note: The reported amounts are for couples in 2006					

Table 1.2: Income thresholds and childcare subsidies pre-post reform

1.4.3 Predictions from economic theory:

The neo-classical model of labour supply can be used to predict the reaction of mothers with young children to the policy changes. The new eligibility to the stay-home benefits should lead to a fall in the employment rate of mothers who had their first child (as long as the child is younger than 11 months old) through a strong income effect and particularly for low-earners. The more generous childcare subsidies should lead to an increase in employment and/or hours worked (conditional on the supply of carers increasing) for women everywhere along the income distribution. The increase in the incentives to work 28 hours could lead to a rise in employment combined with a fall in average hours worked. I find clear evidence of the impact of stay-home benefits and childcare subsidies on employment rates but no impact of the higher incentives to work part-time.[9]

The reform may also induce some behavioral response through other channels such as : habit effects (households get used to taking-up programs), continuation effects (mothers continue to stay out of work longer than the duration of the program), and

[9]The increase in the generosity of part-time work transfers was financed by making the past-work eligibility criteria more stringent

peer effects or changes in societal attitudes..

1.5 Results on labour supply choices using the Labour Force Surveys:

1.5.1 Baseline specification:

In this section I analyse the impact of the policy change on employment variables for mothers of young children. The data used in this section are the French Labour Force Surveys from 2001 to 2009[10]. The data sets contain detailed information on household demographics such as age of all the members, education levels, region of residence and very detailed descriptions of their employment status. The date of birth of the youngest child allows me to allocate the household to the treated and eligible or treated and non-eligible groups. I focus on households where the mother is above 18 years old.

As explained above, I focus only on households with children of pre-school age as they were the most affected by the policy changes. I focus only on households with less than three children. The benefit system was further modified for this latter group in 2006 and the employment decisions of large families may also be strongly affected by different considerations. I will try to estimate the short-run and long-run impacts of the policy using (respectively) a regression discontinuity and a diff-in-diff framework. There are many reasons to believe the magnitude (and even signs) of the effect may differ along different timescales. When focusing on the childcare subsidies, the supply of private providers may be fixed in the short-run and it may take a few quarters or years, for the private care market to settle to a new equilibrium (especially when the mothers competing for carers have access to two different subsidy systems of varying generosities). There could also be confusion in the short-run. Mothers with a child of

[10]Prior to 2003, the surveys were collected once a year and were called Enquete Emploi. In 2003, it was replaced by a quarterly rolling panel (Enquete Emploi en Continu) where each household was interviewed for six consecutive quarters. The procedure for data collection was very similar between the two surveys. I check that the results are not affected by any discrepancy in the data sets.

pre-school age would be eligible to different benefits depending on the child's birth. Women who previously had a child and would have received the old benefits, would be granted the new benefits, while the old benefits were still available to other households. Peer effects could also play an important role. Dahl et al (2013) find evidence that parents did not necessarily respond immediately to an extension of paternity leave in Norway. Mothers of one child, who could stay out of work longer than previously, may not dare to ask their employer at first. A positive feedback of co-workers and relatives who claimed these stay-home benefits may play a crucial role in the mother's decision. It might also be the case, that mothers anticipated the child arrival a few years ahead and smoothed their income according to the entitlements they would receive under the old system.

I run the regressions separately for households with one or two children. I further split these groups into one where the youngest child is between 3 months to one year old (the legal maternity leave duration is 3 months in France, so I omit observations where the youngest child is below 3 months old) and another one where the youngest is between one and three years old. As we saw previously, women who had their first child had strong incentives to stay home for six months after their maternity leave. Mothers might also combine the maternity leave with some normal vacation leave. As a precaution, I include women with a child up to 11 months old instead of cutting off mothers when the child is older than nine and half months old (13 weeks of maternity leave plus 26 weeks of stay-home benefits). I report the results for being employed as the policy appeared to have no impact on the choice of labour supply along the intensive margin across all groups.

In all the regressions, I include a set of control variables that are likely to affect the labour supply decision. These variables are: the education level, age and its square, age of the partner and its square, a dummy for being married, living in Paris, dummies for the quarter of interview, the age of the youngest child in months and a dummy if the youngest was less than two years old or six months old, and an age-group categorical variable. In the last sub-section, I run a battery of specification checks to ensure that the results found are not too sensitive to this baseline specification. The estimated parameters identify intention-to-treat effects.

1.5.2 Identification strategy:

1.5.2.1 short-run impact: regression discontinuity framework

To measure the effects of the policy in the short-run, I use a regression discontinuity framework.The regression takes the following form:

$$y_i = \alpha + 1[t \geq c](f_{post}(t-c) + \gamma) + 1[t < c]f_{pre}(c-t) + \beta' X_i + e_i$$

where $f()$ are functions controlling for different trends in the period before and after the policy (I will estimate f as a linear trend). The months before the policy change are represented as $(c-t)$, and after as $(t-c)$. The control variables X_i are the set of controls described earlier. The coefficient of interest capturing the impact of the policy is γ. I restrict the analysis to women with a child born within a 12 quarters window around the policy.[11]

1.5.2.2 Total impact: difference-in-differences approach

The intuition here is that of a diff-in-diff where the treatment group are mothers of young children and the control group mothers of older children (8-18 years old). The total impact of the policy can be recovered by comparing the outcomes of the treatment group in 2007,2008 and 2009 (three years after the policy implementation) versus 2001,2002 and 2003 with those of the control group during the same time-frame. Two reasons motivate the choice of such a large time-scale: if the childcare subsidy increased the demand for nannies, the private-care market would need a few years for the supply of licensed nannies to increase. More importantly, by 2007 no more mothers would be under the old benefit system for the groups of interest. The estimated parameter γ^{Total} is:

$$\gamma^{Total} = (y_T^{07-08-09} - y_T^{01-02-03}) - (y_C^{07-08-09} - y_C^{01-02-03})$$

[11] I have estimated the regression using local linear methods. The issue with that procedure was that the optimal bandwidth was either one or two months around the policy change. There are very few observations within that time window (about 100 on each side) and the estimates are very imprecise.

where the outcome variable y is a dummy equal to one if employed. To estimate that parameter, I run the following regression:

$$y_i = \alpha + \beta'_T Treated + \beta'_C Control + \gamma^{Total}(Treated * Control) + \beta'_x X_i + e_i$$

where the interaction term γ^{Total}captures the DID estimate, and the variables X are the set of controls described earlier, to which an interaction between the age group variable with a time-dummy is included to control for the different age structures of the control and treated groups.

1.5.3 Estimates from the baseline specifications:

Overall, the policy, significantly and strongly decreased the employment rates of mothers whose first child is younger than one by four percentage points in the short-run and up to nine percentage points in the long-run. When the only child was between one to three years old, this short-run effect was very similar but seems to have been attenuated in the long-run (resulting in no movement in the employment rate). Regarding mothers of two children, the policy also had no impact in the short-run but appears to have had a significant and positive impact in the long-run (nearly three percentage points) when the youngest was between one and three years old.

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Employment rates in 2003	.6695	.5251	.7042	.4846
short-run: RD estimates	-.0424*	-.0303	-.0409***	-0.0029
	(.0233)	(.0254)	(.0139)	(.0151)
N	5481	4910	14730	14034
Total impact: DID estimates	-.0897***	-.0429*	-.0088	.0270*
	(.0243)	(.0222)	(.0166)	(.0145)
N	29023	29948	36983	37398

Table 1.3: Policy impact on employment rates of mothers of young children

So far, the results are in line with the predictions from section 4 except for mothers of one child aged one to three years old. The effects of the policy took some time to fully materialise. In section 6, I will exploit some of the specificities of the policy design to better understand how the employment changes occurred between the short-run and the long-run (particularly for mothers of one child aged one to three).

1.5.4 Robustness checks and heterogeneous impact:

In this section, I run a battery of specification checks and report the results in the appendix. The first part is adding different controls to the baseline specification and clustering the standard errors at the treatment level (months of birth to the policy) for the regression discontinuity and at the time of interview for the difference-in-differences. The variables I add to the baseline specification are time dummies, a dummy to control for the fact that the collection of labour force surveys went from annual to quarterly in 2003 (Enquete Emploi became Enquete Emploi en Continu), or the local unemployment rates at time of interview. I try to control for the local availability and price of local childcare by adding time-regional dummies, and the distance of average nannies wages in the region to the national average in the years of observation. To better understand the possible heterogeneous effects of the policy,

I run the baseline specifications focusing only on high (high-school and more) or low education mothers, married or single mothers, mothers whose partner is a low-earner (wage below the median male wage) or high-earner (wage above the median male wage). Finally, to grasp the potential size and sign of the income transfers threshold changes on employment, I drop observations whose partner's earnings are in-between the old and new income thresholds.

For the regression discontinuity, I also modify the time-window to 8 quarters and 16 quarters around the policy change. In the DID specification, I check that the results are not sensitive to the choice of control group and also run the regression on a placebo group (mothers of children aged six to eight years old).

Looking at the regression discontinuity (Tables 1.13 and 1.14), the magnitude of the effects do not vary much with the different specifications. The significance levels seem to be more sensitive to the specification adopted though. Overall, the regression discontinuity may be too sensitive to the specification adopted to be able to conclude with confidence that the policy impact was statistically different from zero. In Section 6, I use another identification strategy to recover the short-run impact of the policy change. The results will be more precise and in line with what the regression discontinuity framework seems to imply.

The results of the Diff-in-Diff (Tables 1.15 to 1.16) hardly change with any of the checks. For mothers with two children whose youngest is below one. The fall in their employment rates stays significant in the majority of the alternative specifications, and its size is not affected. The impact was concentrated on low educated women whose partner is in the upper-half of the income distribution. This result may seem counter-intuitive at first, but these women probably do not have high incentives to stay in the labour market, and are now not afraid to claim the stay-home subsidies (either from seeing the experience of peers, or changing societal attitudes towards maternal leave). For women with two children where the youngest is one to three, high education, married women, and those with a high-earning partner respond positively and strongly to the policy while this is the exact opposite for low education mothers. In the group of mothers with one child younger than one, the policy has impacted strongly married women and not at all single women. For mothers of one child aged one to three, all the results are in line with the main estimates. Only the case of

single mothers appears an outlier. One should be careful in trying to interpret too much out of it, the result is entirely driven by a few single mothers aged above 40 (the exclusion of these hundred observations) cancels all the apparent effect.

1.5.5 Habit effects:

To investigate further the overall negative response of mothers with two children whose youngest is below one, I define "habit" effects as one's habit to claim benefits. Here, it is possible that the women who received the stay-home subsidy for their first child were more likely to stop working and take-up these subsidies once they had a second child. Having experienced a period out of the labour force already, they may feel more inclined to repeat the experience at the birth of a second child. To separate this indirect effect of the policy from the direct impact of benefit changes, I separate women with two children (whose youngest is of pre-school age) between those who would be eligible to the childcare subsidies but did not have the possibility to take long-leave at the birth of the first child, with those who could have. The first group is composed of women whose second child was born post-2004 but their first child was born pre-2004, while the second group is composed of women whose second and first child were born post-2004. Figures 1.17 and 1.18 do not seem to show the presence of any of these effects. Whether women took-up the stay-home subsidy and six-months leave after the birth of the first child does not appear to play a role in their decision to leave employment and claim these subsidies at the birth of a second child. It is very challenging to identify such a mechanism with a difference-in-difference framework as no control group can be easily found. I run a regression discontinuity and a simple difference with a similar specification to the ones above to check that the birth year of the first child had no impact on the employment decision at the second child's birth. I report the results in Table 1.23 in the appendix.

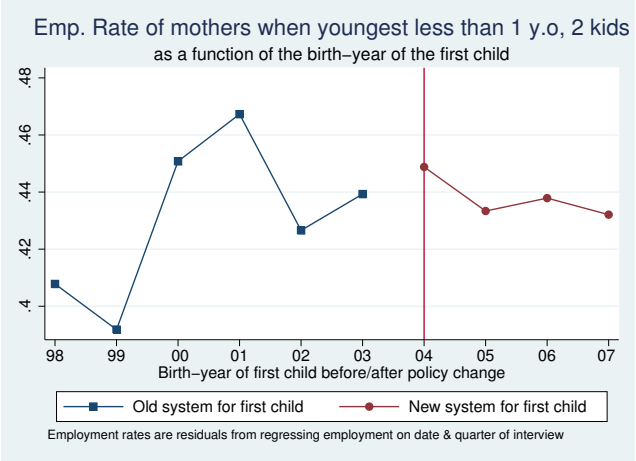

Figure 1.17: Employment rates of mothers of two children, youngest below 1 y.o

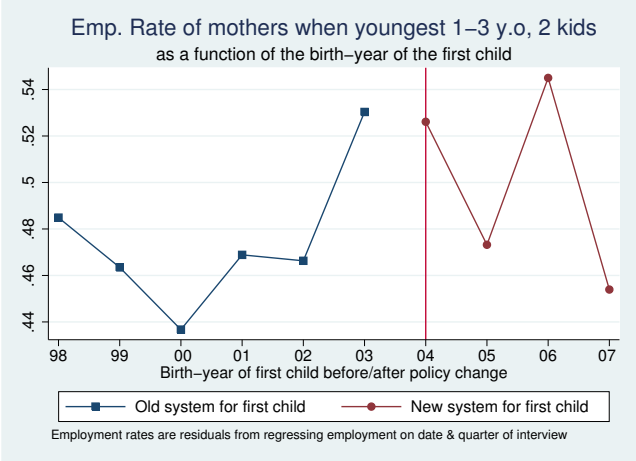

Figure 1.18: Employment rates of mothers of two children, youngest 1 to 3 y.o

In the next section I evaluate the differences between the short-run and final impact of the policy further. To shed some light on what may have occurred in the immediate years following the introduction of the new benefit system, I estimate the policy impact with a different approach.

1.6 Decomposing the short-run and long-run further:

1.6.1 The short-run impacts:

The design of the policy allows me to recover what I will call the "direct" and "indirect" impacts in the short-run. In the years following the policy, mothers of a certain group would be receiving different benefits and subsidies while on the same labour and childcare markets. I can then recover the impact of the policy on these "treated" mothers receiving the policy ("direct impact") by comparing them to the "treated" group not receiving the policy ("indirect impact"). This last group ("treated but not receiving the policy") could be thought as a placebo group, checking that we are truly identifying the effects of the policy. Once again, I will use a control group (mothers

of older children) to infer what would have been the outcome of the "treated but not receiving the policy", if nothing had changed in the institutional environment.

The two graphs illustrate the idea:

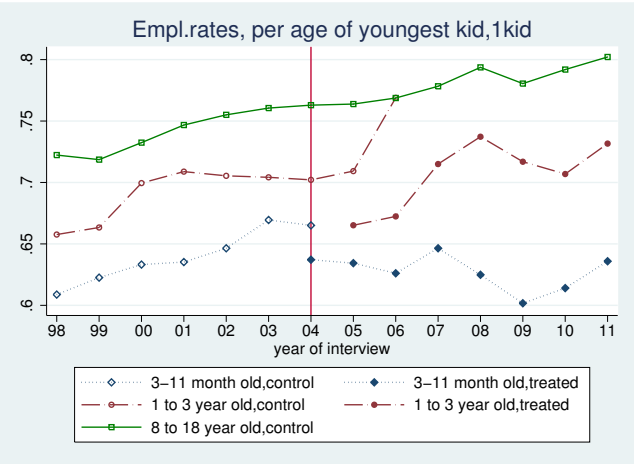

Figure 1.19: Employment rates of first-time mother, by treatment status

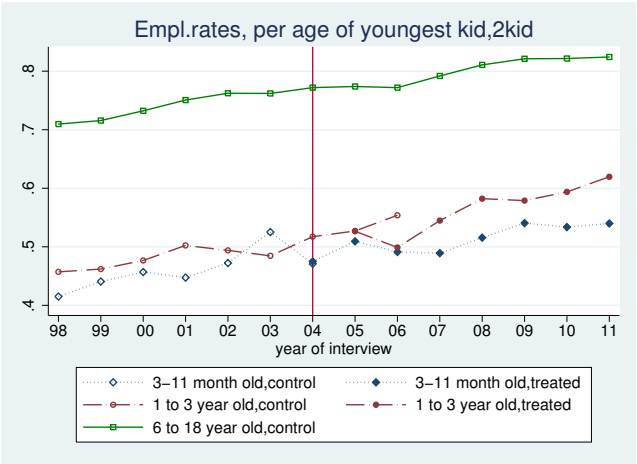

Figure 1.20: Employment rates of mother with two children,by treatment status

An example might clarify matters. Let's focus on the group of mothers with a child between one year-old and three years old in Figure 1.19. In January 2006 say, the mothers with children below twenty-four months old would be on the new policy, while those with children above twenty-four month old would be on the old policy. The difference in employment rates between these two groups is what I call the "direct" impact. The difference in employment rates between these mothers with children above twenty-four months old and its "hypothetical" employment rates (inferred using an unaffected control group) is what I call the "indirect" effect. So, I define the short-run period as the time where the group of mothers with pre-school children could be split between eligible and ineligible mothers. Evaluating the "indirect" effect is done through a DID technique, while the "direct" effect is evaluated through what I call a quasi-DDD (triple differences). Because, I cannot separate the treatment group between eligibles and non-eligibles in the pre-policy period, but I can in the short-run post-policy period, this estimator takes the form of a modified triple difference in differences (comparing the outcomes of only two groups in the pre-period and three

groups in the post-period).

More formally, the parameter estimated for the "indirect" effect in the short-run is a usual DID:

$$\gamma^{SR,2nd\,order} = (y_{T,no\,policy}^{04-05-06} - y_T^{01-02-03}) - (y_C^{04-05-06} - y_C^{01-02-03})$$

where the control group are mothers of children aged 8 to 18 years old. The specification of the regression is the same as the baseline one described in section 5.

The parameter capturing the "direct" effect in the short-run can be represented as:

$$\begin{aligned}\gamma^{SR,1st\,order} &= [(y_{T,policy}^{04-05-06} - y_T^{01-02-03}) - (y_{T,no\,policy}^{04-05-06} - y_T^{01-02-03})] \\ &\quad -[(y_{T,no\,policy}^{04-05-06} - y_T^{01-02-03}) - (y_C^{04-05-06} - y_C^{01-02-03})]\end{aligned}$$

I run the following regression:

$$\begin{aligned}y_i &= \alpha + \beta_T' Treated + \beta_P' Post + \beta_{paje}' Paje + \beta_{PT}'(Post * Treated) \\ &\quad +\gamma^{SR,1st\,order}(Post * Treated * Paje) + \beta_x' X_i + e_i\end{aligned}$$

where the variable $Post$ is a dummy equal to one if the observation is in the period after the policy change (after January 2004), $Treated$ is a dummy for mothers of young children, $Paje$ is a dummy equal to one if the mother is under the new system. The triple interaction term allows me to estimate the "direct" impact of the policy in the short-run through the parameter $\gamma^{SR,1st\,order}$. As explained earlier, this could be thought of a triple difference-in-difference, where the observations of two groups cannot be differentiated in the period prior to the policy ($Post * Paje = Treated * Paje = Post * Treated * Paje$).

1.6.2 The long-run impact:

I estimate how the policy affected the behaviour of mothers with young children once everybody in that group was under the new policy. I basically run a DID where the

treatment group are mothers of young children receiving the new benefits, the control group are mothers of older children. The "pre"- period represents the years when both types of policies were still available (2004-05-06). The "post"-period, the years 2007-08-09. This should capture the difference between the total impact of the policy recovered in section 5 and its short-run effects.

$$\gamma^{LR} = (y_{T,policy}^{07-08-09} - y_{T,policy}^{04-05-06}) - (y_{C}^{07-08-09} - y_{C}^{04-05-06})$$

The regression for that DID follows the baseline specification discussed in section 5.

1.6.3 Summary of the results:

Table 1.4 reports the estimates from the regressions described above:

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
short-run: Treated				
quasi-DDD estimates	-.0384*	.01266	-.0291***	.0012
	(.0204)	(.0224)	(.0105)	(.0114)
N	28692	28859	36182	36406
short-run: Non-Treated				
DID estimates	.0160	.0183	.0343*	.01309
	(.0323)	(.0331)	(.0177)	(.0159)
N	26117	26593	33307	33611
long-run: Treated				
DID estimates	-.04759**	-.0353	-.0103	.0250
	(.02291)	(.0222)	(.0181)	(.0169)
N	28042	33716	33181	38702

Table 1.4: Short-run and long-run impact on employment rates

The short-run estimates of the policy using the quasi-DDD method are very close to what was found in section 5 using a RD method. Mothers of one child between one and three years old did experience a strong fall in employment rates, which is likely

due to mothers not coming back to work immediately at the end of the stay-home subsidies period.

Overall, the "indirect" effect on the placebo group of treated non-eligible mothers is null for all groups except for mothers of one child between one to three. When not controlling for different trends by age groups, this estimate is essentially zero. It is also interesting to note that the magnitude of the impact on non-eligible mothers is nearly the opposite as that of eligible mothers. This could suggest that the mothers leaving employment as a result of the policy were replaced by mothers not eligible to the new policy in the short-run.

The long-run effects are interesting, as they confirm what the results of section 5 suggested. For mothers of a single child younger than one, the negative impact on employment rates of the stay-home subsidies can be equally split between an immediate fall in employment rates of around four percentage points, which is accentuated in the long-run by an extra-fall of about five percentage points. For mothers of one child between one and three, in the long-run the policy eventually had no more impact on employment rates. This can be explained by the effect of childcare subsidies with a slow adjustment of the care providers' supply causing the delay and counteracting the negative continuation effect of mothers slowly coming back to work after taking leave.

1.6.4 Robustness checks and heterogeneous impact:

For each of the regressions above, I ran a battery of specification checks similar to the ones in section 5. For clarity, I report the results in Tables 1.17 to 1.22 in the appendix, but summarise the main points here.

1.6.4.1 Short-run:

In the short-run the conclusions using a diff-in-diff framework on eligible mothers are the same as when using a regression discontinuity design. The results for women with one child aged one to three appear counter-intuitive at first. High educated women's employment fell but not that of the low educated. The employment fall was concentrated among mothers with a low-earning partner. The budget constraint in Figure

1.21 illustrates how the low educated mothers living with a high-earning partner were affected by the change in income transfer thresholds. These changes created higher incentives for them to work full-time as reflected in the budget constraint below. This explains why once the group potentially affected by the changes in that income transfer is removed from the sample, the policy impact estimate becomes even more negative. This evidence is then perfectly consistent with the existence of continuation effects.

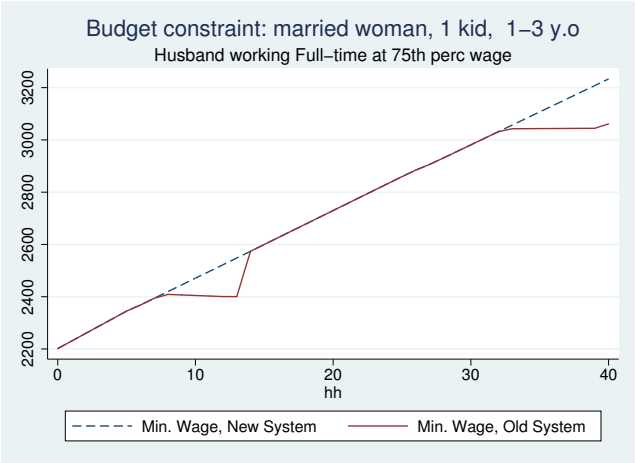

Figure 1.21: Budget constraint for first-time married mother at minimum wage with husband's wage at 75th percentile

When analysing the behavior of non-eligible mothers in the short-run, the jump in employment observed for mothers of a child aged between one and three is concentrated among the highly educated women with high earning partners, which is the mirror of the reaction for the same group of women who were eligible to the new system. This suggests some substitution by employers between non-eligible women and eligible women. As eligible women take-up leave and do not immediately come back to employment, employers substitute them with non-eligible women of the same characteristics. This is also consistent with the sensitivity of the employment jump for these non-eligible women to the inclusion of dummies controlling for potential changes in age-group specific labour markets discussed above.

1.6.4.2 Long-run:

For mothers of a child below one, in the long-run, the fall in employment rates was concentrated among highly educated women and those with a partner in the top half of the wage distribution. Remember that in the short-run, it was the low-educated, low-wage partner group that responded to the policy. This implies that the policy may have had trickle-up effects. The mothers most financially affected (bottom of income distribution) take-up the program immediately, while mothers less sensitive to financial incentives but more concerned by peers and employer reactions slowly respond to the opportunity to take longer leave.

When the child is above one, despite the apparent absence of any impact on aggregate, there appears to be a lot of variation in the response to different components of the policy. When decomposing further the policy impact by education and partner's income quartile the results appear mixed[12]. On the one hand, low educated women responded (very strongly) negatively when their partner had a wage in the top quartile of the distribution. This is explained by the income effect from the income transfers thresholds changes, and is illustrated below in the budget constraint of Figure 1.22. On the other hand, among highly educated women, the fall in employment was strongest when the husband was in the third quartile of the wage distribution which is where the income transfers should have given them incentives to work full-time and not stop work (as apparent in the budget constraint of Figure 1.23). The high-educated women are also the ones who started taking-up the stay-home subsidies in that period of time, suggesting that the continuation effects dominated the incentives to work full-time the income transfers may have created. Those highly educated women whose husband was in the top quartile of the wage distribution ended up facing higher incentives to stop working (as shown in the budget constraint of Figure 1.24) and also decreased their employment rate. For this group of mothers the continuation effects were potentially amplified by the income transfers impact on outside work income. The women who were not susceptible to continuation effects anymore and income transfer changes (low earner partner, single) increase their employment significantly suggesting that childcare subsidies had an impact on their decision to work.

[12]I do not report them here, but they are available upon request

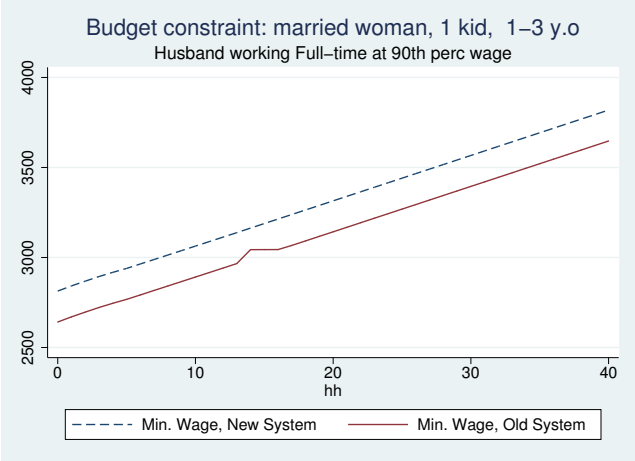

Figure 1.22: Budget constraint for first-time married mother at minimum wage with with husband's wage at 90th percentile

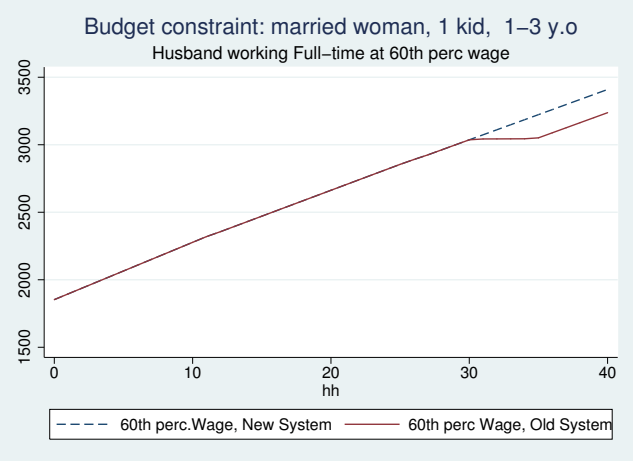

Figure 1.23: Budget constraint for first-time mother, both partners at 60th percentile wage

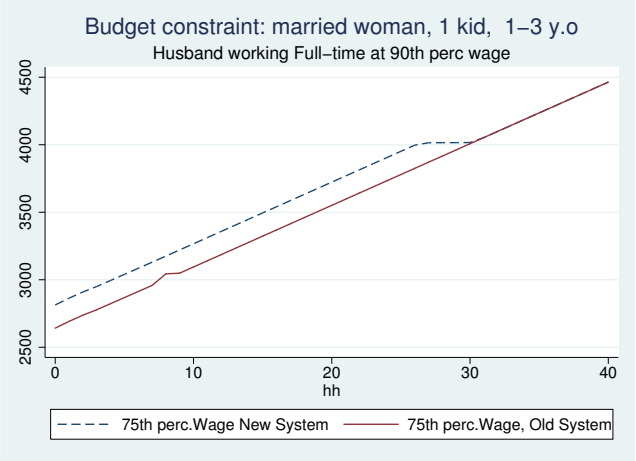

Figure 1.24: Budget constraint for first-time mother at 75th percentile with husband's earnings at 90th percentile wage

For mothers of two children, whose youngest is below one, the impact is similar across all groups. When the youngest is above one, highly educated and married women respond strongly and positively to the policy. Reassuringly, when dropping women who were most likely to be affected by the income transfer thresholds changes, the

overall policy impact increases and becomes strongly significant, suggesting that the childcare subsidies did have a strong positive impact on the employment of this group of mothers.

1.6.5 Summary of the findings out of the Labour Force Surveys:

Table 1.5 below summarises the impact of the policy on each group in every time period, and can be interpreted as follows:

- 0-1 year old, 1 child in the household: Overall a very strong negative impact (about nine percentage points in employment rates), explained by a negative impact in the short-run especially for poorer households and an extra negative impact in the long-run coming from better-off households. This could be explained by first-time mothers not daring to use their right to leave work and learning overtime how employers react. These mothers do not respond to childcare subsidies but to the generous increase in stay-home benefits to which this group was not eligible prior to the reform.
- 0-1 year old, 2 children in the household: Overall negative impact materialising in the long-run (about four percentage points in employment rates). These women were eligible to more generous childcare subsidies and faced no changes in their incentives to stop work. The negative employment effect is particularly strong for low educated mothers with a high-earner partner. These women would have little reason to stay attached to the labour market and may have not dared to take-up leave previously, because of social stigma or peer pressure. We saw that a significant number of women who just had their first child increased the duration of their leave after birth by claiming the stay-home subsidies. This might have also impacted women who just had a second child, to claim the stay-home benefits.
- 1-3 years old, one child in the household: Small non-significant negative impact overall (slightly under 2 percentage points in employment rates). A strong negative impact in the short-run compensated by no impact of the policy in the long-run (probably caused by the increments in childcare subsidies generosity canceling out the continuation effects of mothers who took-up leave following

birth). The negative impact comes from mothers in couples of a child aged between one and two[13], in the same groups as those taking-up the stay-home subsidies. This strongly suggests mothers don't go straight back to work after receiving the stay-home benefits. I will find evidence of it in the last section of the paper.

- 1-3 years old, two children in the household: Significant overall positive impact of the policy (about 4 percentage points), non-significant in the short-run but significant in the long-run. The women most affected by the increase in childcare subsidies generosity responded most strongly.

The childcare subsidies mainly affected positively mothers with children aged between one and three years old, while the stay-home benefits mainly affected negatively mothers with children younger than one year old. To try to understand better the mechanisms behind these findings, I now use another data set with extensive information of labour supply and childcare decisions as well as family income. This data was collected in 2002 and 2007 specifically to evaluate the impact of the Paje policy changes. It allows me to shed some light on the existence of continuation effects, and on changes that occurred in the childcare market.

[13]I ran the regressions on this demographic group splitting further into mothers with a child aged one to two and mothers aged with a child aged two to three.

Age of youngest	3-11 months old		1-3 years old		
Num. children	**1**	**2**	1		**2**
Short-run:	Overall fall	.	Overall fall		.
Mechanism	*Take-up of stay-home subsidies*	.	*Continuation effects*		.
Groups responding most	*Low educated, low earner partner*	.	*All, except low educated with high earner partner.*		.
Short-run: (not treated)	.	.	Overall rise		.
Mechanism	.	.	*Substitution for newly eligible out of work*		.
Groups responding most	.	.	*High educated with high earner partner*		.
Long-run:	Overall fall	Overall small fall	Overall none:		Overall rise:
			negative	positive	
Mechanism	*Take-up of stay-home subsidies*	*Peer effects/social stigma*	*Continuation effects*	*Childcare subsidies*	*Childcare subsidies*
Groups responding most	*High educated,married, high earner partner*	*All*	*High educated,married, high earner partner*	*Low earner partner*	*High educated,married*
Total impact:	Overall fall:	Overall fall:	Overall None		Overall rise:
Mechanism	*Take-up of stay-home subsidies, trickle-up effects*	*Peer effects/social stigma*	.		*Childcare subsidies*
Groups responding most	*Low educated, low earner first, then high educated, high earner*	*Low educated with high earner partner*	.		*High educated,married*

Table 1.5: Summary of impact on employment rates

1.7 Understanding the mechanisms using childcare surveys:

In this section, I use the Enquetes mode de garde that were collected in 2002 and 2007. I exploit the information on type of benefits claimed, and other demographics, to understand how the benefit changes affected the employment outcomes of different groups. The detailed information on childcare arrangements and employment status also allows me to find out if there was any crowding out in the childcare market and how the policy impacted the mix of care modes between different types of households. To investigate these questions, I will follow a strategy similar to Gruber et al (2008). I estimate $Pr(Work\,and\,using\,caremode_j)$ as well as $Pr(No\,work\,and\,using\,caremode_j)$ (for $j = subsidised\,private$, $kindergarten$, $other$) pre and post reform. I only have data for the years 2002 and 2007 and do not have a control group, so can only estimate a simple difference. I find that mothers of two children benefited the most of the childcare places that were freed thanks to the reform.

1.7.1 Data description:

The surveys were collected by the DREES in May 2002 (before the policy change) and November 2007 (what I call the "long-run" period, when no more households with pre-school children were eligible for the old benefit system). Both surveys are a cross-section of the population and interviewed (respectively) 3343 and 8177 households with at least one child younger than seven and a half years old. Each household was asked about their total disposable income as well as details on all the benefits they were receiving. These surveys were designed to understand how households used different types of care and how this changed with the reforms of 2004. Very specific information was collected on time spent in each mode of care during one week. Information on gross costs as well as net costs was reported. The survey also contains demographic variables such as the age of the parents, the date of birth of all the children in the household, the education level of the parents. Unfortunately it does not report any information on wages, even though it does report the employment

status of the parents.

1.7.2 Continuation effects:

I call "continuation" effects the possibility of extending one's stay outside of employment after the expiration of stay-home subsidies. Mothers do not need to have an employment contract when they take-up the subsidy, they need to have worked eight quarters in the last three years. In sections 5 and 6, the fall in employment rates of mothers with one child aged one to three appeared puzzling. I mentioned that the drop appeared to be driven mainly by mothers with a child below the age of two. This suggests that many women did not necessarily return to work once their stay-home subsidy had expired. The Enquete Mode de Garde asks respondents if they previously claimed that subsidy, and when they did so, how long it took them to start work once they were not eligible. Tables 1.6 and 7 report their answer. We observe that a much higher proportion of women did not get back to work immediately among the mothers of one child as opposed to the ones with two children (and stayed out of work longer). About 13% of claimants with one child did not get back to work immediately while the number is about 6% for mothers of two children. This confirms the existence of "continuation" effects that would explain why the employment rates of mothers whose youngest and only child was older than one fell after the extension of the stay-home subsidies in 2004.

	Went back to work at end of subsidy		
	Immediately	Eventually	Not at all
One child	.6233	.1273	.2493
Two children	.6890	.0579	.2530

Table 1.6: Mothers that received the full-time "stay-home" subsidy

	Number of months	
	Median	Mean
One child	3	6
Two children	3	4.5

Table 1.7: Time spent before returning to work if not immediately

1.7.3 Changes in the work and childcare arrangements across demographic groups:

To understand how the childcare arrangements and work decision changed between 2002 and 2007, I first report the raw statistics in the Table 1.8 below. On aggregate, the distribution of childcare choices has not changed a lot between 2002 and 2007. As we saw in the previous section, more mothers entered the labour force, but as reported in the graphs in the introduction, the number of places available in kindergarten and through assistantes maternelles, also increased in that time period in similar proportions. Some children might be allowed to join school as early as two years old, but this is extremely unusual.

%	**Working mother**		**Non-working mother**	
	2002	*2007*	*2002*	*2007*
Assist. Mat.	32.6	31.6	2.1	2.0
Garde Dom.	1.9	2.1	0.3	0.0
Kindergarten	15.5	15.1	0.8	1.9
School	1.4	2.3	0.1	1.0
Other	48.7	48.8	96.8	95.1

Table 1.8: Main childcare modes, children aged 0 to 3 y.o

When splitting the data a little further across demographic and work-status groups in Table 1.9, it becomes apparent that the policy was successful at freeing places among private carers by making non-working mothers ineligible. Nevertheless, the

increase in available places was not sufficient. The newly working mothers (following the structural trend) kept using other modes of care and kindergarten, keeping the overall distribution of childcare modes very similar to pre-2004. It appears, that mothers with one child were crowded out in kindergarten by mothers with a second child. This may be due to priority being explicitly given to siblings in kindergarten . It is very likely that priority is also implicitly given by private carers to siblings.

Youngest 1-3 y.o		2 kids		1kid	
		2002	**2007**	**2002**	**2007**
Work	*Private carer*	17.3	22.0	26.1	29.3
	Kindergart.	5.2	9.3	15.5	12.9
	Other	25.1	30.2	32.8	37.8
No Work	*Private carer*	1.1	0.7	2.9	1.3
	Kindergart.	0.2	0.9	0.4	0.9
	Other	52.1	35.8	22.4	17.8
	Total	100%	100%	100%	100%

Table 1.9: Proportion of mothers in each state

To check these predictions, I run a simple difference regression (unfortunately no obvious control group exists as childcare choices mainly affect mothers of pre-school children). For each household category, I run the following regression:

$$Pr(Work_i \& Childcare_{ij}) = \alpha + \gamma' Post + \beta' X_i + e_i$$

where $Childcare_{ij}$, represents the main childcare mode j used by household i. *Post* is a dummy equal to 1 if the observation was after the policy change, and X_i is a vector of controls (education, age of the mother and its square, the age in months of the youngest child, as well as a dummy if married and in couple). I look at three main modes of care: private carers (assistantes maternelles and garde a domicile) that was affected by the reform, kindergarten (creches) and other. The results are presented below in Table 1.10.

	1 kid	2 kids	1 kid	2 kids	1 kid	2 kids
	Pr (Work & Private carer)		Pr (Work & Kindergarten)		Pr (Work & Other)	
youngest 0-1 y.o	-0.013	-0.027	0.003	0.019	-0.036	.0930**
	(0.047)	(0.033)	(0.033)	(0.022)	(0.052)	(0.041)
youngest 1-3 y.o	0.015	0.026	-.0355*	.0323**	.0580**	.0659**
	(0.025)	(0.022)	(0.019)	(0.015)	(0.027)	(0.026)
	Pr (No work & Private carer)		Pr (No work & Kindergarten)		Pr (No work & Other)	
youngest 0-1 y.o	0.0054	-.0204***	-.0265**	0.007	0.067	-0.067
	(0.0077)	(0.0071)	(0.011)	(0.007)	(0.047)	(0.044)
youngest 1-3 y.o	-.0150**	0.0054	0.008	.0103**	-0.031	-.1396***
	(0.0074)	(0.0044)	(0.005)	(0.004)	(0.021)	(0.026)

Table 1.10: Probability of employment and childcare choices post vs pre-reform

From this exercise, we can conclude the following:

- A significant fall in the probability of using kindergarten for mothers of one child and an increase for mothers of two children, independent of their work situation.
- A significant fall in the probability of using private carers while not working induced by the modification in eligibility rules to subsidies (now available exclusively to working mothers).
- For mothers with a child aged one to three years old (irrespective of the number of children), the probability of working and using other modes significantly rose. The probability of working and using private carers rose (although the impact is not statistically significant and bigger for mothers of two children).
- Regarding the group of mothers with two children whose youngest is one to three, the probability of working and using kindergarten increased strongly. Overall, more of these mothers work in 2007, they increase their use of every possible mode of care.

1.7.4 Summary from the childcare survey findings:

The results from section 5 and 6 strongly suggested that mothers who claimed the leave benefit after their first birth, did not necessarily go back to work immediately at the benefit expiration. I found clear evidence of this type of continuation effects in the childcare surveys.

The evolution of the childcare market three and a half years after the policy implementation can be summarised as follows:

- Private carers became less used by non-working mothers and more by working mothers. This is a direct consequence of the childcare subsidies becoming conditional on employment. The number of available places also generally rose, following the pre-policy trend.
- Mothers of two children increased their use of kindergarten in general, they also dramatically increased their participation and as a result their use of all possible types of care.
- Working mothers of one child had to compensate the loss in places in kindergarten taken-up by mothers of two children. They replaced it with some of the "freed" and new places of private carers (when these were not already taken by mothers of two children) and other modes of care.

1.8 Conclusion:

In the period under study (the first decade of the 21st century), the employment rate of women in France generally increased. The extension of stay-home income transfers following a birth to mothers of one child, negatively affected (directly and indirectly, probably through peer effects) the employment decision of mothers whose youngest child was below one. This effect was particularly strong in the bottom half of the income distribution at first, and then trickled up in the long-run to mothers higher up in the income distribution. The increase in childcare subsidies generosity, did not affect the overall distribution of childcare modes used by mothers of pre-school children. Restricting access to subsidies to working mothers, while the total number

of private carers kept increasing according to its pre-2004 trend, ensured that no extra shortage of childcare would appear on aggregate. By freeing some places used by non-working mothers and making it more affordable to choose a private carer, the policy pushed more mothers of two children where the youngest is between one and three to work. Some of these mothers, when not working, switched from private carers (subsidised but now conditional on working) to kindergarten (not work dependent and priority for siblings). These two mechanisms crowded out some working mothers with one child. These mothers could not compete with mothers of two children for places (especially since price paid for care is bounded above and below by government regulation, restricting price adjustments in the market and forcing the allocation of restricted places to depend on other rules likely to be sibling priority or customer history). When combined with continuation effects, the policy ended up impacting their employment rates negatively in the short-run but having no impact in the long-run.

A quick back-of-the-envelope calculation suggests that the childcare subsidies reform was not close to self-financing. In 2009, the total amount spent on the private carers subsidies by the government was €4.6 Billion while the figure stood at €2.3 Billion in 2003. Adjusting for inflation and the rising trend prior to the reform (due to an increase in women's participation rate in the economy), the reform probably cost around €1.1 Billion. We saw that it increased the employment rate of mothers with two children whose youngest is one to three by around 3.8 percentage points. In 2009, there were about 400,000 women in this category. So the reform pushed about fifteen thousand women to work in that group. For mothers whose only child is of the same age, the impact of the reform on aggregate was null. But we saw that in the long-run, some mothers increased their leave period (as a result of continuation effects), while others did join the labour market, the two effects canceling out. A generous estimate of the childcare subsidies impact on that group would be in the neighborhood of four percentage points [14] ,this represents roughly eighteen thousand jobs. So overall the reform pushed thirty-three thousand women to work at a "cost" of €1.1 Billion, or

[14]To estimate (roughly) the jobs created by the childcare subsidies in the long-run, one could argue that continuation effects decreased the employment rate by four percentage point (as in the short-run) so that the childcare subsidy would have increased the employment rate by four percentage points.

an average cost per new job of €33,333[15]. We saw that the reform did not affect the intensive margin of work, so using the average net wage of the group, hours worked and my tax-schedule simulation, these women's productivity (total cost to employer) was on average €34,000 a year . It is very likely that these women would have started work once their youngest child started school at the age of three (the employment rates of mothers whose youngest is older than three was not significantly affected by the reform), so the dynamic and lifetime gains in terms of human capital accumulation are probably limited.

This paper showed that offering generous maternal leave income transfers pushes women out of employment, not only through the usual income effect, but also through peer effects and continuation effects (extending the time out of work once the benefits expired). Having taken-up the leave program for the first child does not seem to impact the probability of leaving work again at the birth of a second child (the absence of such habit effects could be explained by the relatively small duration of the permitted leave). It also highlighted the difficulty of providing access to universal child care with policy instruments such as childcare subsidies for private carers. Availability of public childcare places as an (imperfect) substitute to private carers, and priority rules (ether explicit or implicit) favouring households with certain characteristics (such as number of siblings), can lead to crowding-out even among working mothers. As a result, childcare subsidies to private carers may not be the most cost-effective way to push mothers' employment rates up. Further research on the effectiveness of other modes of care such as public kindergarten and early-age school would be welcome.

In the next chapter I develop a structural labour supply model for married women. I will use the reduced-form estimates of the policy impact to check the validity of the estimated model. This will also allow me to separately disentangle the effect of each policy change.

[15]This might be might an upper-bound as I did not look at the impact on households with three children and more who represent about a fifth of households with pre-school children. The reform also impacted households whose youngest is three to six years old who could claim these childcare subsidies. But this latter group did not respond to the reform. In 2003, 260 thousand children aged three to six were receiving the subsidies, and 278 thousand in 2009 according to DREES. These numbers for pre-school age children are respectively 512 thousand and 586 thousand.

Appendix:

Labour Supply of mothers with two (youngest below one) children, and one child aged one to three:

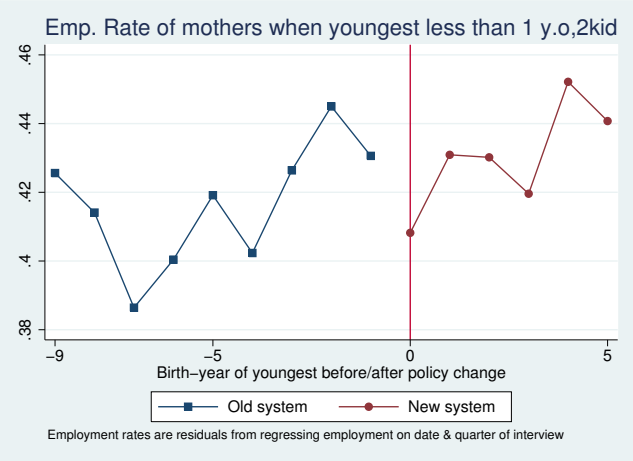

Figure 1.25: Employment rates for mothers of two children (youngest under one year old)

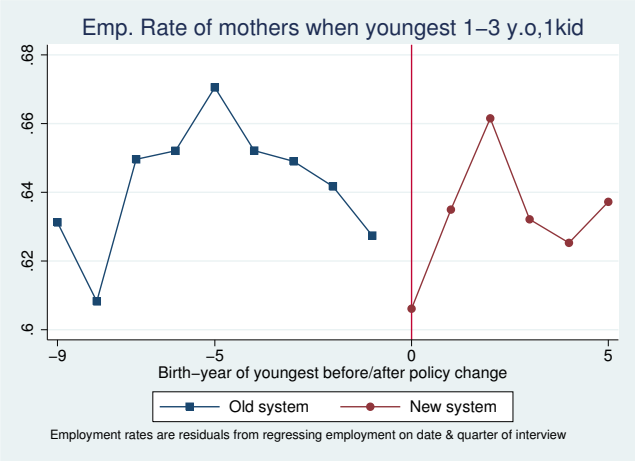

Figure 1.26: Employment rates for mothers of a first child (one to three years old)

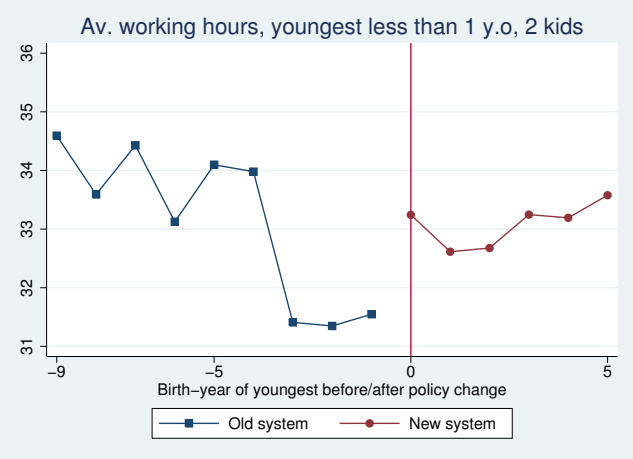

Figure 1.27: Working hours for mothers of of two children (youngest under one year old)

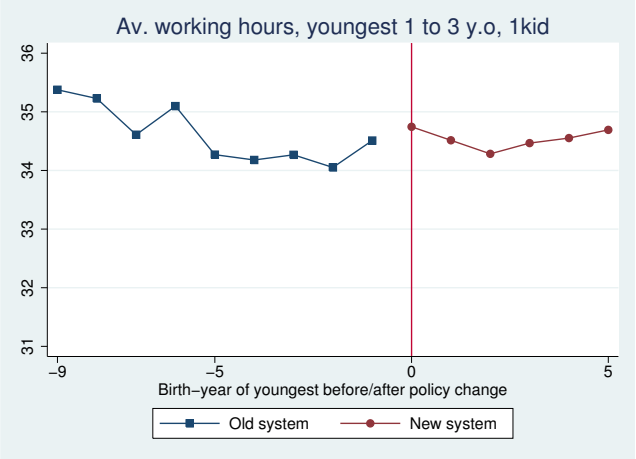

Figure 1.28: Working hours for mothers of a first child (one to three years old)

The Income Transfers (Allocation de base) effect on work incentives for mothers:

The increase in the eligibility thresholds to income transfers affected the budget constraints of mothers with one or two children differently. Effectively, this income transfer cannot be claimed at the same time as the Stay-home benefits. When mothers are not receiving the Stay-home benefits, they may claim the income transfer if the household income is below certain thresholds. The increase in eligibility thresholds would have had little impact on single mothers budget constraints (their income being most of the time already below the threshold pre-reform). By increasing the eligibility thresholds, mothers in couples with one child aged one to three might have seen their budget constraints shift out (depending on their partner's income and their wage) at certain hours of work. The incentives to work affected mainly women with one child in the third quartile of the income distribution. Figures 1.29 to 1.32 give examples of the changes in incentives faced by some of these women.

Turning our attention to mothers of two children, for the women who became eligible to that Allocation de base, when combined with the stay-home benefits to work part-time (that are non-means tested), the budget constraint may have shifted out above 28 hours of work a week (as illustrated in the third budget constraint below), resulting in higher incentives to work full-time. This could affect only mothers with two children.It is hard to draw a clear prediction as to how the incentives changed in general for mothers who would have been affected by these thresholds increases to the Allocation de base. To control for its potential impact on my estimation of the childcare subsidies impact, I re-run my regressions, getting rid of women whose partner's income is in between the old and new thresholds (this is an imperfect check as it assumes partner's labour supply is fixed). I also estimate my regressions separately for households in the bottom-half and top half of the income distribution. As mentioned earlier, this modification in the tax schedule affected mainly households in the top half of the income distribution, and potentially more significantly women with one child aged one to three years old. As mentioned in section 3 though, the share of eligible households to that income transfer rose by 15 percentage points as a result of the changes (which is not an incredibly high number). I also check in the second chapter with a structural model what was the likely overall effect of these specific changes and will find them

to be small and positive.

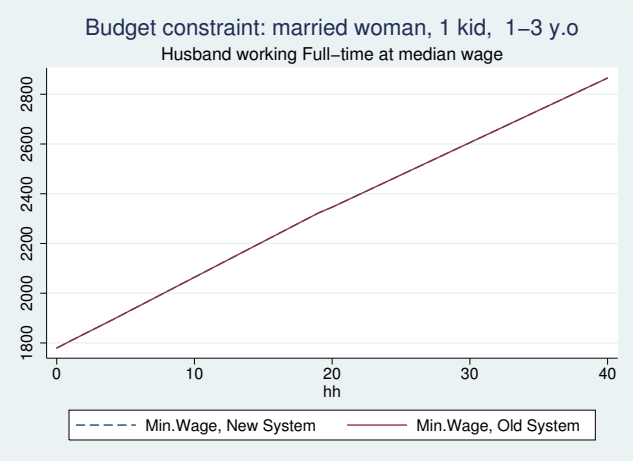

Figure 1.29: Married mother of one child at minimum wage, husband at median wage

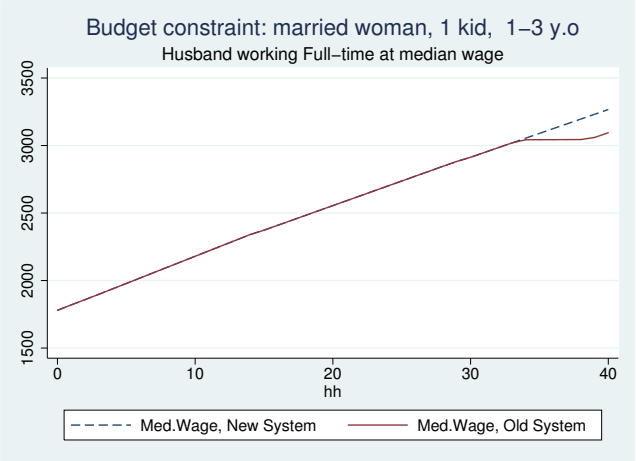

Figure 1.30: Married mother of one child at median wage, husband at median wage

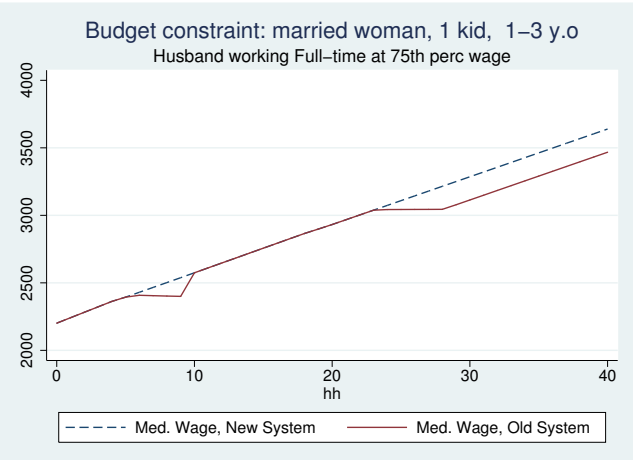

Figure 1.31: Married mother of one child at median wage, husband at 75th perc. wage

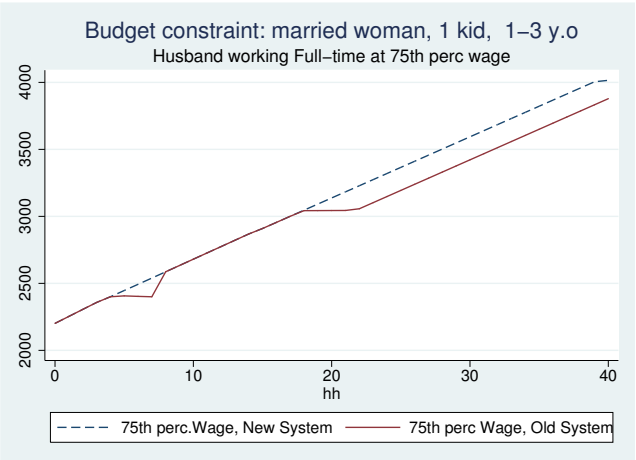

Figure 1.32: Married mother of one child at 75th perc. wage, husband at 75th perc. wage

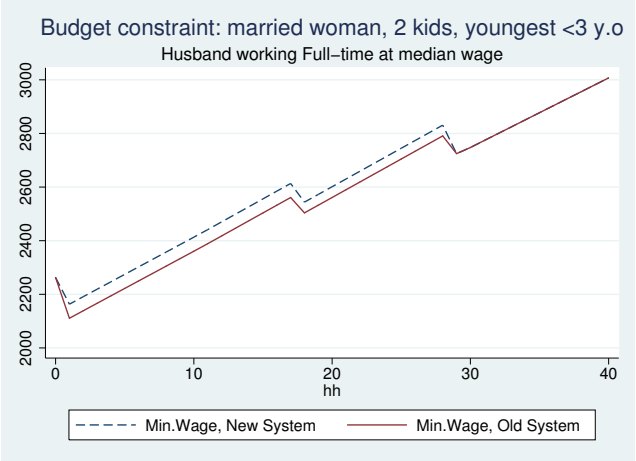

Figure 1.33: Married mother of two children at minimum wage, husband at median wage

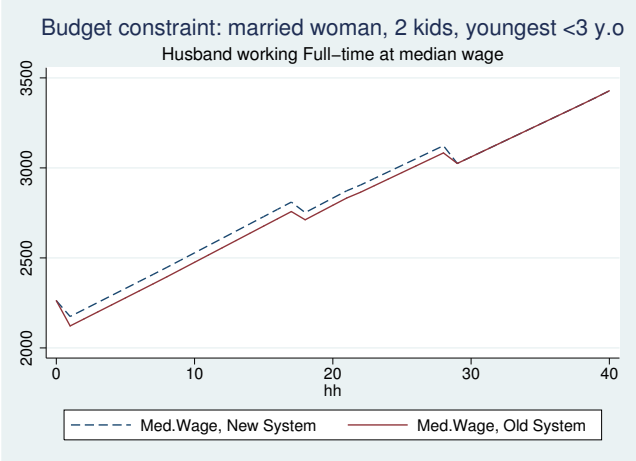

Figure 1.34: Married mother of two children at median wage, husband at median wage

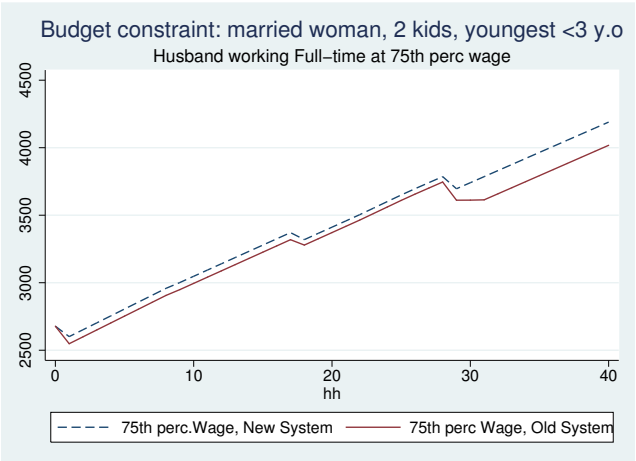

Figure 1.35: Married mother of two children at 75th perc. wage, husband at 75th perc. wage

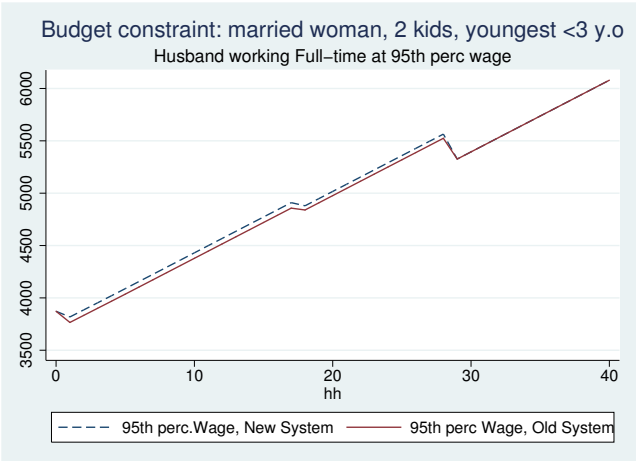

Figure 1.36: Married mother of two children at 75th perc. wage, husband at 95th perc. wage

Summary Tables of the reform:

	Old System (APE)	*New System (PAJE)*
ELIGIBILITY	Youngest kid born before 1st Jan. 2004	Youngest kid born after 1st Jan 2004
TRANSFERS	APJE: Same as Allocation de base, but the eligibility thresholds are much lower.	Allocation de.base: 171 €/ month during first three years of kid (**means-tested**). **The increase in the eligibility thresholds augmented the number of eligible families by 15 p.pts.**
BENEFITS	APE: If mother decreases hours worked or stops work, she receives a monthly benefit. Needs to have two or three kids to claim it. Big disincentive to work (cf.Piketty). Not means-tested	CLCA: If mother decreases hours worked or stops work, receives a monthly benefit of 305,404,531€ (if she does not receive the "Allocation de base", if she does than 171 Euros are deducted from these transfers). The **part-time payment is 15% higher than APE**. **Mothers of first kid can now claim it for 6 months** after maternity leave (so within first 10 months of the kid). **Conditions on past work experience more stringent than APE.Not means-tested**

Table 1.11: Summary of changes to the tax-benefit system

	Old System (APE)	*New System (PAJE)*
ELIGIBILITY	Youngest kid born before 1st Jan. 2004	Youngest kid born after 1st Jan 2004
CHILDCARE	Government pays employment contributions Benefit to pay employee up to a cap (income-tested) Household pays min. of 15% of employee salary Not work-dependent If both parents work,remaining childcare costs used for tax deductions Covers home-care costs less generously than assistante maternelle (only 50% of contributions & no benefit)	Government pays employment contributions **More generous benefit** up to a cap Household pays min. of 15% of employee salary **Need to work to claim it** If both parents work, remaining childcare costs used for tax deductions Covers home-care costs less generously than assistante maternelle (only 50% of contributions) **but can now claim benefit to pay salary of employee like for assistante maternelle**

Table 1.12: Summary of the changes to the childcare subsidies system

Specification checks of Section 4:

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part I:				
Cluster s.e	-.0424578525	-.0303342417	-.0409001186***	-.0029067912
	(.0308821741)	(.0218149107)	(.0123729948)	(.014306929)
year dummies	-.0249169618	-.0215853285	-.0411203764***	.013365102
	(.0308721364)	(.0336059853)	(.0156614874)	(.0172790568)
control EE	-.0266440753	.0008959887	-.0379883796***	-.0031759904
	(.0268720426)	(.0293544233)	(.0140095865)	(.0153155522)
high edu	-.0413259715	-.0111454055	-.0567795783***	.0194431767
	(.0270744506)	(.0342540666)	(.0160816349)	(.020019196)
low edu	-.0767136514*	-.0479708128	-.0032357967	-.0165729355
	(.046350725)	(.0384840816)	(.0277340785)	(.0243940875)
married	-.0307956431	-.0633210167**	-.0384971499**	.0144212199
	(.0331806876)	(.0322232991)	(.0190079696)	(.0188794732)
single	.0342286304	.1079500914	-.0440552756	.0375350714
	(.0945982859)	(.102373749)	(.0432926454)	(.0494544655)
unemployment rates	-.0411480404*	-.0308364015	-.043303635***	-.005198549
	(.0233938619)	(.0254895203)	(.0138716912)	(.0150888385)
drop Alloc. base	-.0290980209	-.0424482301	-.0467999466***	-.0040832642
	(.0249681119)	(.0264947601)	(.0149387913)	(.0158765167)
region dummies	-.044092834*	-.0330117941	-.0423858687***	-.0015621308
	(.0237684473)	(.0256614946)	(.0140168006)	(.0152474046)
nannies wage variation	-.0456363522*	-.0263553727	-.0407813862***	-.0024115075
	(.0233939514)	(.0255052969)	(.0139613338)	(.0152465906)
partner in bottom half wage distr.	-.0527689829	-.0696946904*	-.0626612082***	-.0368989334
	(.0340792201)	(.0372598916)	(.0208888277)	(.0231007375)
partner in top half wage distr.	-.0285259318	.0045309463	-.0223561917	.0172449574
	(.0323070996)	(.0346849747)	(.0185379405)	(.0201735478)

Table 1.13: Regression discontinuity specification checks, Part I

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part II: different windows				
8 qu. Window	-.0255080294	-.0053196293	-.0408610813**	.0241873134
	(.0291686263)	(.0319054574)	(.0171640497)	(.0185371991)
N	3781	3399	9945	9592
16 qu. Window	-.0336858891*	-.0355489589	-.0222025067*	-.00562956
	(.0201517176)	(.0219363887)	(.0123528829)	(.0132838432)
N	7114	3781	18624	17936

Table 1.14: Regression discontinuity specification checks , Part II

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part I:				
Cluster s.e	-.0897979289**	-.0429497696**	-.0088387756	.0270545632
	(.0323958062)	(.0175959822)	(.0183531791)	(.0159447044)
year dummies	-.0896969363***	-.0434613265*	-.0089754239	.0270809159*
	(.0243154783)	(.0222062729)	(.0166640654)	(.0145359868)
control EE	-.0897428766***	-.0435026027*	-.008637324	.0266909935*
	(.0243216474)	(.0222051423)	(.0166616347)	(.0145335356)
high edu	-.1316915303***	-.0366569832	-.0161552317	.0579622686***
	(.0312805995)	(.0309228618)	(.022503376)	(.0198191479)
low edu	-.1209774837***	-.0976190493***	-.0275210254	-.0630510673***
	(.0455477163)	(.0365294106)	(.0278576855)	(.0228952859)
married	-.0910101458***	-.0487664677*	-.0381856449*	.0392436907**
	(.0343638025)	(.026929047)	(.0225684047)	(.0170880053)
single	-.0065021478	-.0976461992	-.0817979649**	-.0844488814*
	(.063991785)	(.0721115619)	(.0363512076)	(.0442342237)
unemployment rates	-.0934214443***	-.046115648**	-.0136317443	.0241474323*
	(.0243348107)	(.0221968573)	(.0165939406)	(.0144844968)
drop Alloc. base	-.0912028477***	-.0468402691**	-.0083684893	.0217081681
	(.026870247)	(.0232173596)	(.0187421087)	(.0151355118)
region dummies	-.0901270062***	-.050546404**	-.0064244824	.0261147246*
	(.0243748222)	(.022361096)	(.0166120864)	(.0145894364)
nannies wage variation	-.0923328847***	-.0409842245*	-.0092192944	.0279803649*
	(.0243342817)	(.0222835653)	(.0167123247)	(.014578227)
partner in bottom half wage distr.	-.1087860018***	-.0178518407	-.0177919306	-.0175845027
	(.0355001315)	(.0312960409)	(.0238256566)	(.0210535955)
partner in top half wage distr.	-.0723659024**	-.0708088279**	.0019735941	.0601688512***
	(.0336259007)	(.0316638015)	(.0233741235)	(.0201328024)

Table 1.15: DiD baseline specification checks, Part I

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part II: different control groups				
youngest 72 to 216 months old	-.0739048868***	-.0399898291**	.0013908282	.0262065027**
	(.020831071)	(.01904114)	(.0142140565)	(.0125615709)
youngest 96 to 216 moths old (All mothers)	-.0865174904***	-0.014985754	-.0135876583	.0306314342**
	(.01924739)	(.018061867)	(.014358446)	(.012636664)
Part III: Placebo group	1 child	2 children		
Youngest 72 to 95 months old	-.0184333809	.0055916705		
	(.0135541493)	(.0104079358)		

Table 1.16: DiD baseline specification checks, Part II & III

Specification checks of Section 5:

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part I:				
Cluster s.e	-.0384356156***	.0126688965	-.0291037075**	.0012679729
	(.011834316)	(.0285740234)	(.0102055511)	(.0111967484)
year dummies	-.0359700471*	.0073424634	-.0304927155***	.0063860673
	(.0215472039)	(.0237442851)	(.0117886467)	(.0124131059)
control EE	-.036546614*	.0153317768	-.0279844273***	.0127274869
	(.0205152035)	(.0224797092)	(.010551597)	(.0120806005)
high edu	-.0210764501	.0368198007	-.0405050144***	.021591343
	(.0236891434)	(.0302468147)	(.0123347593)	(.0150280772)
low edu	-.096760489**	-.0236759204	-.013671075	-.0237798803
	(.0404794477)	(.0327037089)	(.0204198658)	(.0177509189)
married	-.0345107093	.0095833419	-.0424107052***	.0176868904
	(.0287851337)	(.0286242086)	(.0143178813)	(.0141645316)
single	-.0482309423	.1405691504*	-.053584855	-.0721592158*
	(.0787093341)	(.0785910562)	(.0349927731)	(.0378751867)
unemployment rates	-.0419100747**	.0077787559	-.0312416069***	.0009039417
	(.0205833931)	(.0224935468)	(.010530103)	(.011361246)
drop Alloc. base	-.0324499309	.0046836343	-.031510666***	-.0325795375***
	(.0217426084)	(.0232709218)	(.0109934574)	(.0118323723)
region dummies	-.0442235842**	.0127146896	-.030127652***	-.0023841639
	(.020729389)	(.0220330693)	(.0106047401)	(.0113913678)
nannies wage variation	-.0407964066**	.0157064255	-.0270424262**	.0013172298
	(.0204734094)	(.0225315057)	(.0105726533)	(.0114708338)
partner in bottom half wage distr.	-.0609722398**	.0041591409	-.0424822085***	-.0283068717*
	(.029449515)	(.0320735015)	(.0153008932)	(.016847901)
partner in top half wage distr.	-.0197105817	.0189567376	-.017855335	.023933934
	(.0287261903)	(.0315520652)	(.0145254042)	(.0155051816)

Table 1.17: Short-Run Treated quasi-DDD specification checks, Part I

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part II: different control groups				
youngest 72 to 216 months old	-.0391678661*	.0153510589	-.030072175***	.0025241754
	(.0205222182)	(.0224862099)	(.0105393352)	(.0114521682)
youngest 96 to 216 moths old (All mothers)	-.0412649363**	.0154254055	-.0305596329***	0.002170634
	(.0204923358)	(.0224400628)	(0.01052414)	(0.011467099)

Table 1.18: Short-Run Treated quasi-DDD specification check, Part II

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part I:				
Cluster s.e	.0160975046	.0183340516	.0343257748	.0130905127
	(.0358458385)	(.0298840087)	(.0215135198)	(.0178906471)
year dummies	.0155019984	.016532287	.0349333733**	.0122858174
	(.0327310525)	(.0334732533)	(.0178224985)	(.0159963518)
control EE	.0141387377	.0151622808	.0340747572*	.0124205668
	(.0323738381)	(.0331219807)	(.0177431963)	(.0159114674)
high edu	.054257188	-.0333908238	.0664571747***	-.0071114944
	(.0410191007)	(.0454612449)	(.0247715041)	(.0225806404)
low edu	.0138154691	.0398601629	.0385904238	.0225006826
	(.0629293695)	(.0530995354)	(.028336307)	(.0235389024)
married	.0456768945	-.0087557174	.0377134271	-.0113351578
	(.0462165847)	(.040546719)	(.0238166805)	(.0187913459)
single	-.0003765976	-.0478874706	.0746692***	.0433338173
	(.1280602515)	(.1027058437)	(.215135)	(.0485743396)
unemployment rates	-.036138	.0163047779	.0311792772*	.0118970117
	(.0242411)	(.0347337574)	(.0177212339)	(.0158289056)
drop Alloc. base	-.0370173	-.0223876	.0343257748*	.0130905127
	(.0265871)	(.0244638)	(.017746048)	(.0159013551)
region dummies	.0292896423	-.0082204	.0343794636*	.0130825527
	(.0330591649)	(.0230637)	(.017763067)	(.0158534665)
nannies wage variation	.0162677597	.0170271844	.0344753116*	.0132426247
	(.0323788486)	(.0332768969)	(.0177860335)	(.0159430187)
partner in bottom half wage distr.	-.0682215542	.057229884	-.0018821525	.0067773764
	(.0462523997)	(.0481780171)	(.0248461999)	(.0232064966)
partner in top half wage distr.	.1094086766**	-.026313806	.1669263989	.0134619437
	(.0458322465)	(.0465356186)	(.1150180995)	(.0219835788)

Table 1.19: Short-Run Non-Treated DiD specification checks, Part I

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part II: different control groups				
youngest 72 to 216 months old	.0101248324	.012256165	.0191799328	.0200799759
	(.0287281815)	(.0291557573)	(.0145510621)	(.0133994697)
youngest 96 to 216 moths old (All mothers)	.0335665531	-.0101285046	.036941383**	.0172206331
	(.0305056218)	(.0282466449)	(.0155605357)	(.0136777405)
Part III: Placebo group	1 child	2 children		
Youngest 72 to 95 months old	-.018419281	.011602766		
	(.014037284)	(.010684092)		

Table 1.20: Short-Run Non-Treated DiD specification checks, Part II & III

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part I:				
Cluster s.e	-.0475914292**	-.0353182815**	-.0103534805	.025030097*
	(.0226303153)	(.0168370008)	(.0169892088)	(.0132849617)
year dummies	-.0480260439**	-.0352034271	-.0120491767	.0218358357
	(.0229844656)	(.0223070551)	(.018541541)	(.0156161916)
control EE	-.0475914292**	-.0353182815	-.0103534805	.025030097
	(.0229102504)	(.0222811401)	(.0181147326)	(.0169207435)
high edu	-.1030652449***	-.0176278595	-.0413559191*	.0730443522***
	(.0298303906)	(.0301449765)	(.0241765268)	(.022856582)
low edu	-.0637916103	-.0568043478	-.0231541153	-.0276219752
	(.04291391)	(.0366685018)	(.0321008973)	(.0273488294)
married	-.0528208688	-.0176377837	-.0446590707*	.0493050553**
	(.0327396318)	(.0270770267)	(.0251271892)	(.0205506962)
single	.0109671913	-.1271184*	-.03650041*	-.0226997
	(.0588885918)	(.712968)	(.0205322)	(.218688)
unemployment rates	-.0481547303**	-.0376609042*	-.0091474429	.0220243894
	(.0228706058)	(.0222497471)	(.0180635434)	(.0168416668)
drop Alloc. base	-.0507907122**	-.0222239364	-.0070754346	.0358179435**
	(.024272332)	(.0238755923)	(.0194802526)	(.0180793237)
region dummies	-.040994253*	-.0432690606*	-.0037899541	.0260348935
	(.0229840949)	(.022214083)	(.0181374233)	(.0167745594)
nannies wage variation	-.0502670221**	-.0366564617	-.0122849075	.029862294*
	(.022924101)	(.0223454311)	(.018126348)	(.0170029625)
partner in bottom half wage distr.	-.0253691152	-.0419392064	.0278151613	.026654182
	(.0319309458)	(.0316905268)	(.0251860674)	(.0255386624)
partner in top half wage distr.	-.0800842047**	-.0307411496	-.0542844422**	.0350797214
	(.0330120027)	(.0319353007)	(.0263157263)	(.0227906629)

Table 1.21: Long-Run Treated DiD specification checks

Age of youngest	3-11 months old		1-3 years old	
Num. children	1	2	1	2
Part II: different control groups				
youngest 72 to 216 months old	-.0263276808	-.0441737249**	.0146586196	.0188949592
	(.0194738973)	(.0187898465)	(.0155027881)	(.0144964699)
youngest 96 to 216 moths old (All mothers)	-.0594719686***	-.0322064534*	-.0221576504	.0259858985*
	(.0208354779)	(.0188323725)	(.0160133466)	(.014563839)
Part III: Placebo group	1 child	2 children		
Youngest 72 to 95 months old	-.0169823766	-.0178628005		
	(.0144168315)	(.0125931995)		

Table 1.22: Long-Run Treated DiD specification checks

Habit effects, regressions estimates:

Age of youngest	Method	All	High education	Low education
3-11 months old	Regression discontinuity:	-.0054070498	-.0228483062	.0265412368
		(.0484123901)	(.0620891526)	(.0651458949)
	Difference:	-.0084998105	-.0006912955	-.0284995586
		(.012907153)	(.0163916852)	(.0174583085)
1-3 year old	Regression discontinuity:	-.0305294301	.0152711291	-.0447930358
		(.0388000719)	(.0336264782)	(.053495571)
	Difference:	-.0053118682	-.0134688588	.0077692638
		(.0117106549)	(.019251531)	(.0171445757)

Note: standard errors clustered at birth date of first child for RD, and interview date for Difference specification. All regressions include the same control variables as in the baseline specification discussed in section 5.1 .

Table 1.23: Employment rates differences of mothers with two kids depending on the birth of the first

2 Labour supply of French married women, a structural approach.

2.1 Overview

In this chapter, I develop and estimate a static labour supply model with part-time and full-time wage equations as well as demand-side constraints. This allows me to understand to what extent the assumption of a unique hourly productivity and the absence of any difficulties to find work may affect the elasticities estimates and the predictions from tax reform simulations.

2.2 Introduction:

In this chapter, I develop a static labour supply model that will also be used in the third chapter and applied to British data. I focus exclusively on married women with working husbands for reasons discussed further down. I will use the availability of a very clear and large policy change (the availability of stay-home subsidies to mothers of a first child) to check the validity of different specifications of the model. Indeed, to depart from many papers, I will estimate a model with part-time and full-time wage equations as well as demand-side constraints. This allows me to understand to what extent the assumption of a unique hourly productivity and the absence of any difficulties to find work may affect the elasticities estimates and the predictions from tax reform simulations.

The model in this chapter builds on the work by Blundell et al (1999) to specify the supply side, and the work of Laroque and Salanie (2002) and Blundell et al (1987) re-

garding the demand-side. Many labour supply studies have used different approaches to account for involuntary unemployment. Blundell et al (1987) introduce an index function, depending on a variety of macroeconomic and microeconomic factors, that determines whether an individual who wishes to work is in employment, this results in a double-hurdle model. Focusing on lone mothers, Bingley and Walker (1997) combine a discrete-choice multinomial probit model with a latent model for the probability of involuntary unemployment. They use the survey information on desired hours worked to discriminate between voluntary non-participation and involuntary unemployment. Duncan and McCrae (1999) follow a similar strategy using a conditional logit framework, but also differentiate the unemployed seekers from the discouraged workers. More recently, Bargain et al (2010) extend the Duncan and MacCrae (1999) approach by allowing unemployment to be involuntary for both members of the household and by using the desired hours of unemployed workers and not just the fact that they wish to work. On French data, Laroque and Salanie (2002) disentangle the minimum wage barrier (called "classical unemployment") from unemployment resulting from frictions and/or business cycles (called "other unemployment"). The specification I pursue follows that "other unemployment" modeling technique. It is also worth mentioning that all the above papers with the exception of Laroque and Salanie (2002) estimate a unique wage equation in a first-step.

The results show that accounting for part-time wage penalties does not really affect the elasticities estimates and the predicted reaction to fiscal reforms. Explicitly accounting for potential rationing on the labour market diminishes the size of the elasticities and more realistically predicts the effects of large tax and benefit reforms. Due to data limitations, I cannot model the changes in childcare prices pre and post reforms. I can predict the impact of each of the other policy component. The reform simulation from the model confirm the main conclusions from Chapter 1. The large fall in employment rates for mothers of a first child is entirely due to the extension of stay-home subsidies, the fall in employment for mothers with two children whose youngest is below one cannot be explained by any changes in the work incentives they faced. For mothers of two children whose youngest is one to three, the income transfer threshold changes and change in part-time work transfers had a rather limited impact on their labour supply. A large share of their employment rate increase observed in

the first chapter should therefore be attributed to the childcare subsidies.

Section 3 presents the model specification, section 4 discusses the data used and estimation results, while section 5 uses the model to evaluate the reform and compare the predictions from the results from a Differences-in-Differences similar to the one presented in the first chapter.

2.3 A model of Labour Supply:

In this section I describe the static labour supply model I estimate on French data here (and on UK data in the next chapter). This model builds on the work by Blundell et al (1999) and Laroque and Salanie (2002).

Modeling the couple's joint labour supply decision would be a huge challenge in France as married couples pay taxes jointly[1]. As a result, I assume that each woman i, takes her husband's labour supply as given. She chooses the hours of work that maximise her utility derived from household consumption C and her hours worked H:

$$\max_{H_i, C_i} U_{(H_i, C_i)}$$

Her choice set is discrete, and she chooses her hours of work H_i such that $H_i^j \epsilon \{0, 20, 30, 35\}$. The labour market is assumed to be competitive and an individual is paid her productivity. At each hour choice H_i^j, she is paid a gross hourly wage W_i^j that depends on her productive observable and unobservable characteristics:

$$\ln(W_i^j) = \gamma^j Z_i + \sigma^j \varepsilon_i$$

Her productive characteristics Z_i are education, age and its square. Apart from age, the variables affecting productivity are not affecting one's preferences. The unobservable characteristic ε_i is drawn from a standard Normal distribution. To control for

[1] Also, the majority of non-employed husbands are unemployed and it is impossible with the information in the data to infer the unemployment benefits they receive. In France the unemployment benefit system is based on replacement rates that vary with the duration of the unemployment spell.

a possible part-time wage penalty, the returns to these characteristics (γ^j and σ^j) and the constant terms contained in γ^j differ at each hour choice. This specification controls for the fact that the jobs available part-time are likely to differ from the jobs offered full-time, but that a worker's characteristics (observables as well as unobservables) stay the same.

When making her decision, the woman is facing a household budget set defined in terms of the gross wage rates she is offered, her husband's earnings and the tax system. The household consumption is $Y_i^j = R(W_i^j H_i^j, W_{husband} H_{husband}, X_i)$,where R is the tax and benefits system function, which may also vary with some of the household characteristics X_i (such as number of kids). In this simple specification, the household consumption in each state is: $C_i^j = Y_i^j$.

The utility function is a quadratic function of consumption and hours worked:

$$U_{(H_i^j, C_i^j, X_i)} = \beta_{yi} C_i^j + \beta_{hi} H_i^j + \alpha_y (C_i^j)^2 + \alpha_h (H_i^j)^2 + \alpha_{yh} C_i^j H^j$$

Observed heterogeneity is introduced linearly through parameters β_y and β_h:

$$\begin{aligned} \beta_{yi} &= \beta_{0y} + \beta_{1y} X_i \\ \beta_{hi} &= \beta_{0h} + \beta_{1h} X_i \end{aligned}$$

The observable characteristics X_i include the number of kids and dummy variables controlling for the age of youngest child, the woman's age and its square, a dummy if the woman left school before the age of 16, and a dummy if living in Paris. Education generally does not affect preferences. If one has not completed school until the age of sixteen, this may reveal particular tastes, otherwise, any extra year of education only affects a woman's productivity. The fertility decision here is not modeled. Women have kids exogenously. Children affect the woman's taste for leisure, but not her productivity.

To allow for state-specific errors in perception, random disturbances ν^j assumed to be independently distributed as a Type I extreme value, are added to utilities in each

labour market state. The utility derived from each alternative is then:

$$U^*_{(H_i^j, C_i^j, X_i)} = U_{(H_i^j, C_i^j, X_i)} + \nu_i^j$$

And the probability of choosing the labour market state j, can be defined as a logit:

$$\begin{aligned} \Pr(H_i = H_i^j) &= \Pr(U^*_{(H_i^j, C_i^j, X_i)} > U^*_{(H_i^k, C_i^k, X_i)},\ for\, all\, j \neq k) \\ &= \frac{\exp[U^*_{(H_i^j, C_i^j)}]}{\sum\limits_k \exp[U^*_{(H_i^k, C_i^k)}]} \end{aligned}$$

It is important to note that the IIA property holds in this specification. A common way to relax the assumption is to introduce random heterogeneity in the utility function coefficients, but Haan (2006) has shown that the estimates obtained in either specification do not differ significantly[2].

2.3.1 Accounting for unobserved wages and selection bias:

Unfortunately, the wages of women not working in the data are not observed. The unobserved productive characteristic of the woman should have an impact on her decision to participate in the labour market. The distribution of unobservables for workers in the sample is not the same as the one for non-workers, and to recover the population distribution (and not simply the distribution conditional on working) it is important to account for a potential selection bias. I will follow the specification of Laroque and Salanie (2002) and Laroque (2005). The disturbance ε_i is allowed to be correlated with the utility of not working. The utility at zero hours of work becomes:

$$U_{(0, C_i^0, X_i)} = \beta_{yi} C_i^0 + \alpha_y (C_i^0)^2 + \rho \varepsilon_i$$

This unobserved ability does not affect her choice of hours of work, but only her choice to participate or not. In a discrete choice model, one identifies only the differences in utility. When looking at the difference in utility between working j hours and not

[2]I have checked that this was still holding in a simplified version of the model where the wage equation was estimated in a first-step and rely on these observations

working : $U^*_{(H_i^j,C_i^j,X_i)} - U^*_{(H^0,C_i^0,X_i)} = U_{(H^j,C_i^j,X_i)} + \nu^j - U_{(0,C_i^0,X_i)} + \nu_i^0$, a higher $\rho\varepsilon_i$ would increase that difference. So the probability of choosing not to work, defined as: $Pr(U_{(0,C_i^0,X_i)} - U_{(H_i^j,C_i^j,X_i)} > \nu_i^j - \nu_i^0)$ increases as $\rho\varepsilon_i$ rises, holding everything else constant. On the other hand, the choice between j hours and $k > 0$ hours does not directly depend on that unobserved ability ε_i. If the correlation ρ is negative, women with higher unobserved ability have a higher preference for work, and are less likely to be observed not working. A positive correlation could be interpreted as the most productive women being more reluctant to participate in the labour market.

I do not model the possibility of measurement error in wages. Van Soest et al (2002), explicitly separate the unobserved part of the wage equation into an unobserved ability residual and an unobserved measurement error residual that does not enter the Labour Supply decision. They find that the measurement error in wage rates account for most of the unobserved part of the hourly wage. This measurement error residual, they argue, could be interpreted more generally as the part of the hourly wage rate which is job or hours specific. By estimating three wage equations instead of one, I should minimise its impact.

2.3.2 Accounting for Costs of Work:

The model presented above is too simplistic, in that the only disincentive to work comes from the loss of leisure time. Working also has a monetary cost. It can be decomposed into a fixed cost (the price of transport fares to go to the office for instance) and a variable cost in the presence of childcare (if every hour worked increases the hours of childcare usage).

2.3.2.1 Fixed costs of work:

I add fixed costs of work to the model in the following way. I introduce a fixed cost of work expression for part-time and full-time workers that varies with the number of children and the age of the youngest child, if the woman lives in Paris, and a constant. I also add another constant fixed cost of work for full-time workers

$$FC_i = X'_{i,FC}\theta 1[H_i^j > 0] + \theta_{ft} 1[H_i^j = 35]$$

As Heim and Meyer (2004) note, costs of work are identified in these type of labour supply structural models only through strong functional form assumptions. They are supposed to capture the pecuniary costs of working, but may also reflect other benefits or utility costs.

2.3.2.2 Childcare prices:

To account for child-care expenditures, I follow a similar strategy to Blundell et al (2000). I define household groups according to their net observed total income. I then estimate a discrete distribution (6 points) of hourly costs p_c for each group. It is important to note that due to data limitation these are net hourly costs in France. In France, the price of childcare depends on the town you live in and also on your household income.

I assume a linear deterministic relationship of hours of work on hours of childcare used for each household group and estimate the following specification:

$$h_{cc} = \alpha + \alpha_h h$$

For each woman, at each working hours choice (20 hours, 30 hours, Full-time), I determine the predicted hours of childcare per child: h^j_{cc}. I then multiply this by each p_c point to obtain childcare costs:

$$CC_{H^j} = h^j_{cc} p_c$$

and integrate out the p_c distribution in the likelihood.

Household income at each childcare hourly cost becomes:

$$C^j_{H^j_i, p_c} = R(W^j_i H^j, W_{husband} H_{husband}, X_i) - FC_i - CC_{H^j}$$

This approach does have shortcomings, especially that it does not model for the choice of childcare usage, trying to add this to the already complicated model and with the information available in the data seems extremely challenging. Another shortcoming is that it does not account for the presence of relatives such as grand-parents. But in

my sample I only consider households with one family unit and no other dependent except children. To control for the availability of family relatives for childcare on French data, Chone et al (2004) introduced in the child-care expenditure equation a dummy equal to 1 if the wife lives in the department where she is born. This dummy was found to be not significant, and it may not be the case that the grand-parents still live in the same department anyway, so I don't pursue this idea.

2.3.3 Labour demand constraints.

So far the model implies that women choose their optimal hours of work and can find a job. This assumption seems particularly unrealistic in the French labour market. To control for the possibility of constraints in the demand for labour, I assume that women have a probability of finding work (as in Laroque and Salanie (2002)), should they choose to participate in the labour market. This probability depends on a vector of characteristics J_i : the age of the individual, the local unemployment rate and a constant. Laroque and Salanie (2002) specify an exponential function bounded between 0 and 1. I follow the double-hurdle specification of Blundell et al (1987) and consider a Normal distribution instead:

$$\Pr\left(Find\,work\right) = \Phi(\zeta J_i)$$

This is a reduced-form specification and does not intend to capture any structural explanation as to why such constraints are observed.

2.3.4 The likelihood function:

The model specification considers a woman knows her productivity, the wages she would be paid, and the household net revenue at each of her available hours choice. She decides what hours maximise her utility. She then gets on the labour market and may find a job or may not. This specification is similar to Blundell et al (1987), but differs from Laroque and Salanie (2002). In this latter model, a woman may not be able to find a full-time job, but could prefer working part-time than not at all.

The likelihood contribution of a woman observed working can then be written as:

$$l_i = log \sum_{p_c} \prod_j Prob(H_i = H_i^j | Z_i, p_c, \varepsilon_i)^{1(H_i = H_i^j)} Pr(Find\, work) Pr(p_c)\, Pr(\varepsilon_i)$$

The wages of a woman observed not working need to be inferred and her likelihood contribution integrated over the distribution of ε, is given by:

$$l_i = log \int_{\varepsilon} \sum_{p_c} \prod_j \{Prob(H_i = 0 | Z_i, p_c, \varepsilon_i) + [1 - Prob(H_i = 0 | Z_i, p_c, \varepsilon_i)] Pr(Find\, work)\} Pr(p_c)\, f(\varepsilon)$$

The integrals in the log-likelihood are approximated using simulation methods.

2.3.5 Identification:

The identification of these types of labour supply models has been widely discussed in the literature. To ensure that the identification of the model does not rest solely on the parametric specifications, some exclusion restrictions need to be imposed.

The woman's productivity enters the work decision only through its effect on the net disposable income when she works. The husband's wages enter the work decision through the income outside work (and also through the income should she work). So variation in husband wages as well as women's wages, combined with the non-linearities and dependance of the tax-schedule on certain household characteristics (such as number of children or location) should ensure enough variation in the income variable to identify its impact on labour supply choices. To identify the parameters of the utility function, variables presumably affecting exclusively the demand-side of the labour market (education and unemployment rate) do not influence the utility function. In addition, work preferences may vary with certain taste shifters (number and age of children), independently of the productivity characteristics. As mentioned earlier, the fixed costs of work parameters can be identified only through the strong functional form assumptions made.

To ensure I can identify the parameters of the employment probability function, I restrict a continuous variable (the local unemployment rate variable) to enter only

in $\Pr(Find\,work)$, while education enters only the wages. Women who have very productive characteristics (long studies say) and strong tastes for work characteristics (young without children for instance), but are still observed not working would ensure identifiability of these parameters.

2.4 Data and estimation results :

2.4.1 Data:

I use the French Labour Force Survey (Enquete Emploi en Continu) 2007. In the sample under study, I focus on married households where the wife is between 25 and 50 years old, where neither the head nor the wife is studying, self-employed, retired, a member in the forces or seriously disabled. I drop women working as teachers or professors as they are likely to report working Part-time when in reality they work Full-time but don't account for the preparation work done at home. I also drop observations with unrealistically low wages, or reporting paid work but no earnings. I consider households where the husband is observed working. In France, most of the non-working husbands are unemployed and I do not have enough information in the survey to model properly their unemployment benefits and therefore realistically model their labour supply choices.

To recover the childcare price distribution and hours of childcare usage per hours worked I use the survey collected by the Drees in 2007 "Mode de garde et d'accueil des jeunes enfants" that I already used in the first chapter. A representative sample of 8,177 households with children below the age of seven and a half were interviewed, and asked questions about all the types of childcare used, the hours and price of each type of childcare and other demographic characteristics. They were also asked about the childcare subsidies they receive. I do not differentiate among types of childcare used, and consider the average net hourly price of childcare paid per child. Most households tend to use one type of paying childcare. This net price of childcare will be correlated with the household's earnings and to control for that I will separate the population according to net observed household income. Implicitly, I am assuming that in France when a mother decides how much to work, she will take the net hourly

price of childcare as given and will not account for the potential change due to different household resources following a change in her labour supply. This assumption seems hard to avoid due to data limitation, but may not be too critical. As I showed in the first chapter, the subsidies to private carers resemble a lump-sum reimbursement of costs, where the generosity of that lump-sum transfer varies only according to two income thresholds.

The results of the childcare regressions and details on the distribution of prices are reported in the appendix. I am grateful to Guy Laroque who let me use the routines he wrote for the French tax system in the early 2000's, I have updated and modified these routines to match the 2007 French tax system.

2.4.2 Estimates:

The parameter estimates are presented in the appendix. Regarding the utility functions, across all three specifications, the marginal utility of income is positive, living in Paris increases the marginal utility of income, while having left school before the age of sixteen decreases it. The marginal utility of hours worked is negative and strongly significant across all three specifications, it decreases with the number of children, and increases in Paris. The only parameter that appears affected by the different specifications is the correlation term controlling for selection. It is negative and significant when I do not account for demand constraints (suggesting that more productive women are more likely to be employed everything else constant). This goes against the usual predictions and results where more productive women have higher reservation wages (their time is worth more to them) and are hence less likely to be observed working. Once I control for demand constraints, the sign of the parameter becomes positive (and non-significant). This suggests, that the demand-side constraints are strong and are captured by the selection mechanism when not explicitly accounted for.

The fixed costs of work parameters are very similar in the different specifications. The constants are negative, suggesting that the benefits of being employed surpass its costs (this could reflect human capital accumulation benefits, or pension savings). As expected, living in Paris and having young children is associated with a positive

cost. Note that the cost is very small for children aged three to six, which should reflect the possibility of leaving them all day at school. Finally having more children brings benefits to working (and not costs). This result is counter-intuitive, and might reflect the idea that mothers still have an incentive to stay in the labour force for career prospects for instance.

Regarding the employment constraints, local unemployment has a significant negative impact on the probability of finding work, while older women have higher chances of being successful in their job hunt.

In the wage equations, the inclusion of demand constraints hardly influences the parameter estimates. The estimates reflect exactly what economic theory would predict (positive and diminishing effect of age, and positive returns to education). The parameter estimates of the wage equation in the one-wage model are very close to the Full-time wage equation ones in the three-wages model (which is sensible as the majority of working women are employed full-time). The difference in returns to lower education attainments between part-time and full-time work are sizable.

Table 2.9 in the appendix shows the full model with demand constraints and part-time wages fits best the data.

2.4.3 Elasticities

The wage elasticities presented in Table 2.1 decrease slightly by accounting for part-time wage differentials (especially for mothers of young children and low educated women) and a little more when accounting for demand constraints. Overall controlling for potential rationing decreases the elasticities by about 10% which is similar to the results of Bargain et al (2010). Demand constraints affect particularly the elasticities of women without children or highly educated, as these women are most likely to be willing to work and therefore affected by constraints to find work. I also recover the income elasticities by simulating the response to a 1% increase in outside of work income. Table 2.2 reports the income elasticities that decrease slightly with the presence of demand constraints.

Model	No Part-Time Wages		No Demand Constraints		Demand Constraints	
Elasticities	Intensive	Participation	Intensive	Participation	Intensive	Participation
All	.50	.42	.49	.41	.45	.38
Age of youngest:						
Youngest kid 0 to 3	.76	.67	.72	.63	.70	.62
Youngest kid 3 to 6	.52	.44	.51	.43	.47	.41
Youngest kid 6 to 18	.47	.39	.47	.38	.44	.36
No kids	.40	.33	.39	.32	.33	.27
Education level:						
Below GCSE	.59	.54	.57	.52	.59	.53
GCSE	.52	.45	.51	.43	.49	.42
A-levels	.49	.41	.48	.39	.43	.36
Higher education	.46	.37	.45	.36	.39	.31
University	.42	.33	.42	.32	.35	.26

Table 2.1: Wage Elasticities

Model	No Part-Time Wages		No Demand Constraints		Demand Constraints	
Elasticities	Intensive	Participation	Intensive	Participation	Intensive	Participation
All	-.14	-.14	-.15	-.14	-.13	-.12
Age of youngest:						
Youngest kid 0 to 3	-.14	-.15	-.13	-.14	-.13	-.14
Youngest kid 3 to 6	-.23	-.22	-.23	-.21	-.19	-.18
Youngest kid 6 to 18	-.18	-.17	-.18	-.16	-.15	-.14
No kids	-.03	-.03	-.05	-.04	-.05	-.04
Education level:						
Below GCSE	-.10	-.11	-.10	-.12	-.10	-.11
GCSE	-.12	-.12	-.13	-.12	-.12	-.11
A-levels	-.14	-.14	-.14	-.14	-.12	-.12
Higher education	-.17	-.16	-.17	-.15	-.14	-.12
University	-.21	-.18	-.20	-.17	-.17	-.14

Table 2.2: Income elasticities

2.5 Paje reform evaluation: Diff-in-Diff vs Structural model

In this section, I simulate the impact of modifying the 2007 Paje system for mothers of young children back to the 2004 APE system. I can then compare the predictions from my models with the overall impact of the reform evaluated via a Diff-in-Diff on the same groups of women. The Diff-in-Diff follows the total impact specification of chapter 1, section 5 where the pre-period was composed of the years 2001-2003 and post-period the years 2007-2009. I will check the evaluations for the same demographic groups as in chapter 1, along the extensive and the intensive margin. The structural model also allows me to differentiate clearly the impact of different components of the reform. I can evaluate the sole impact of the attribution of stay-home subsidies to mothers of a first child. I also check that the small increase in transfers to mothers who choose to decrease their hours of work to look after a young child had a negligible impact. Finally, I can shed some light on the overall impact in the changes of thresholds to the income transfers received by many households. The results are presented in Table 2.3 below.

When simulating the policy changes, .along the extensive margin, the model specification really affects the size of the simulated policy impact for mothers of one child younger than one. This is important as these women were the most affected by the changes in incentives to come back to work following a birth. Without demand constraints, the extensive margin responses simulated by the model are nearly twice the reduced-form estimate. With demand constraints, the model simulates an impact much closer to the difference-in-differences estimate. Looking at the other groups, the model correctly predicts the absence of changes in the employment rates of mothers with only one child aged one to three. It predicts an increase in the employment rate of mothers with two children whose youngest is one to three by 1.7 percentage points, while the reduced form estimate is more than double that. This is particularly reassuring because my model does not account for the fall in net childcare prices resulting from the modification in childcare subsidies (I use the 2007 childcare prices in the model). This suggests, that a big part of the positive reaction to the policy from this group of women does indeed come from the childcare subsidies. Finally, the

fall observed in the employment rates of mothers with two children whose youngest is below one, is particularly puzzling given the changes in work-incentives they faced. I already discussed this in the first chapter and advanced that changes in social attitudes and/or peer effects might explain it. The evidence provided by the simulation results reinforces that argument.

Along the intensive margin, the model predicts no changes in hours worked while in employment and this is observed in the data in all groups except mothers of two children whose youngest is below one. The reduced-form estimates suggest that those mothers who quickly came back to work after the birth of their second child were able to increase their working hours (probably thanks to the childcare subsidies and the priority rules associated with siblings).

The structural models also allow me to specifically disentangle the effect of the different transfer changes. It appears that the reaction of mothers whose first child is younger than one is entirely driven (as one would expect) by the eligibility to the stay-home benefits. For mothers of two children whose youngest is one to three, the changes in part-time work incentives through the CLCA (ex-APE) had very limited impact. The changes in the income transfer thresholds that was problematic for the interpretation of my results in chapter 1, suggest that this policy change may have increased the employment rate by 1.3 percentage points (roughly a third of the 3.6 percentage points estimated by the DID), which is in line with what I found in Chapter 1 when I excluded the women who were most likely to have been affected by these income threshold changes.

Along the intensive margin, as expected the rise in part-time work incentives through the CLCA (ex-APE) had a very limited negative impact (less than minus twelve minutes of work a week) and this effect would have been offset by the increase in full-time work incentives induced by the income transfer thresholds changes.

Overall this exercise is reassuring along two dimensions. On the one hand, it suggests that the structural model with demand constraints can be trusted for policy simulations exercises (and probably more than the models without the double-hurdle specification). On the other hand, it confirms the conclusions from chapter 1: the fall in employment for mothers of a first child is entirely driven by the eligibility to stay-home subsidies. The increase in employment among mothers of two children whose

youngest is older than one can mainly be attributed to childcare subsidies . The fall in employment for these mothers when the youngest is below one cannot be explained by any changes in the work incentives they faced and should be attributed to other factors (such as peer effects or changes in societal attitudes).

	Extensive margin				Intensive margin			
Age of youngest	3-11 months old		1-3 years old		3-11 months old		1-3 years old	
Num. children	1	2	1	2	1	2	1	2
Overall system								
DID method	-.081**	-.038	-.026	.036**	1.051	3.288***	-.104	.087
95% C.I	[-.151,-.011]	[-.093,.015]	[-.072,.020]	[.002,.071]	[-.963,3.066]	[1.674,4.903]	[-1.432,1.223]	[-.973,1.147]
Structural model: Demand constraints	-.114	.017	.005	.017	-.467	-.036	.115	.020
Structural model: No demand constraints	-.144	.016	.007	.017	-.380	-.030	.101	.031
Structural model: No part-time wages	-.150	.017	.008	.018	-.360	-.030	.096	.072
Stay-home subsidies to 1st kid								
Structural model: Demand constraints	-.119	.	.	.	-.586	.	.	.
Structural model: No demand constraints	-.152	.	.	.	-.479	.	.	.
Structural model: No part-time wages	-.160				-.475	.	.	.
Part-time subsidy increase (CLCA)								
Structural model: Demand constraints	.003	.004	.	.004	-.196	-.242	.	-.239
Structural model: No demand constraints	.003	.004	.	.004	-.160	-.200	.	-.199
Structural model: No part-time wages	.003	.004	.	.004	-.166	-.206	.	-.201
Income transfer thresholds (Alloc.Base)								
Structural model: Demand constraints	.021	.012	.005	.013	.372	.220	.115	.275
Structural model: No demand constraints	.024	.012	.008	.013	.305	.180	.101	.243
Structural model: No part-time wages	.025	.012	.008	.013	.316	.185	.096	.231

Table 2.3: Policy impact estimates from Difference-in-Differences and models simulations along the extensive and intensive margins of work

2.6 Conclusion:

This chapter showed that the double-hurdle and part-time wages specification decreased the elasticities of labour supply simulated by a discrete choice labour supply model. Controlling for the existence of barriers to work was necessary to modify the simulated impact of the 2004 Paje policy changes closer to the Difference-in-Differences estimate. Without such constraints, the labour supply model overestimates the impact of the reform. For smaller reforms, the predicted labour supply reactions are very close no matter what model was specified. Bargain et al (2010) arrived at similar conclusions using German data.

In terms of better understanding the 2004 Paje reform, the different policy simulations confirm the main results from chapter 1: the fall in employment rate for first-time mothers is entirely due to stay-home subsidies. The fall in employment rate of mothers who just had their second child is puzzling when considering the changes in work-incentives they face and should be attributed to indirect effects of the policy. The increase in the employment rate of mothers with two children whose youngest is above one is a combination of changes in income transfer eligibilities and mainly a change in childcare subsidies generosity.

Being confident in the double-hurdle with part-time wage penalties model specification, I estimate the exact same model on a sample of British married women in the next chapter. This allows me to better understand the determinants of cross-country hours of work differences. I will then use the model to briefly study the impact that joint-taxation in France has on married women's (with working husbands) labour supply.

Appendix:

		No Part-Time Wages		No Demand Constraints		Demand Constraints	
		Parameter	(s.e)	Par.	(s.e)	Par.	(s.e)
β_y :	age	.1177938	(.2342492)	.2969375	(.2562993)	-.0211404	(.3442384)
	age squared	-.4425467 .	(.7440443)	-.9975328	(.8199947)	.0956037	(1.081601)
	Paris	.0363812	(.0808591)	.0699259	(.0887306)	.0634008	(.1172478)
	left school before 16 y.o	-.153455	(.0950228)	-.1586632	(.105265)	-.2830348	(.1394994)
	constant	1.386172	(.7636662)	.8465666	(.824654)	2.109509	(1.12682)
β_h:	age	.0025424	(.0340199)	-.0194026	(.0365332)	.0319474	(.0462901)
	age squared	-.020723	(.1088982)	.0464243	(.1180091)	-.1739887	(.1488431)
	Paris	.0400427	(.0147043)	.0310462	(.0153028)	.0328435	(.017699)
	age of youngest kid 0 to3	.0045387	(.0078413)	.0109703	(.0083239)	.0005985	(.009133)
	age of youngest kid 3 to6	-.0085806	(.0072565)	-.0071881	(.007409)	-.0153598	(.0079)
	number of dependent kids	-.0346241	(.0028045)	-.0335959	(.0028802)	-.0355333	(.003013)
	left school before 16 y.o	-.0346241	(.0028045)	.031257	(.0167557)	.0513159	(.0207549)
	constant	-.4367367	(.116767)	-.3608379	(.1245348)	-.5106735	(.1581345)
α_y:		-.0377106	(.0049611)	-.0375474	(.0053681)	-.038754	(.006096)
α_h:		.0061968	(.0006724)	.0059398	(.0007946)	.005777	(.0009167)
α_{yh}:		.0088524	(.0013955)	.008492	(.0015243)	.0079727	(.0016939)
ρ:		-.2418728	(.1118455)	-.3444242	(.1100562)	.0268267	(.1254705)

Note: income was divided by 100

Table 2.4: Utility Functions

	No Part-Time Wages		No Demand Constraints		Demand Constraints	
	Parameter	(s.e)	Par.	(s.e)	Par.	(s.e)
FC constant	-1.724124	(.3628312)	-1.838811	(.4026316)	-1.834302	(.3826994)
Paris	1.214525	(2162396)	1.04928	(.2288573)	.9096733	(.2218583)
age of youngest kid 0 to3	.3076515	(.2157944)	.461925	(.2269392)	.2855556	(.2106917)
age of youngest kid 3 to6	.0237745	(.2010472)	.0606426	(.2033997)	.0210882	(.1884332)
number of kids	-.6928487	(.0870376)	-.6362418	(.0859905)	-.4555657	(.0764048)
FC Full-Time	-.659892	(.0689106)	-.602895	(.0817324)	-.5366605	(.079718)

Table 2.5: Fixed Costs of Work

	No Part-Time Wages		No Demand Constraints		Demand Constraints	
	Parameter	(s.e)	Parameter	(s.e)	Parameter	(s.e)
Local unemployment rate	.	.	.	.	-11.70016	(2.183749)
Age	.	.	.	.	.2319446	(.0923116)
Constant	.	.	.	.	1.40013	(.3432415)

Table 2.6: Employment probabilities

	All hours	
	No Part-Time Wages	
	Par.	(s.e)
age	.2546032	(.0332252)
age squared	-.4025158	(.1151989)
education level 1	.1987293	(.0167089)
education level 2	.3815646	(.0180999)
education level 3	.6001042	(.0199817)
education level 4	.7050709	(.0194829)
Paris	.1654523	(.013098)
constant	1.420786 .	(1051882)
$\ln(\sigma_j)$	-1.036607	(.0156769)

Table 2.7: Wage equation in the model with no part-time penalties and employment constraints

	20h				30h				Full-Time			
	No Constraints		Demand Constraints		No Constraints		Demand Constraints		No Constraints		Demand Constraints	
	Par.	(s.e)	Par.	(s.e)	Par.	(s.e)	Par.	(s.e)	Par.	(s.e)	Par.	(s.e)
age	.2375816	(.0647135)	.2371632	(.0675548)	.3732711	(.0593421)	.358264	(.0558788)	.2273653	(.0366497)	.2224444	(.0356379)
age squared	-.4098693	(.2295244)	-.4812559	(.2367231)	-.8017309	(.2002585)	-.7985752	(.1874229)	-.3063128	(.1266146)	-.3205765	(.122926)
education level 1	.1067988	(.0333012)	.1075927	(.034765)	.2665303	(.030291)	.2648197	(.028717)	.2032632	(.0176892)	.1990309	(.0172641)
education level 2	.2590067	(.0364128)	.262981	(.0383732)	.4784799	(.0317448)	.4737279	(.0301698)	.3783571	(.01912)	.3709876	(.0186775)
education level 3	.4824832	(.0387753)	.484299	(.0407547)	.7311147	(.0332423)	.7157483	(.0316969)	.5782503	(.0210806)	.5664776	(.0206242)
education level 4	.7148507	(.0360041)	.7256793	(.0384898)	.7486697	(.0336618)	.7534219	(.0320046)	.6877178	(.0210309)	.6853334	(.0205663)
Paris	.1486968	(.0277331)	.1515614	(.0294207)	.1234536	(.0231961)	.1204044	(.0218267)	.166352	(.0141728)	.1632867	(.0139533)
constant	1.48622	(.2042046)	1.551913	(.2133865)	.9547737	(.188401)	1.056542	(.1781169)	1.527608	(.1152575)	1.590163	(.1120138)
$\ln(\sigma_j)$	-.920975	(.0264768)	-.9512379	(.0248307)	-1.025325	(.0236249)	-1.060558	(.0218378)	-1.072547	(.0158884)	-1.110474	(.0134714)

Table 2.8: Wage equations in the models with part-time wages and employment constraints

	Hours	Observed	No Part-Time Wages Predicted	No Demand Constraints Predicted	Demand Constraints Predicted
All	0	.281	.258	.252	.271
	20	.113	.116	.117	.114
	30	.138	.142	.145	.142
	Ft	.467	.485	.484	.472
Youngest kid 0 to 3	0	.447	.421	.412	.431
	20	.092	.103	.101	.099
	30	.128	.109	.111	.107
	Ft	.332	.367	.374	.360
Youngest kid 3 to 5	0	.307	.279	.274	.305
	20	.121	.136	.138	.131
	30	.163	.145	.152	.147
	Ft	.407	.438	.435	.416
Youngest kid >5	0	.243	.226	.221	.238
	20	.131	.135	.136	.131
	30	.153	.154	.160	.157
	Ft	.473	.486	.482	.473
No kids	0	.202	.171	.168	.183
	20	.091	.078	.082	.081
	30	.104	.144	.141	.138
	Ft	.601	.608	.611	.597
Quasi-concave utility & pos. MUy			.998	.998	.969

Table 2.9: Model fit

Child-care first-stage regressions:

The four income groups each contain about a quarter of the households, households with disposable incomes below 2000€ belong to group 1, households with disposable incomes between 2000€ and 3000€ belong to group 2, households with disposable incomes between 3000€ and 4000€ to group 3, and households with disposable income above 4000€ to group 4. The following Table 2.10 presents the childcare hourly cost (per child) distribution for each household group:

Price range	0	]0,.5]	].5,1]	]1,1.5]	]1.5,2]	>2
Income group 1	.45	.26	.17	.06	.01	.05
Income group 2	.32	.18	.35	.08	.03	.04
Income group 3	.16	.18	.32	.16	.11	.06
Income group 4	.11	.06	.16	.21	.17	.29

Table 2.10: Frequency in price range (Euros)

	constant	(s.e)	slope	(s.e)
Income group 1	7.80323	(3.974517)	.2461619	(.1215633)
Income group 2	8.23608	(2.973548)	.3805881	(.0921147)
Income group 3	20.42692	(3.111333)	.1666463	(.0936205)
Income group 4	16.16387	(3.17261)	.4512845	(.0898695)

Table 2.11: Hours of childcare per child and hours of work:

3 Why do married women work less in the UK than in France?

3.1 Overview

Using household level data and detailed tax programs, I try to understand why the number of hours worked by British married women is lower than that of French married women. I find that in the presence of children, British mothers are far more responsive to financial incentives. Husbands earnings and their interaction with childcare prices seem to play an important role. Nevertheless, the fall in hours worked in the British households with children, despite facing lower taxes than in France, remains somewhat puzzling in the light of conventional explanations. It could be mainly attributed (in the framework used) to different preferences.

3.2 Introduction:

In an influential paper, Prescott (2004) uses a representative agent model to understand international differences in average hours worked. He claims that most of the cross-country variation can be explained by variation in tax rates. His approach does not allow for extensive responses, relies on a very high estimate of labour supply elasticity and does not consider heterogeneity among individuals. Following studies, by Rogerson (2006, 2008) and Blundell et al (2012), look at the extensive and intensive margins of work for different categories of the population in the OECD countries. They find high cross-country differences for the young and old workers, suggesting that other institutions (such as early retirement schemes for instance) may play a role

in the international differences of hours worked. Blanchard (2004) believes that the answer is to be found in differences in preferences and culture. Lungqvist and Sargent (2006) incorporate the benefit system (in addition to taxes) in a calibrated macroeconomic model and restate the puzzle as why do Europeans work so much given the tax and benefit systems they face. Alesina et al (2005) argue that Europeans work much less because of Union policies in the 1970's and 80's, and highly regulated labour markets. They also advance without much evidence that "tax rates differences could explain most of the cross-country differences in hours worked among married women, but not for men".

Surprisingly, not much attention has been paid to the different female attitudes across countries (except in Blundell et al (2012)). The aim of this paper is to fill that gap and check the validity of the above statement. Using household level data (Labour Force Surveys and childcare surveys in 2007) combined with precise information on the taxes and transfers faced by married women in the UK and France, I estimate the same labour supply model in each country. This allows me to estimate preferences and elasticities across the two countries, while controlling for costs of work, part-time wage penalties and employment constraints.

The reason for choosing these two countries is that they figure (respectively) in the middle and lowest rank of Prescott classification of average hours worked in the OECD. Among the European countries, the UK is considered the one with the lowest taxes, the most flexible labour market and Anglo-Saxon preferences for leisure (they would enjoy leisure less than their Continental neighbours), whereas France is associated with high taxes, heavily regulated labour markets and a high preference for leisure.

If one was to predict the hours worked by married women, it would be tempting to predict that they work much more in the United Kingdom than in France. As we will see, the opposite is observed in the data. I find that the cost of childcare and, its interaction with income available outside work (through the husband's earnings) can fully explain the observed gap. part-time wage penalties could also explain a fraction of the observed hours gap for mothers of very young children.

The underlying labour supply seems wider than suggested by the data (once country-specific institutions and constraints are accounted for). The specification chosen and

data available allows me to identify the impact of childcare costs on labour supply choices. Unfortunately, I cannot control for the quality and availability of childcare due to data limitation. As a result, the preferences for leisure appear much higher for British mothers. Such a result should be taken with a pinch of salt. It could in fact reflect the lack of satisfactory care options for mothers in the UK.

The model estimated is a static labour supply one. Childless married women work slightly more in the UK than in France. The estimation results suggest that British married women are less attached to the labour market (particularly to full-time jobs) during motherhood, compared to French women. This might be a side-effect of a more flexible labour market. If it is difficult to re-enter the labour market (after raising children) for a French mother, she would be more reluctant to give up a full-time position. I can identify such a mechanism at work, but a life-cycle specification of labour supply choices would be welcome to estimate its true size and importance.

In the following section I describe more specifically what I observe in the data. In Section 4, I justify the choice of looking only at married mothers with working husbands, leaving aside single-mothers and unmarried women in couples. In Section 5, I briefly describe and compare (through budget constraints) the UK and French tax systems. In Section 6, I look at descriptive statistics to address different explanations and justify my choices of modeling. The slight differences in the childcare costs in the structural labour supply model are presented in Section 7. The model estimates are presented and put into perspective in Section 8. Section 9 presents different policy experiments. Section 10 concludes.

3.3 What we observe in the data: Labour Force Surveys 2007

3.3.1 Decomposing the data for all 25-50 years old women according to age and marital status.

Modeling the education and retirement decisions are above the scope of the paper, as a result, I focus on the 25 to 50 years old age group. In this section I look at

the average hours of work per marital status. The first point to draw attention to, in Figures 3.1 and 3.2, are the higher average hours worked in France for women in all types of households. As documented in Blundell et al (2012), female workers join the labour force earlier in the UK than in France, but from their late twenties, the hours of work in France are slightly higher at all ages, and particularly during the child-rearing years.

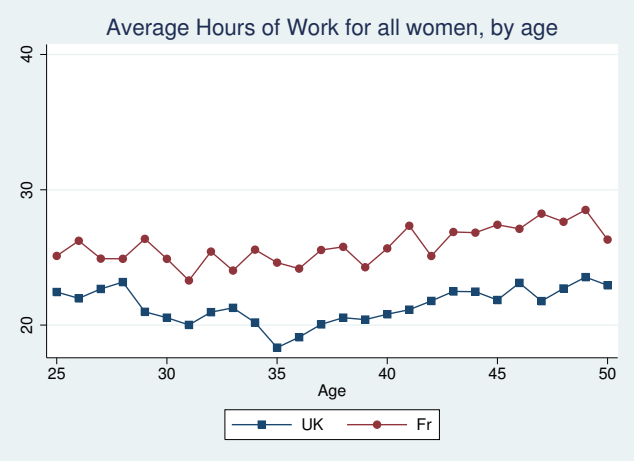

Figure 3.1: Aggregate hours of work for all women, by age

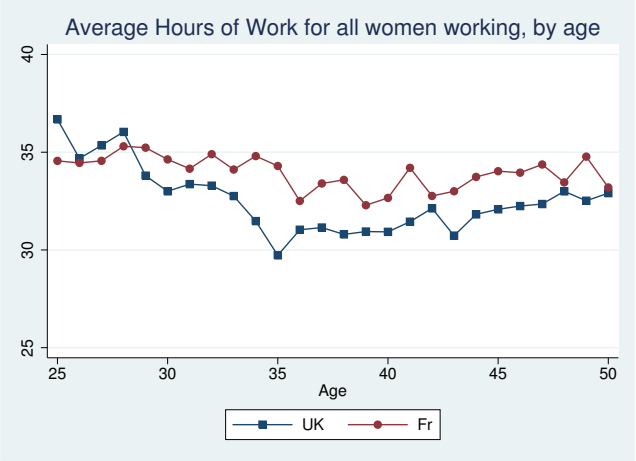

Figure 3.2: Average working hours for all women, by age

Nevertheless when looking into more details, it appears that the narrative differs a little wether women are married or not. As Figures 3.3 and 3.4 show, for married women no clear pattern emerges along the extensive margin of work, whereas along the intensive, it is very apparent that once in the labour market, French married women work longer hours.

Figure 3.3: Employment rates of married women, by age

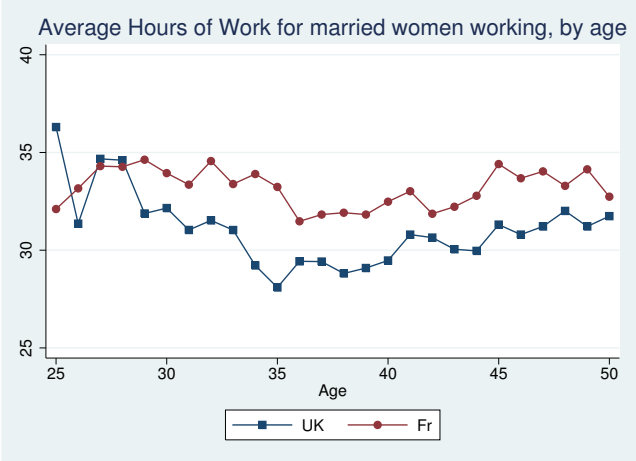

Figure 3.4: Average working hours of married women, by age

When focusing on non-married women, the narrative is slightly different (Figures 3.5 and 3.6), there is a clear difference along the extensive margin, but once these women have decided to work, their choices of hours do not differ a lot across countries. This is true if they are in out-of-wedlock couples:

Figure 3.5: Employment rates of women in couples (non-married), by age

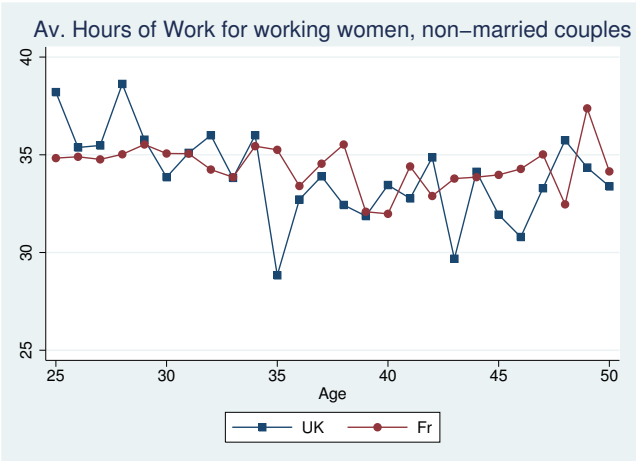

Figure 3.6: Average working hours of women in couples (non-married), by age

And is particularly striking for single women in Figures 3.7 and 3.8.

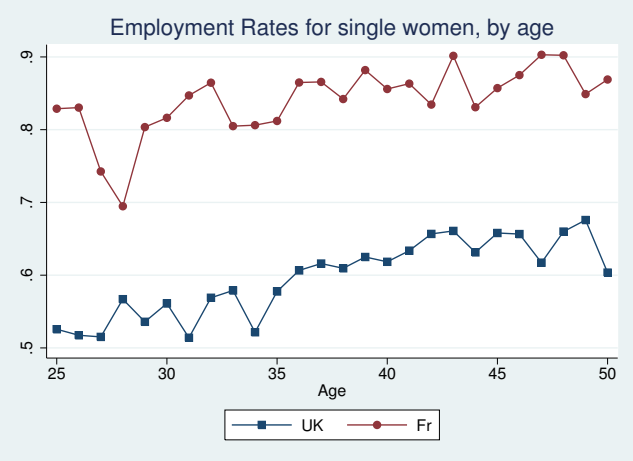

Figure 3.7: Employment rates of single women, by age

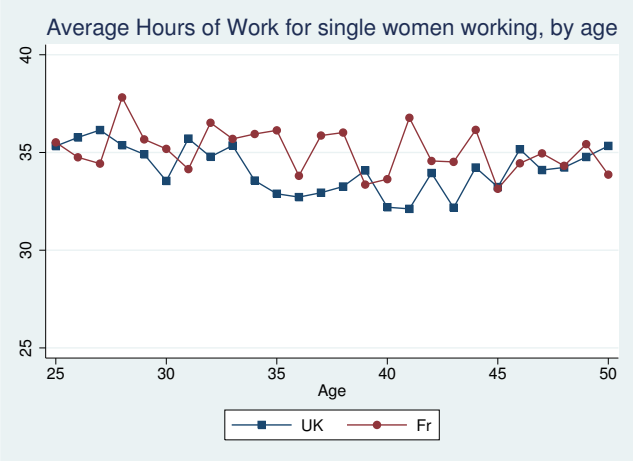

Figure 3.8: Average working hours of single women, by age

I will argue further down, that the composition of the single women and non-married women groups may differ across countries, making any insightful comparison difficult. In that project, I will focus on understanding what causes the differences observed across countries for married women.

3.3.2 The presence of kids in married households impacts women differently in the two countries:

I now look into more details at married women. When looking at the extensive and intensive margins of work om Figures 3.9 and 3.10, it is very interesting to note that the extensive margins are rather similar across both countries no matter what the age of the youngest kid is. A very different picture emerges on the intensive margin of work, in the presence of children, married British females decrease their hours of work, and a large majority work part-time:

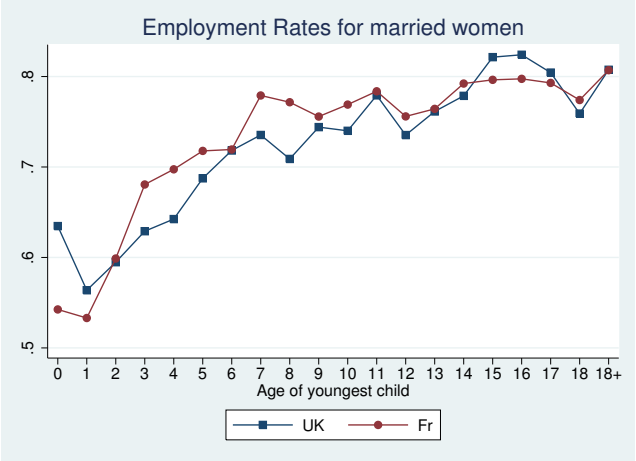

Figure 3.9: Employment rates of married women, by age of the youngest

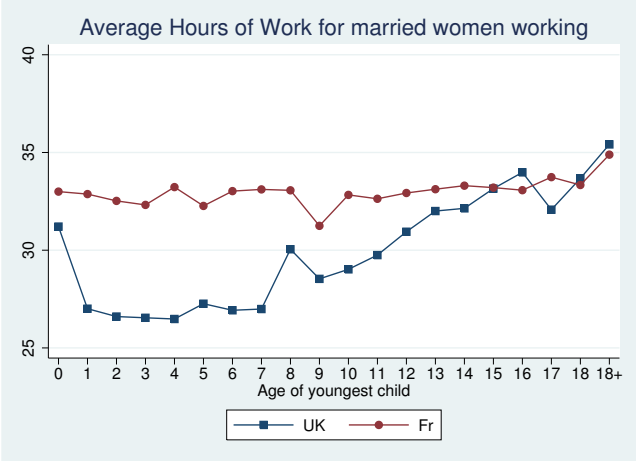

Figure 3.10: Average working hours of married women, by age of the youngest

Looking at the hours distribution in both countries (Figures 3.11 and 3.12) it becomes evident that the majority of married British mothers work part-time as opposed to France.

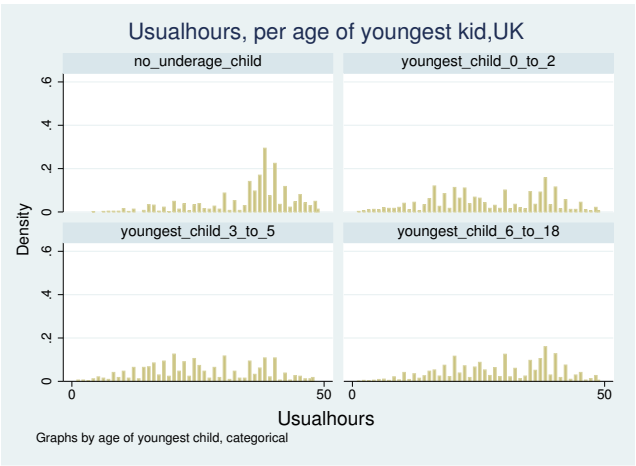

Figure 3.11: Working hours distribution in the UK, by age of the youngest (married women)

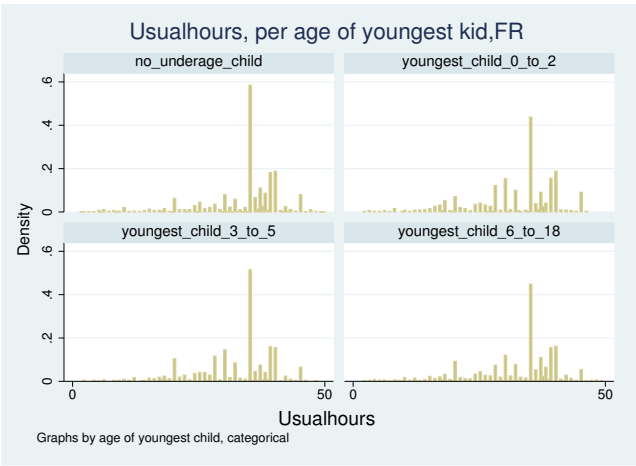

Figure 3.12: Working hours distribution in the UK, by age of the youngest (married women)

This drop in working hours in the presence of children is observed at every education

levels. Figures 3.13 and 3.14 compare the intensive margin of work for married women with no kids and two kids by education level in each country:

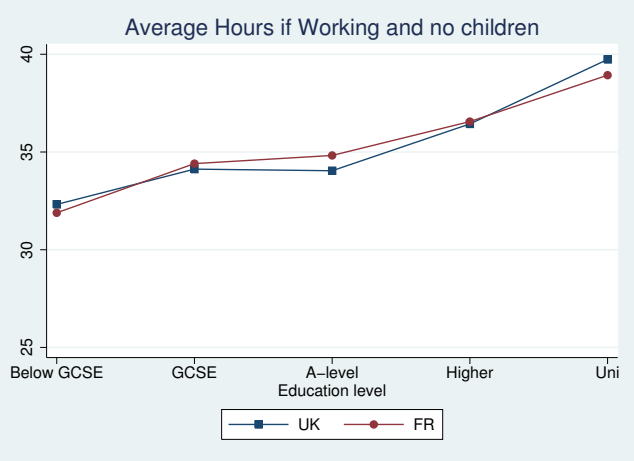

Figure 3.13: Average working hours of married women with no children, by education level

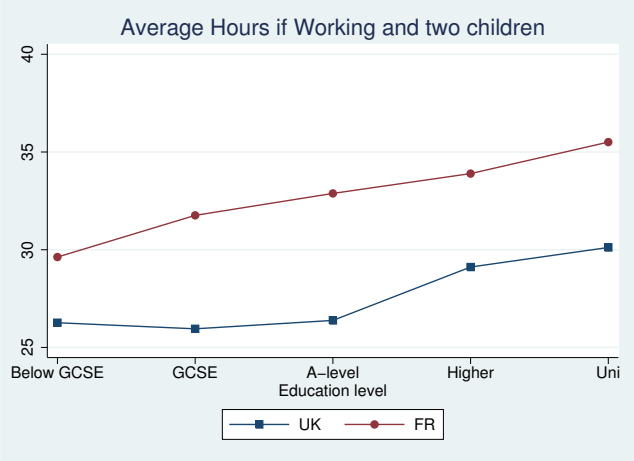

Figure 3.14: Average working hours of married women with two children, by education level

The interesting question to ask now is can the tax and benefits explain this different intensity of work for mothers (as advanced by Alesina et al. (2005)) or are there other factors that explain the labour supply differences? But first I will discuss why I focus on that specific sub-group of the population.

3.4 Comparing the observable characteristics of married and non-married households in each country:

A cross-country study is not short of problems and difficulties. An individual with the same unobservable characteristics, having lived in different countries may have encountered herself with different institutions, incentives, culture and her position at a certain time in her life may be the result of successive selection into particular states (education, marital status, fertility for instance). I want to focus on married

females in the two countries because they appear similar across key margins. Prime-age married women, had their first child on average at 27.5 years in the UK and 26.7 years in France. Table 3.8 in the appendix describes the close distribution of children among them. The education distribution of married women are strikingly similar as reported in Table 3.8 in the appendix. In 2007, the average age at first marriage was 29.8 in the UK and 29.5 in France. The number of divorces per thousand married couples was 11.8 in the UK and 10.7 in France. The husbands of these women do not appear very different: they work slightly longer hours in the UK (Table 3.8 in the appendix), but their choices are not affected by the presence of children in either country. The average husband's age in my sample is 41.6 in the UK and 39.4 in France. Also, looking at Figure 3.15, the husbands' hourly productivities distribution does not appear to be higher in one country, it is more spread in the UK, but not shifted to the right or left of the French distribution. All this evidence suggests that focusing only on households where the husbands work may not be too restrictive to understand the mechanisms affecting married women's choices of labour supply on both sides of the Channel.

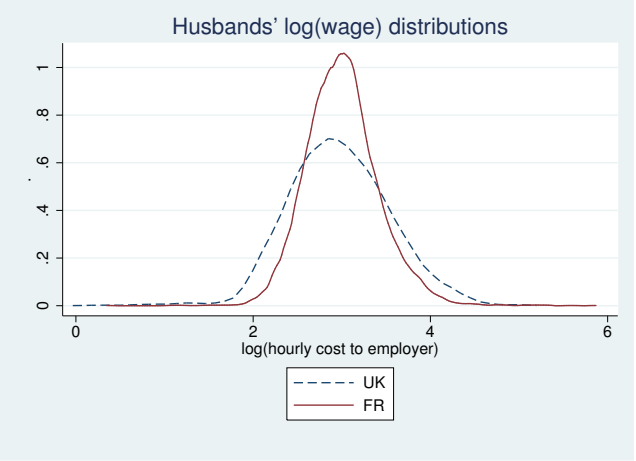

Figure 3.15: Husbands'wage distributions in the UK and France

In the UK, the decision to live single instead of in a couple might be influenced by the tax-benefit system. Once in a couple it appears very unlikely that the tax-benefit system would affect the decision to get married (Adam & Brewer 2011). In France there might be a penalty/premium for living as married and not simply cohabiting

as well as for living single as opposed to in a couple (each of these status affects the calculation of "parts" in the Quotient Familial as explained in the appendix). The proportion of women married are similar in both countries (Table 3.8 in the appendix). Among non-married women, the distribution between those declaring themselves as single or in couple differs a lot. I take the view that a woman may face an ordered choice where she goes from single to cohabiting and then to married. So the decision to live as single or cohabiting could be influenced by the tax benefit systems, but the impact of tax-benefit systems on the decision to get married once in a couple would be negligible. I will consider that the similar ages at first marriage, divorce rates and marriage rates in the two countries point towards similar attitudes to marriage, on which the influence of the tax-benefit system is negligible. I rely on the results of Ellwood (2000) and Lundberg & Pollack (2007) that do not find evidence of taxes having an impact on marriage decisions.

I do not aim to model the education decision, and will consider it as fixed. As to fertility, I will assume that the impact of financial incentives on it is negligible. Baughmann and Dickert-Conlin (2003 and 2009) do not find conclusive evidence that fertility is influenced by taxes and financial incentives, while Laroque and Salanie (2008) find some correlation.

Married women may still differ along unobservable characteristics across the two countries. Their tastes for leisure or time spent with children, and for income may vary. This is why it is important that I estimate a labour supply model accounting for preference heterogeneity in each population. I will not explicitly model any intra-household bargaining mechanism as incorporating the bargaining over joint-taxation in France would prove to be extremely challenging, for that same reason (and for the lack of cross-country variation in the husbands hours of work) I will consider the husband's decision to work as fixed. By ignoring non-married women, I will not be able to control for potential unobserved marriage tastes. I rely on the similarities discussed above to assume that the married women are comparable individuals across the Channel.

3.5 Different tax and benefit systems:

The following sub-section intends to describe the specificities of the tax systems (for the keen reader) as succinctly and clearly as possible. The reader can jump directly to section 4.2, where I highlight how the tax and benefit systems interact and result in individual-specific average and marginal tax rates.

3.5.1 Tax systems facing married households in each country:

3.5.1.1 Brief overview of the UK tax and benefit system:

Main benefits affecting married households: The main benefits for families with children are the child benefit and the child tax credit. The former is non-taxable, non-contributory and non-means tested. It's payable to all families regardless of income. The rate is higher for the eldest child, then lower for subsequent children. The Child Tax Credit is paid on top of child benefit to the main carer in the family. It is independent of employment status. The claimer needs to be responsible for at least one child below 16 years old (or 19 if at school). It is important to note that it is joint means tested with the Working Tax Credit. The CTC is made up of a family element, a baby element and a child element. Below 100.11£ a week it is fully paid, it is then withdrawn (with the WTC) at a rate of 37%. There is a second income threshold of 958£ up to which the family is guaranteed the family element.

Low income household can receive four major benefits: the income support, the Working Tax Credit, housing benefits and council tax benefits. The income support is means tested but non-taxable and non-contributory. The family income needs to be below a certain applicable amount, and the benefit would top up the family resources to that amount. It entitles the household to maximum housing and council tax benefits. The WTC is non taxable, non-contributory, and means tested. It provides in-work support for low paid working adults. For families with children to be eligible, at least one adult should work 16 or more hours per week (30h if no kids in the household). It is made up of a basic element, a couple element, a 30 hours element (if the worker works 30 hours or more). Importantly it also has a childcare element: if both parents work more than 16 hours a week, it reimburses childcare costs up to

140£ a week with one child and 240£ with more children. But this childcare element gets tapered away like the rest of the tax-credits. The housing and council tax benefits are both non taxable, non contributory and means tested. The housing benefits helps families with low incomes to cover their rent, the maximum level is equal to the "eligible rent" minus deductions for non dependents. This "eligible rent" is capped at a "local reference rent". The amount of benefits received depends on the household income relative to the "applicable amount", which varies with the number of children. If the family income is above that applicable amount, the housing benefits get tapered away. The council tax benefit conditions are very similar to the housing benefits, and it covers the cost of part (or the entirety) of the council tax.

Taxes on income derived from work: Each worker in the household pays the income tax and national insurance contributions. For income below 6,035£ a year, no income tax has to be paid. The tax rate is then 20% up to £34,800 of taxable income and 40% above. The national insurance contributions are paid by the employee on her gross wage and by the employer. For weekly earnings below 105£, both employee and employer pay no contributions, between 105£ and 770£ the employee standard rate is 11% and 12.8% for the employer. Above 770£, the former drops to 1% and the second remains at 12.8%. Households also pay the council tax that depends on the band rate of their property. As reported in the appendix, social contributions generally represent slightly less than 20% of the cost to employer

3.5.1.2 Brief overview of the French tax-benefit system for married households

Main benefits affecting married households: The child benefit is independent of the household's resources, all families with at least two kids below 20 years old are eligible. They are larger for kids above 11 years old and 16 years old, except for the oldest kid in a family with two children. The family complement is available to families with three or more kids between the ages of three and twenty-one. It is conditional on resources and family composition. Eligible families get 155.05€ whatever the family composition is. Families with kids below three years old may be entitled to the PAJE and receive 171.06€ per month. There is a complement if the mum decides to stop full time work, or reduce her activity to part-time job. If both parents work, part

of the childcare costs can be covered. It's awarded conditional on resources of the household and family composition. Depending on their resources and composition, families with children between the age of 6 and 18 receive in September of each year a school benefit (272.57€) per child to help cover the costs of schooling. In 2007, low income households could claim the RMI (income support). It was replaced in 2008 by a similar benefit called the RSA. It is a benefit that tops up the household income to a minimum level. To be eligible you need to be more than 25 years old and have resources below a minimum level that varies with the household composition. When one member of the household finds a job, he keeps the RMI for the first three months. After, for 9 months, only 50% of the revenues from work are taken into account in the RMI calculation, or she receives a monthly premium of if she works more than 78 hours a week. If the household has no housing rents or mortgage repayments, or receives housing benefits, a fixed amount (household demographics dependent) is deducted from the RMI payment. When receiving the RMI, you do not pay council tax and are eligible for housing benefits. Housing benefits are resources-dependent and their calculation is very complicated (the details of it are described in the appendix), the size of the transfer is equal to the rent and housing costs of which are taken out a personal participation. Once the final transfer has been calculated, it is taxed by the CRDS at 0.5%.

Household taxes: The income tax is household-specific (not individual). The taxable income is composed of the net salary and other sources of income (especially financial, and/or housing). To be more precise, you are taxable on your net salary, to which the CRDS need be included and part of the CSG. Some deductions apply on that initial taxable income estimate. Now, the specificities of the French system kick in. First of all, you are assigned a number of "parts" linked to your household demographics. With the taxable income and the number of parts N, you obtain your family ratio "Quotient familial" as the ratio of taxable income to the number of parts. If your taxable income is below a part-specific level, you are not taxable. If you are taxable, the calculation becomes more complicated and more specific details are reported in the appendix. It is important to note that more than half of the French households do not pay any income tax. Every working member of the household is also eligible for a small in-work tax credit (Prime pour l'emploi), that depends on

the number of working adults, the number of kids and work income. Finally, every household is liable to pay a council tax, based on a local renting value estimate of the house. The tax level is affected by local and national rates as well as family and/or income discounts. Local authorities can also apply a discount for low income households and a general discount. People entitled to the RMI do not pay this tax.

Social contributions paid by the employee: These contributions vary with a threshold called "plafond". In 2007, the threshold for monthly salary was 2,682€. On their gross salary, employees pay about 21.7% up to the threshold of contributions towards various social insurance and retirement programs. Above the threshold, the rates differ and details are reported in the appendix.

Social contributions paid by the employer: The employer pays about 38.2% of the gross salary in social contributions up to the threshold and this rate will vary after the threshold, more details are reported in the appendix.

Discount on social contributions for low salaries : Since 1993, discount on the social contributions paid by employers for low salaries have been introduced. They varied throughout the years, and especially after the introduction of the 35h workweek in 1999. This reduction concerns the contributions to the "sickness,maternity,invalidity and old age" insurances and to the family benefits. This discount is calculated as follows:

$$Discount = Gross\,monthly\,wage * discount\,rate$$

The discount rate falls as the salaries rise, it is maximal at the minimum wage and decreases linearly to reach zero at 1.6 times the minimum wage. It is defined as follows:

$$Discount\,rate = (0.26) * (\frac{1.6 * gross\,hourly\,SMIC * hours\,worked}{0.6 * \ monthly\,gross\,wage} - 1)$$

It is important in France to estimate the cost to the employer for low-wage earners, as this discount makes it very expensive for employers to increase net wages. As reported

in the appendix, total social contributions generally represent slightly more than 40% of the cost to employer.

3.5.2 Tax rates observed in the data:

It is very difficult from the description above to understand what the tax rates faced by married women are. To illustrate how tax rates are higher in France than in the UK, I infer the average (participation) tax and marginal tax rates for each woman observed working in my French sample under each country's system. I then calculate the difference between the tax rate she faces in France to the one she would face under the UK system. I report the distribution of this statistic below. For instance, if her effective marginal tax rate was 30% in the UK and is 50% in France, the difference between the two systems is of 20 percentage points and is reported in Figures 3.16 and 3.17 as 20%:

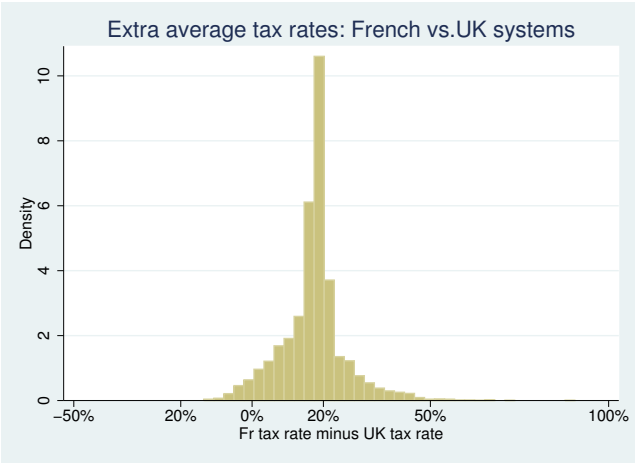

Figure 3.16: Extra average (participation) tax rates under the French tax system, at observed hours

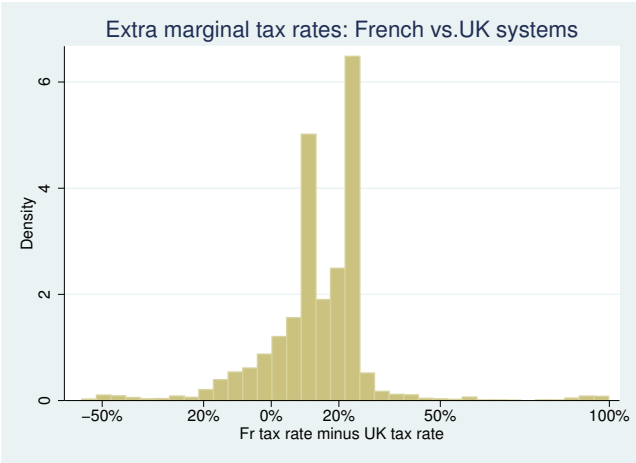

Figure 3.17: Extra marginal tax rates under the French tax system, at observed hours

Of course, these tax rates are endogenous in the sense that those women would have chosen their hours of work according to their budget constraint and the statistics presented here do not reflect the entire slope of their budget constraint. By estimating wage equations, I will be able to recover the potential tax rates faced by each woman at

every hours choice and present a more rigorous statistic further down. These tax rate differences appear quite important (for a major share of married women, the French tax system makes them face average and marginal tax rates around 15-20 percentage points higher than under the British system). These results are not unrealistic. The OECD computes the average and marginal tax wedge in each of its member countries for typical households. In Table 3.1 below I report their estimates for married couples in the UK and France. The marginal wedges computed by the OECD appear smaller than mine, but they are the ones for the principal earner in the household. The OECD calculations also do not account properly for the reduction in benefits on the tax rates (for instance in the UK the large discrepancy for the average wedges is explained by the loss of working and child tax credits when the main earner works).

	OECD evaluations		Author's evaluations	
	UK	France	UK	France
Two children				
One earner at 100% of av.earnings, one at 33%				
Average wedge (principal earner)	26.4	39.9	49.4	53.6
Marginal wedge (principal earner)	40.6	48.3	43.0	50.4
One earner at 100% of av.earnings, one at 67%				
Average wedge (principal earner)	29.9	44.8	38.7	48.8
Marginal wedge (principal earner)	46.5	51.2	47.4	51.9
No children				
One earner at 100% of av.earnings, one at 33%				
Average wedge (principal earner)	30.8	43.3	35.1	50.0
Marginal wedge (principal earner)	40.6	51.2	41.6	51.9

Table 3.1: Tax wedges for two-earners married couples, OECD 2007 evaluations vs author's calculations

In France the joint taxation, may also affect the tax rates paid by women, compared to the situation where the couple would not be married. It could increase the marginal tax rates (if the husband has a very high income say), or it could also decrease it (the Quotient familial is a rebate on taxable income), and I study its impact in the final chapter of this thesis.

3.5.3 Budget constraints:

The following graphs (Figures 3.18 and 3.19) show the budget constraint faced by a married woman in a household with kids aged 5 and 11. Both the female and male earn the median observed hourly wage in the French sample, the male work the average hours observed for males. The wage was translated to the corresponding employer hourly cost so that when passed onto the UK system it could be fully compared. The exchange rate used is the OECD estimate of the PPP for the year 2007. The results are striking, the exact same household would have a higher income than in France, at all hours level, from the woman not working to working full-time. The marginal tax rates appear higher in France than in the UK:

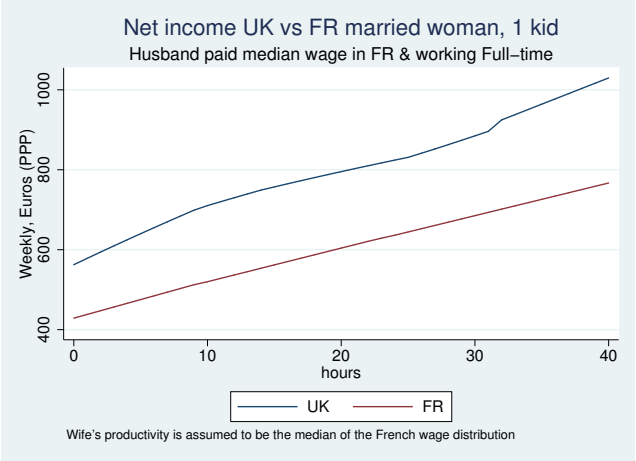

Figure 3.18: Budget constraints for married woman with one child

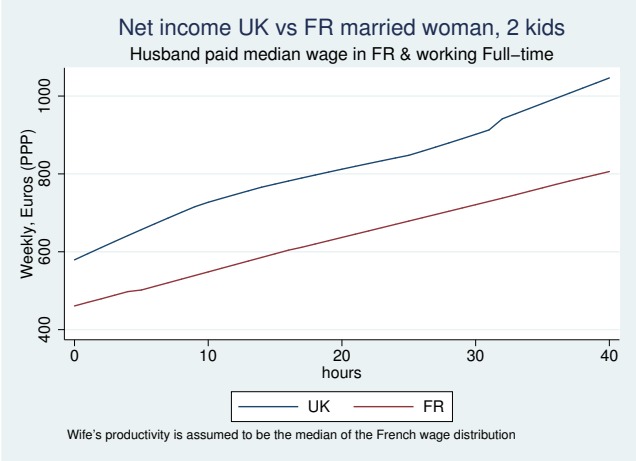

Figure 3.19: Budget constraints for married woman with two children

3.5.4 Household income if the woman is not working:

We have seen previously that the hourly wage and hours of work distribution of husbands do not differ incredibly across the two countries. Yet the UK tax system leaves households with a higher net disposable income if only the husband works. To make that point clear, I infer the net disposable income (for each household in my French sample) if only the husband works under both tax systems. I then take the ratio of that net disposable income outside work in the UK to the one in France. The

distribution of these ratios on the sample of French women are reported in Figure 3.20. A ratio value of 1.2 for a household would mean that the income available to the household when the woman does not work (but the husband does) is 20% higher in the UK than in France.

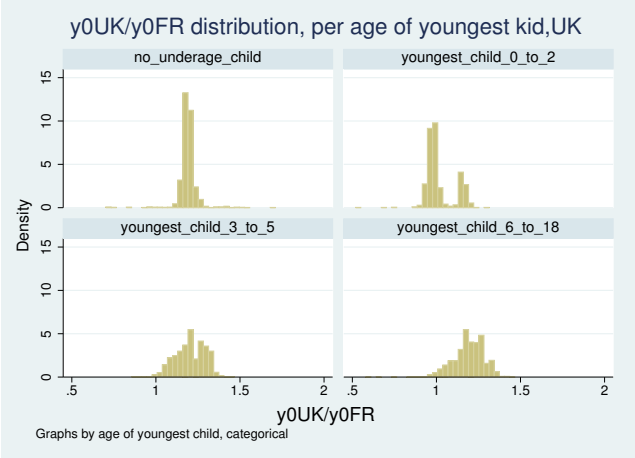

Figure 3.20: Ratio of outside work income : UK to France

This discussion makes it clear that French married households are more heavily taxed than in the UK. It might be useful to pause for a moment the narrow scope of the paper, and briefly focus on the two countries tax and benefit spendings as a share of GDP. Once again, I rely on data for the OECD to construct Tables 3.2 and 3.3 below. Most of the extra-revenue generated by the French tax authorities comes from higher employer social contributions. And most of that extra tax income for the authorities appear to be spent on old age pensions in France:

	UK	France
Income, profits, capital gains		
Individuals	*10.8*	*7.5*
Corporates	*3.4*	*3.0*
Total	14.1	10.4
Soc.security contributions		
Employees	*2.6*	*4.1*
Employers	*3.8*	*11.0*
Self-employed	*0.2*	*1.2*
Total	6.6	16.2
Taxes on property	4.5	3.5
Taxes on goods & services	10.4	10.9
Other taxes	0	2.6
Total	**35.8**	**43.7**

Table 3.2: Tax revenue as % of GDP 2007

	UK	France
Old age	5.7	11.1
Survivors	0.2	1.8
Incapacity related	2.5	1.8
Health	6.9	8.7
Family	3.3	3.0
Active labour mkt policies	0.3	0.9
Unemployment	0.4	1.2
Housing	1.1	0.8
Other	0.2	0.3
Total	**20.4**	**29.7**

Table 3.3: Social expenditure as % of GDP 2007

3.5.5 A simple tax rate explanation implausible:

A simple tax argument a la Prescott to understand the lower hours worked despite lower tax rates faced by married women in the UK would require backward bending labour supply curves, where the income effect is very strong and quickly dominates the substitution effect. Even though the magnitude of the effect would probably need to be much higher than what is usually observed in the literature, I will estimate utility functions that allow for the possibility of backward bending labour supply curves.

Tax rates do not appear to be the main driver of the hours worked differences observed, and other aspects of the institutional framework facing these women need to be discussed and accounted for.

3.6 Other institutions:

3.6.1 Childcare prices higher in the UK than in France:

If for every hour that the mother works, she has to pay a price of hourly childcare for her kids to be looked after, this is equivalent to a fall in her net hourly wage, and this is the sort of mechanism that depreciate the intensive margin of work. It is hard to obtain the exact price paid by households for nurseries but some evidence on the average prices in the two countries exist.

According to yearly surveys realised by the daycare trust, the average weekly price for a nursery (under 2 years old) in 2007 was 152£, 140£ (if above 2 years old) for 50h a week which amounts to about 3£/hour. For after school club (keeping in mind that school finishes usually around 3pm in the UK) it is at 38£/week for 15h or 2.53£/hour. These are prices paid by parents before receiving the childcare element of the WTC. It is crucial to note that households with earnings above 16,000£ a year are not entitled to the WTC and its childcare subsidy. During holidays, parents would pay on average 77£ a week for their child's care.

In France, according to a survey realised in 2007 by the Drees, on average the gross cost for an hour in a nursery is 2.7 Euros, but after tax deductions and subsidies

comes down to 1.2 Euros. According to this study only half of pre-school age kids are looked after through formal paid care. In France the price you pay for a nursery is equal to 0.005% of your taxable income per hour. There is no such things as after school clubs in France. After school hours, kids can stay from 4.30pm to usually 6pm under supervision in the schools for a small price that varies across cities.

In its 2007 report, the Daycare trust claimed :"Parents in the UK pay around 70% of the price of childcare, compared with European parents who pay around 30% of their childcare cost".

In July 2010, the insurance company Aviva released the results from their COTS (Cost of the sibling) study interviewing households in the UK with two kids: their result is maybe provocative but deserves further investigation : "Millions of "average" two-child families are being forced to cut their working hours as they struggle to cover the cost of childcare". This was echoed in the Guardian and other newspapers.

It is therefore crucial to control for hourly childcare costs in my model.

3.6.2 Labour market rigidities:

There might be some rigidities in the Labour market that prevent married women to choose their hours of work optimally. According to Table 3.9 in the appendix, in France, the mothers seem constrained to work less than they would desire, and in the UK, if anything, they would prefer to work less. I believe it is important to account for such constraints to work and will try to incorporate it in my model as conveniently as possible.

The minimum wage may also be a barrier to employment, making it difficult or impossible for low productive women to find a job. When looking at the wage distributions in each country (Figures 3.21 and 3.22), there are no mass points around the minimum wage. This result may seem at odds with previous findings in France by Laroque and Salanie (2002). They look at data at the end of the 1990's, and since then, the real minimum wage in France has not increased. It might also be the case that the minimum wage is particularly binding for young workers that are not in my sample of 25 to 50 years old women. Evidence in the UK points in that direction, Brewer et al (2009) find that the minimum wage is most likely to affect single women below

the age of 25. Because it does not appear particularly binding in the data I will not account for a minimum wage barrier in my model.

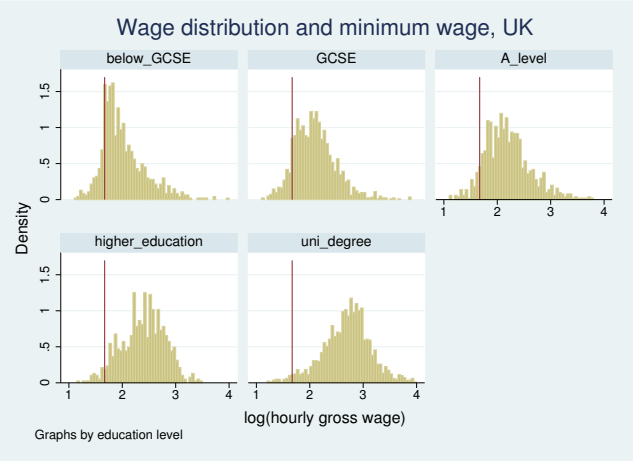

Figure 3.21: Wage distribution and minimum wage in the UK

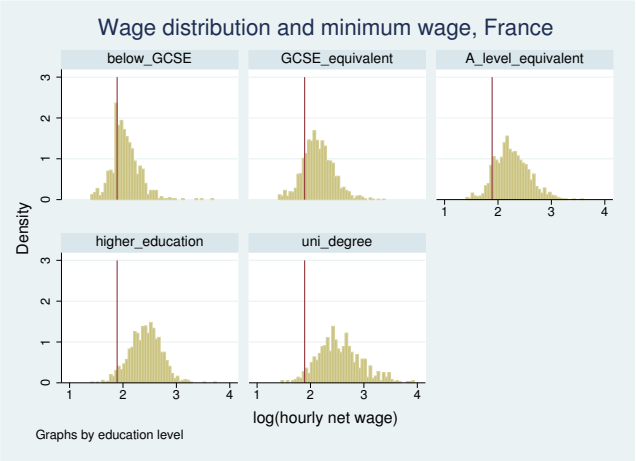

Figure 3.22: Wage distribution and minimum wage in France

The part-time wage penalty may also differ in both countries, and could be an important factor in explaining the pre-dominance of part-time work among British women, so I will estimate part-time and full-time wage equations in my model.

3.7 A model of Labour Supply:

I estimate the model of Chapter 2 on the sample of British married women with working husbands as well. The specification is exactly the same with the exception of the full-time work option in the UK being 40 hours instead of 35. The childcare prices enter the model in the same manner even though the household groups are defined according to their demographic characteristics in the UK as in Blundell et al (2000).

3.8 Data and estimation results :

3.8.1 Data:

I use the Labour Force Survey and its French equivalent (Enquete Emploi en Continu). In order to minimise the impact of negative business cycles, I study the year 2007 (just before the start of the Great Recession). The surveys sizes, designs, and questions are extremely similar and enable me to confidently compare demographic and key variables such as hours of work or earnings. In the sample under study, I focus on married households where the wife is between 25 and 50 years old, where neither the head nor the wife is studying, self-employed, retired, a member in the forces or seriously disabled. About the same share of the initial population is cut from the samples in both countries (the disabled population proved to be challenging, as the incapacity benefit is perceived by far more households than the Allocation Adulte Handicape in France. As a result I consider households in the UK as seriously disabled if they receive a disability living allowance, the proportion of disabled households in each country are then of the same magnitude). I drop women working as teachers or professors as they are likely to report working part-time when in reality they work full-time but don't account for the preparation work done at home. I also drop observations with unrealistically low wages, or reporting paid work but no earnings. I consider households where the husband is observed working. In France, most of the non-working husbands are unemployed and infering their income would prove extremely challenging with the information in the surveys. The shares of unemployed husbands do not differ much across countries, but the share of inactive husbands is slightly higher in the UK (probably due to the differences in the number of claimants of disability benefits).

To recover the childcare price distribution and hours of childcare usage per hours worked I use the Family Resources Survey 2007. The information is collected on married mothers observed working. Unfortunately, the data does not make publicly available the location of households, and I am unable to separate households in London from the rest of the country.

In France, no such standardised survey with childcare information exists. I use a

survey collected by the Drees in 2007 called " Mode de garde et d'accueil des jeunes enfants". A representative sample of 8,177 households with children below the age of seven and a half were interviewed, and asked questions about all the types of childcare used, the hours and price of each type of childcare and other demographic characteristics. They were also asked about the childcare subsidies they receive. I do not differentiate among types of childcare used, and consider the average net hourly price of childcare paid per child. Most households tend to use one type of paying childcare. This net price of childcare will be correlated with the household's earnings and to control for that I will separate the population according to net observed household income. Implicitly, I am assuming that in France when a mother decides how much to work, she will take the net hourly price of childcare as given and will not account for the potential change due to different household resources following a change in her labour supply. This assumption seems hard to avoid due to data limitation, but may not be too critical. The subsidies to private carers resemble a lump-sum reimbursement of costs, where the generosity of that lump-sum transfer varies only according to two income thresholds (as explained in the first chapter).

The results of the childcare regressions and details on the distribution of prices are reported in the appendix. It is interesting to note that in France, few women pay more than 1.5 Euros an hour, whereas in the UK paying more than 3 Pounds an hour is not uncommon.

The net incomes in the UK are calculated using the Fortax library, in France, I am grateful to Guy Laroque who let me use the routines he wrote for the French tax system in the early 2000's, I have updated and modified these routines to match the 2007 French tax system.

3.8.2 Estimates:

The parameter estimates are presented in the appendix.

In both countries income affects utility positively. Its effect decreases with age. In both countries, the preferences for leisure increase in the presence of kids and especially young kids, and for women who left school before the age of sixteen. Living in the capital cities do not significanlty impact the tastes for work or income. The constant

in the β_h is negative and significant in France, but positive and not significant in the UK. The opposite signs of the α_h parameters may counteract this discrepancy. In France, the correlation with productivity controling for selection effects, is not significant, but in the UK it is positive and significant.

In both countries there seems to be a benefit to working full-time as reflected by the negative estimate for the full-time fixed cost of work term. This may reflect the fact that full-time jobs are more valuable for human capital accumulation and lifetime earnings. Also, living in the capital city has a significant cost, having children results in a small benefit to working whereas having young children has a rather large significant cost in France it has a small negative benefit in the UK. The negative fixed costs of work estimated in both countries for the number of children seems counter-intuitive. Combined with the effect of children on preferences, it could mean that for women with children, working a small number of hours per week is attractive for career prospects. Van Soest (2002) also finds small negative fixed costs of work associated with children. Entering the labour market in the UK is generally associated with a large (non-significant) fixed cost, whereas in France it is associated with a significant benefit (that may again reflect the human capital argument discussed above, in France finding a job might be hard, so being in the labour market facilitates the transition between jobs and has a certain value in terms of lifetime earnings).

The constant on the probability of finding work is higher in the UK than in France (which is expected). In France, age increases the probability of finding a job, but the local unemployment rate has a very strong, significant and negative impact. In the UK, the non-significant positive coefficient of regional unemployment might be explained by the fact that I only use regional unemployment rates (and not at the council level) which is not specific enough (there are 17 different values for that variable in the UK and more than 90 in France). It could also reflect the fact that 2007 was an extremely buoyant year for the labour market in the UK everywhere in the country. The negative coefficient on age in the UK is rather surprising, and could reflect the fact that older women would have worked part-time during child-rearing years and are thus less likely to find work later on in their life.

Regarding the wage equations, the estimates are in line with economic theory predictions. The distribution of unobservables when working 20 hours of work have a larger

variance in France and the UK.

3.8.3 Fit of the model:

To check the fit of the model, I compute the average probabilities for each hours category and compare it with the observed frequencies:

		UK		France	
	Hours	Predicted	Observed	Predicted	Observed
All	0	.265	.268	.271	281
	20	.233	.232	.114	.113
	30	.119	.119	.142	.138
	Ft	.382	.381	.472	.467
Youngest kid 0 to 3	0	.431	.448	.431	.447
	20	.256	.247	.099	.092
	30	.085	.084	.107	.128
	Ft	.227	.219	.360	.332
Youngest kid 3 to 5	0	.372	.383	.305	.307
	20	.319	.309	.131	.121
	30	.102	.112	.147	.163
	Ft	.207	.196	.416	.407
Youngest kid >5	0	.229	.228	.238	.243
	20	.257	.274	.131	.131
	30	.140	.157	.157	.153
	Ft	.372	.341	.473	.473
No kids	0	.156	.175	.183	.202
	20	.144	.137	.081	.091
	30	.120	.094	.138	.104
	Ft	.578	.591	.597	.601

Table 3.4: Model fit

The model does a good job at replicating the observed frequencies. Accounting for the selection mechanism explicitly slightly worsens the fit. All of the observations in the UK and 97% in France are estimated to have quasi-concave preferences and positive marginal utility of income.

3.8.4 Elasticities simulation:

Using the parameters of the utility function I simulate labour supply elasticities by increasing the hourly cost of work to the employer (i.e wages) by 1%:

Model	UK		France	
Elasticities	Intensive	Participation	Intensive	Participation
All	.56	.34	.45	.38
Youngest kid 0 to 3	1.01	.73	.70	.62
Youngest kid 3 to 6	.89	.61	.47	.41
Youngest kid 6 to 18	.49	.30	.44	.36
No kids	.29	.16	.33	.27

Table 3.5: Wage Elasticities

Intensive elasticities measure the percentage increase in hours of work amongst those observed working, and participation elasticities measure the percentage point increase in the employment rate. The elasticities appear generally higher in the UK. This probably reflects the more flexible labour market that allows women to adjust their labour supply more easily. In the UK, the magnitude of elasticities vary tremendously with the composition of the households. In the presence of young children, British women become extremely responsive to financial incentives and as children age, they become less and less responsive. This is not the case in France, only when children are of pre-school age (below three years old) do the elasticities increase moderately.

The elasticities are in line with the results found in the literature. Blundell et al (1998) find wage elasticities for UK married women in the range [.14,.37]. Following a similar approach to that paper, Blundell et al (2012) find very close elasticities. Still on UK data, with models accounting for demand-side constraints, Arellano and Meghir (1992) obtain a range [.29,.71], Blundell et al (1987) recover a mean elasticity of .31. Using 2001 Euromod data, Bargain et al (2012) recover (net) wage elasticities of .09 (UK),.13 (France) and participation elasticities of .07 (UK) and .10 (France). Finally, Laroque and Salanie (2002) recover a participation elasticity of .82 on French data.

It is important to note that having a kid of pre-school versus a kid of school age multiplies the elasticity magnitude by a factor of roughly two in France and more than three in the UK. The presence of pre-school kids in the household make British mothers far more sensitive to financial incentives than French mothers, particularly along the intensive margin.

The model specification allows me to esimate what proportion of women would be willing to work but cannot find work. In the UK, I estimate that 6.0% of women in the sample are in a such a situation (out of 26.6% not working). The Labour Force Survey asks women if they are looking for work, or if they would be willing to work but are not looking (this may be thought of as a proxy for discouraged workers). Using the answers to these questions, it appears that 7.6% of the women are actually constrained. In France, such information is not available, but my model allows me to estimate that about 7.4% of women in the sample are constrained (out of 27.7% not working).

I also recover the income elasticities by simulating the response to a 1% increase in outside of work income. Once again, women in the UK are more responsive to financial incentives than in France (especially along the intensive margin). It should be noted that in France the income elasticities are extremely similar between the extensive and intensive response. In the UK, women have higher income elasticites along the intensive margin than the extensive margin. This suggests that hours worked by women are likely to be more sensitive to husband's income in the UK than in France.

Model	UK		France	
Elasticities	Intensive	Participation	Intensive	Participation
All	-.22	-.13	-.13	-.12
Youngest kid 0 to 3	-.36	-.24	-.13	-.14
Youngest kid 3 to 6	-.33	-.22	-.19	-.18
Youngest kid 6 to 18	-.21	-.12	-.15	-.14
No kids	-.11	-.06	-.05	-.04

Table 3.6: Income elasticities

3.8.5 Part-time wage penalties:

I use the wage equation estimates to infer the part-time hourly wage penalties for each woman in the sample. When a woman is observed working, I can predict exactly her wage at every hours, when not working, I predict the wages for each draw and, calculate the wage penalty at that draw and average it over all the draws. The following Table 3.7 report the average part-time wage penalties in the sample:

% Difference between:	W_{20} and W_{Ft}		W_{30} and W_{Ft}	
	UK	France	UK	France
All	1.6%	-7.1%	-2.7%	-4.5%
Education level:				
Below GCSE	-0.1%	-1.6%	-7.2%	-11.1%
GCSE	1.1%	-10.3%	-4.6%	-4.8%
A-levels	0.0%	-11.4%	-1.8%	-1.6%
Higher education	5.6%	-8.8%	2.7%	2.9%
University	3.3%	3.6%	0.0%	-4.9%

Table 3.7: Part-time wage penalties

In the UK, there does not seem to be any part-time wage penalty at 20 hours of work, while it is relatively small at 30 hours of work (most of the gap coming from low educated women). The part-time wage penalty seems to be bigger in France, and especially when working 20 hours a week. By working 20 hours a week instead of full-time, French women seem to suffer from very large wage penalties. This probably reflects the lack of flexibility of employers to let them freely choose their hours, and the fact that they may have to accept different jobs when working half-time instead of full-time.

3.8.6 Tax rate distribution in the economy

By using the tax algorithm and the wage equation estimates, I infer on the French data the average and marginal tax rates faced by the women at each hours choice, under

the French tax-benefit system and under the UK tax-benefit system. For each woman I subtract the latter to the former. I reproduce the distribution of this difference in tax rates across the two countries for the same set of women in Figures 3.23 and 3.24:

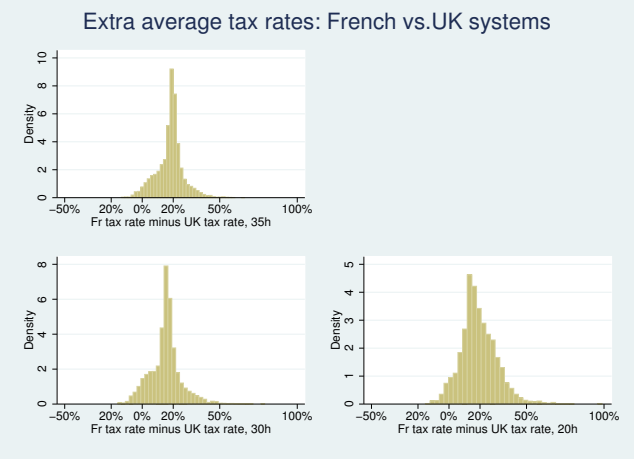

Figure 3.23: Extra average (participation) tax rates faced under the French system

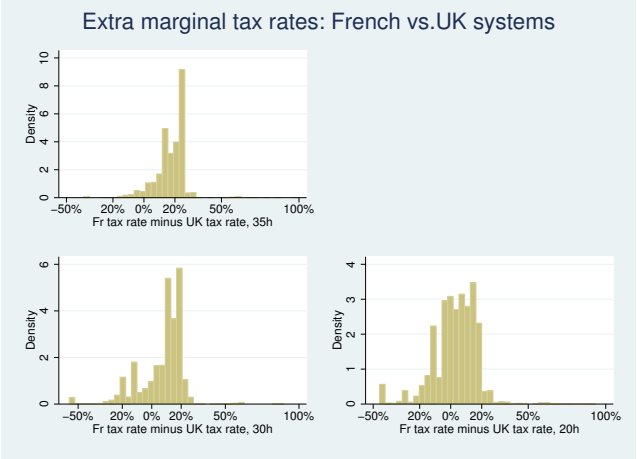

Figure 3.24: Extra marginal tax rates under the French system

Most women face higher marginal tax rates in France than in the UK, and they nearly all face higher average (participation) tax rates, which confirms the observations of section 5.

3.9 Explaining the observed hours gap:

In this section, I conduct a series of policy experiments to identify the institutions and parameters that could explain the cross-country hours difference.

3.9.1 Passing the French system on the UK data:

Here I conduct a policy exercise replacing the UK tax-benefit system with the French tax-benefit system on the UK dataset, using the parameters estimates from the model above. I conduct three experiments: substitute only the childcare price distribution

(keeping the UK tax system intact except for childcare subsidies provided through the Working Tax Credit), substitute the tax system and substitute both. The details of the changes are reported in Table 3.18 in the appendix.

By substituting the UK childcare system for the French one, average hours increase by a percentage point, all the effect comes from mothers of pre-school kids who would increase their hours of work by 9.12%. This result is particularly strong considering the model specification and data limitations (remember that I cannot control properly for the costs of childcare in London versus the rest of the country). The effect is particularly strong along the extensive margin and the decision to work full-time. This finding goes a long the way in the direction of the hypothesis that British mothers reduce their hours of work due to high childcare costs.

When faced with the French tax system, British women would reduce their hours of work by nearly 15%. The impact is particularly dramatic on mothers of pre-school children, which can be explained by the relatively high sensitivity of that population to financial incentives (as reflected by the estimated elaticities discussed earlier). The participation rate would fall for all categories. The most dramatic change appears to be the fall in full-time work (that would be partly compensated by a rise in part-time work for households without children).

3.9.2 Passing the UK system on French data:

Here I replace the French system with the UK system on the French dataset, using the parameters estimates from the model above. I conduct the same three experiments as in the section above: substituting only the childcare price distribution (keeping the French tax system intact except that I impute the childcare subsidies the woman would receive under the UK tax system and subtract them from the gross UK childcare cost), substitute the tax system only, and substitute both. Again the detailed results are in Table 3.19 in the appendix.

When the net childcare costs in France are replaced with the net UK childcare costs that the woman would incur if in the UK, the hours of work for mothers of pre-school children fall by about 11%. For mothers of children above three the impact is far more limited.

By Substituting the French tax-benefit system for the UK one and keeping the French childcare distribution. This budget constraint combines the low UK tax rates with low French childcare prices. women increase their hours of work by more than 12%. The impact is particularly dramatic on mothers of pre-school children (about 32%) and around 7% to 10% increase for the other women.

When the budget constraint is the UK childcare distribution and the UK tax system, the impact is more mitigated. The UK childcare prices have a dramatic impact, reducing by nearly half the gains on pre-school kid mothers and even decreasing the hours (compared to French system base case) of mothers with kids between the age of three and six. These women in France would put their kids in school and (in my model) incur no childcare costs. As discussed earlier, in France, the childcare costs observed in the DREES survey by this category were relatively small and I ignored them in my model.

3.9.3 Understanding the results:

Figure 3.25 should make the main results of this section clearer:

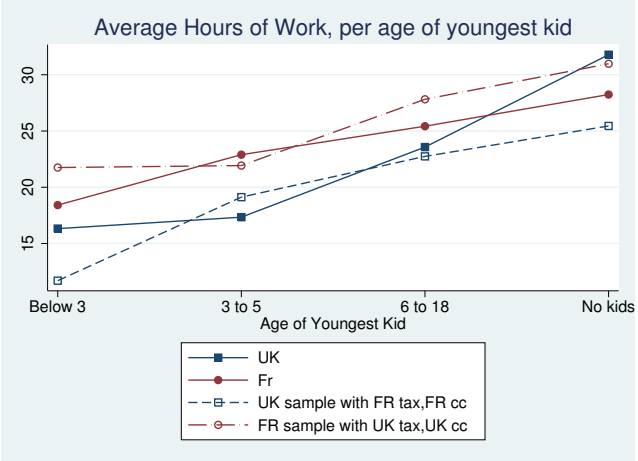

Figure 3.25: Interchangeing the tax systems cannot explain the observed gap in hours

Generally, the UK tax system pushes a lot of married women to enter the labour force , specifically in couples where the youngest child is less than three years old.

This makes sense, as we saw in section 3, once in the labour market, the intensive margin of work is hardly influenced by the age of the youngest child in France. The benefits for mothers of young children PAJE who decide to stay at home are quite generous in France and have a strong impact on the decision to return to work after a child-birth (as found in the first chapter and by Piketty (2005)). In the UK system, the incentives to stay at home for mothers of young children are much smaller, and therefore, this pushes a lot of women with pre-school kids to enter the labour force.

On the one hand, the UK tax system is designed to incentivise part-time work through the Working Tax Credit scheme. Nevertheless, under the UK tax system, part-time work would fall for most married women. Most of the rise in hours would be due to a rise in full-time work. The tax credits that encourage part-time work are means-tested, and were particularly designed for low productive single mothers. The level of these subsidies for the married women in my sample are probably too small to have an impact on their labour supply choices. On the other hand, the introduction of UK childcare prices causes the full-time and 30 hours choices to fall and only the 20 hours margin to slightly increase. So childcare prices in the UK push married mothers either out of the labour market or towards part-time jobs, while the UK tax system pushes them into the labour force and particularly in full-time jobs.

In the French system the high incentives to stay out of the labour force are balanced by cheap childcare prices. The magnitude of their respective impact on the aggregate hours of work for mothers with pre-school children appear similar.

3.9.4 Comparison of the net weekly childcare prices distribution:

To better illustrate the difference in childcare prices across the two countries, I use the wage predictions from the model to impute what each French woman's childcare subsidy would be if she lived under the UK tax system and gross childcare price distribution. I can use this to simulate the net childcare cost distribution for French women under UK taxes and childcare prices, and compare it to the French equivalent. Figures 3.26 and 3.27 represent the ratio of the expected childcare costs at each hours choice in France to the one in the UK on the sample of French women.

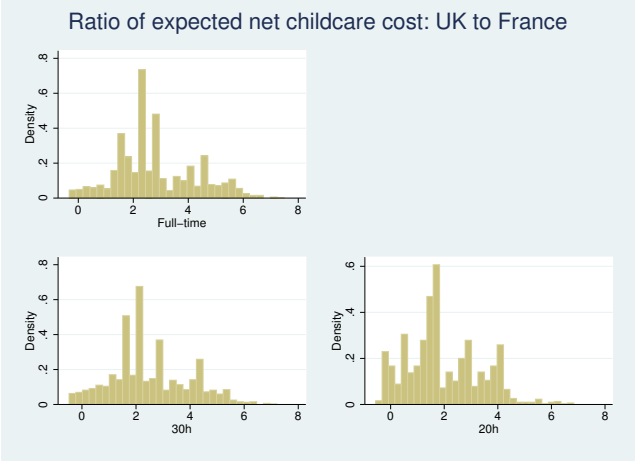

Figure 3.26: Ratio of net childcare prices: UK to France

The net childcare costs for households with kids younger than three doubles to triples between the UK and France. This is in line with the findings from studies discussed in section 6 and can explain all the observed gap in hours worked for households with these children.

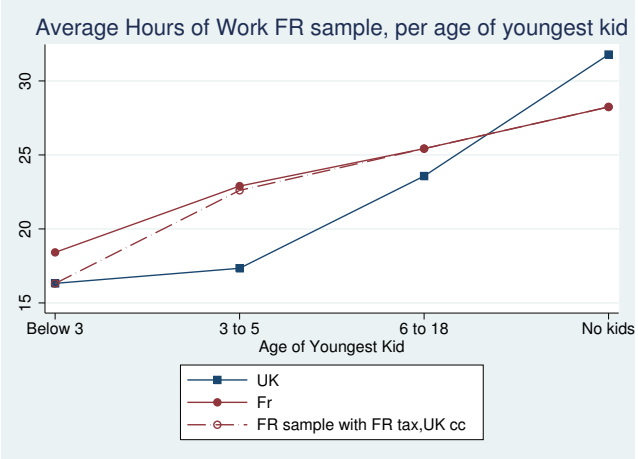

Figure 3.27: French childcare prices in the UK

Despite these huge differences, the childcare prices on their own cannot explain a lot of the difference when the youngest child is 3 to 6 years old.

3.9.5 The importance of outside work income levels

The British women hours of work may also be lower if the income outside work for them are relatively higher. To check this possibility, I substitute in each country the income outside work with the one that would be available to the women under the other country's tax schedule. But at each positive hour choice, I keep the country-specific "slope" of the budget constraint. I effectively shift the entire budget constraint down for (most) British women and up for (most) French women. The tax rates being lower in the UK, it appears that husbands (with slightly higher hours of work and wages) end up bringing more income home under the UK tax-benefit system. The exact details are reported in Tables 3.20 and 3.21 in the appendix.

Figure 3.28 shows the results when only the income outside work are modified.

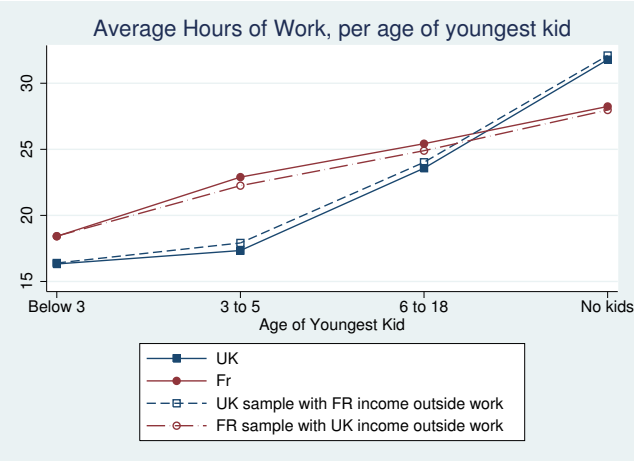

Figure 3.28: Substituting only the outside work income of each country

Modifying the income outside work in France to match the one in the UK system has a small effect, it decreases the probability of working at any hours choice. By shifting the budget constraint up for French women, hours of work decrease as expected. The impact on mothers of pre-school children is particularly small. Most of the changes seem to occur along the decision to work full-time in households and is strongest when children are three to six years old.

When this difference in outside work income is combined with the childcare prices difference, the effects are more sizable as illustrated in the graph below

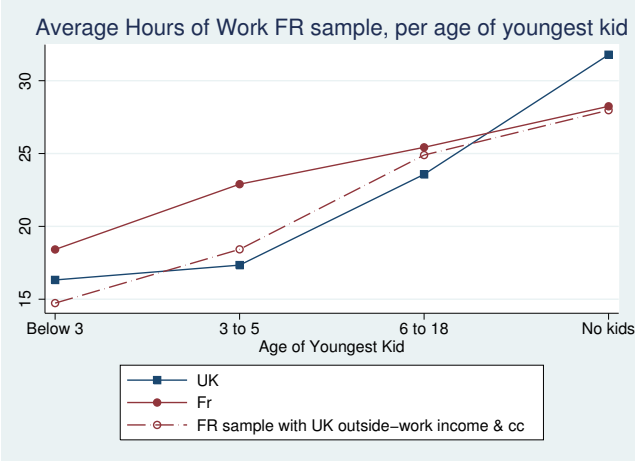

Figure 3.29: Combining childcare prices and outside-work incomes could explain most of the observed gap in hours

When UK childcare is introduced, the changes are particularly dramatic for French women. The large fall in full-time work for mothers of kids between the age of 3 to 6 is particularly striking. The income effect due to a rise in outside work income combined with the substitution effect due to a rise in the hourly childcare costs tremendously affects the labour supply decision for mothers with young children. All the observed gap in hours for that demographic group is closed. Overall, the interaction of outside-work income and childcare prices could reduce all the observed hours gap for mothers.

3.9.6 Wages and part-time wage penalties:

The part-time wage penalty appears stronger in France. I substitute the part-time wage penalty of each country and predict the hours of work.

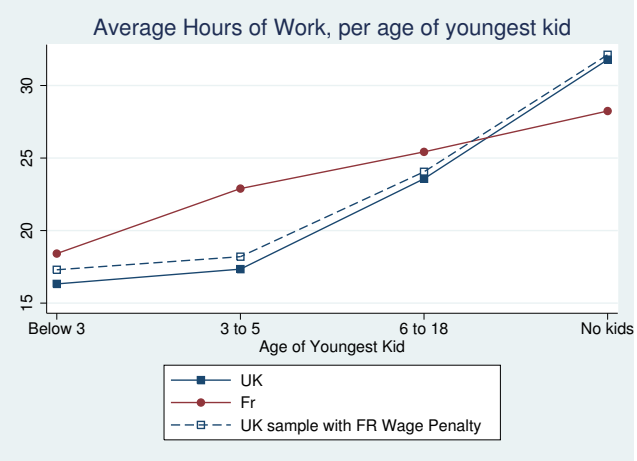

Figure 3.30: Role of part-time wage penalties

The impact of part-time wage penalties appears to be very limited on French women (and is not reported in Figure 3.30 for clarity) and stronger on UK women. It could explain half the difference observed for pre-school children, but very little for the rest of the marrid women population. As we saw above, the penalty to working part-time is very limited in the UK, but relatively important in France. So it makes perfect sense that the UK women, in the presence of young children, are not afraid of reducing their hours worked when facing the UK wage structure of low part-time penalties.

3.9.7 The true difference in labour supply is much wider:

It is difficult to truly identify the impact of each institution on the aggregate hours worked as it interacts with the rest of the system and environment faced by individuals. The interaction of childcare prices and income outside of work could close the observed hours gap. Lower part-time wage penalties and in the UK could also help explain some of the differences for mothers of very young children. Nevertheless, preferences in each country may differ, and to illustrate that possibility, I predict the hours of work on the sample of UK women replacing the preference parameters by the ones estimated in France (the line "UK sample FR preferences" in Figure 3.31). The results are striking. The underlying labour supply gap is much wider than observed in the data. I also pass the French tax-benefit (and childcare) system, and adjust the full-time

hours of work (to reflect the 35 hours week in France) for an additional check.

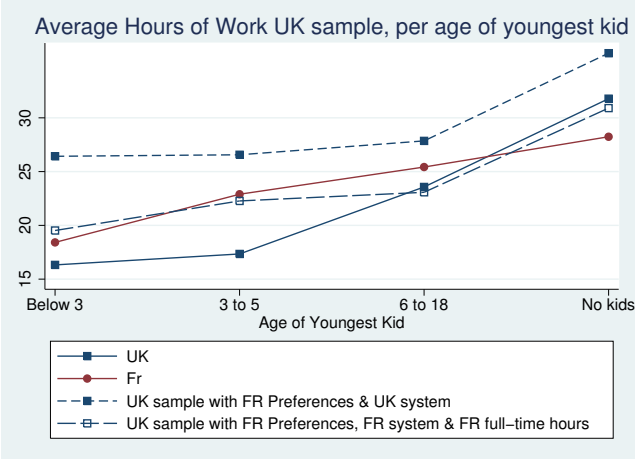

Figure 3.31: Differences in labour supply due to preferences

The line "UK sample FR preferences" in the graph above represents to a certain extent "French women substited with UK women keeping everything else in the UK household environment fixed". The difference between the second line "UK sample FR preferences,FR system & full-time hours" and the observed hours in the French sample should account for potential differences in the population structure, varying demand-side and husband characteristics. For women with children younger than six, the gap is completly closed. A discrepancy persists for women with a child older than six and no children. We saw earlier that differences in the wives wage structure seem to play a minimal role in the cross-country differences. The estimated demand-side constraints are very similar in both countries as illustrated in Figure 3.35 in the appendix. The wages of husbands (but not the working hours) differ quite strongly in the UK between these two groups and less so in France (Figures 3.32 and 3.33). A simple income effect (from lower husbands earnings) for married women with no children could explain why they would work more (and those whose child is older than six would work less) than the observed hours in the French sample.

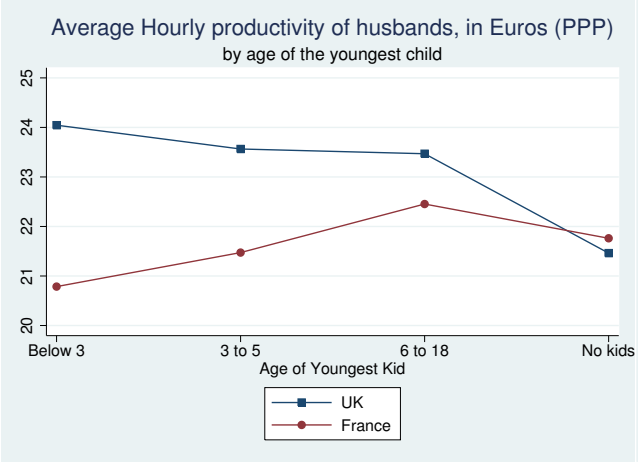

Figure 3.32: Wages of husbands per age of youngest child

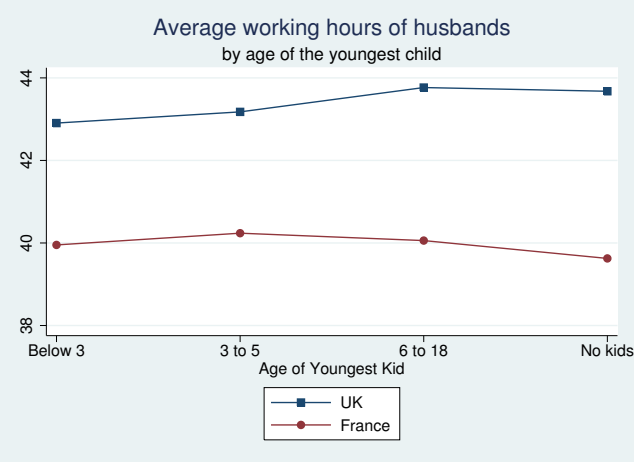

Figure 3.33: Hours of husbands per age of youngest child

These results suggest that the preferences in the UK for leisure are much stronger than in France for married women with children (and particularly young children).

3.9.8 Summary:

In both countries, the French tax system appears to sligthly depress average total hours. Women in France generally work more despite these high taxes. All of the gap in observed hours for households with pre-school children can be accounted for by cheaper childcare costs in France. Under the UK tax system, the higher income brought home by husbands has a small negative income effect, slightly depressing hours worked by married women. But all of the aggregate hours gap can be accounted for by the interaction of higher outside work income and higher childcare prices in the British system. Furthermore, in the presence of young children, women in the UK face lower part-time wage penalties, which also depresses their hours of work. However, this analysis suggests the main driver of lower hours worked by British married women is explained by higher preferences for leisure in the presence of children. Particularly when young children are in the household. This finding makes sense if one believes that country-specific institutions reflect the underlying preferences of the population: in this case, British mothers value leisure more than French mothers and as a result,

availability of cheap and accessible childcare facilities are not a priority of policy makers trying to maximize the welfare of the population.

The results also suggest that in France, women are less sensitive to financial incentives along the intensive margin than in the UK. This might reflect a two-tier labour market where outsiders find it difficult to enter full-time positions, and full-time workers are privileged and reluctant to adjust their working hours down.

3.10 Conclusion:

In this paper, I documented and looked for an explanation as to why prime-aged women in the UK have lower hours of work than in France. Focusing on a comparable demographic group (married women with employed husbands), it is particularly striking to observe the extent to which the intensive margins of work differ in the presence of children across the Channel. I show that neither tax rates nor labour market constraints can come close to explaining what I observe in the data. It appears that wage penalties, income outside work (husbands earnings and transfers) and especially childcare prices play an important role in explaining the cross-country differences. Yet, mothers of young children in the UK are far more responsive to financial incentives than in France. Concluding that preferences differ and that mothers in the UK have much higher preferences for leisure may still be too simplistic. One aspect that is not modelled very well in this study is the choice of childcare and childcare infrastructures available in the UK might be of lower quality. In this case, the intrinsic mothers' tastes for leisure may not differ in the two countries. In both countries, the mothers may have similar tastes for childcare arrangements but if the childcare quality in the UK is much lower, UK mothers may prefer to stay home and look after their children (especially when working part-time is not associated with a substantial wage penalty). Unfortunately with the data available, I cannot identity if pure tastes for leisure, or quality and availability of childcare, are driving the results. More generally, as discussed by Heim & Meyer (2004), these types of structural models cannot perfectly differentiate the true underlying preferences from costs of work. The intra-household allocation may also differ within the two countries, although this does not appear to be a convincing explanation. The employment rates and hours of work of husbands

are very similar in both countries and insensitive to the presence of children in the household. This paper highlighted the difficulty of modeling and finding one "key" factor to understand cross-country hours of work differences.This study abstracted from life-cycle decisions. The woman's labour supply during the child-rearing years may impact her labour supply choices later on in her life (especially for retirement decisions), and further research in that direction would be welcome.

Appendix:

Sample statistics:

	UK	**France**
% of prime-aged women per marital status		
Single	27 %	21 %
In couple, not married	15 %	23 %
Married	57 %	56 %
Married Women		
Kids distribution		
0	28 %	24 %
1	26 %	28 %
2	33 %	33 %
3 & above	13 %	15 %
Education distribution:		
Below High-school degree	49 %	49 %
High school degree	16 %	18 %
Above High-school degree	35 %	33 %
Husbands labour supply:		
Average hours of husbands		
household with 0 kids	43	40
household with 2 kids	43	40
Employment rate of husbands		
household with 0 kids	89 %	93 %
household with 2 kids	91 %	93 %

Table 3.8: Prime-age married women characteristics

Constraints on intensive margin				**Constraints on extensive margin**		
	UK	France			UK	France
% working & answering "yes"				*Non-working actively looking*		
Would you like to work more?	5%	22 %		% in the population	3.5%	8 %
Would you like to work less?	25%	4 %		Median duration of search	4 months	12 months

Table 3.9: Employment constraints for women in the sample

Child-care first-stage regressions:

The UK:

I follow the specification of Blundell et al(1999) and define six groups according to the age of the youngest kid and the number of children. The following Table 3.10 presents the childcare hourly cost (per child) distribution among women observed working:

Price range	0	]0,2]	[2,3[	[3,4[	[4,5]	>5
1 child,age of youngest<3	.56	.05	.08	.15	.07	.08
2 children,age of youngest<3	.50	.11	.08	.14	.08	.09
2+children,age of youngest<3	.63	.10	.10	.06	.04	.06
1 child,age of youngest 3 or more	.93	.03	.02	.01	.01	.00
2 children,age of youngest 3 or more	.93	.03	.02	.01	.01	.00
2+children,age of youngest 3 or more	.94	.03	.01	.01	.00	.00

Table 3.10: Frequency in price range (Pounds)

	constant	(s.e)	slope	(s.e)
1 child,age of youngest<3	6.49647	(2.42185)	.3947476	(.120124)
2 children,age of youngest<3	9.683139	(2.335399)	.24624	(.0867135)
2+children,age of youngest<3	11.77743	(2.958219)	.2084117	(.0991119)
1 child,age of youngest 3 or more	7.87098	(2.166104)	.6158683	(.0708488)
2 children,age of youngest 3 or more	10.72665	(2.751551)	.3829336	(.1375437)
2+children,age of youngest 3 or more	13.74182	(2.200187)	.2341691	(.0855256)

Table 3.11: Hours of childcare per child and hours of work

France

The four income groups each contain about a quarter of the households, households with disposable incomes below 2000€ belong to group 1, households with disposable incomes between 2000€ and 3000€ belong to group 2, households with disposable

incomes between 3000€ and 4000€ to group 3, and households with disposable income above 4000€ to group 4. The following Table 3.12 presents the childcare hourly cost (per child) distribution for each household group:

Price range	0	]0,.5]	].5,1]	]1,1.5]	]1.5,2]	>2
Income group 1	.45	.26	.17	.06	.01	.05
Income group 2	.32	.18	.35	.08	.03	.04
Income group 3	.16	.18	.32	.16	.11	.06
Income group 4	.11	.06	.16	.21	.17	.29

Table 3.12: Frequency in price range (Euros)

	constant	(s.e)	slope	(s.e)
Income group 1	7.80323	(3.974517)	.2461619	(.1215633)
Income group 2	8.23608	(2.973548)	.3805881	(.0921147)
Income group 3	20.42692	(3.111333)	.1666463	(.0936205)
Income group 4	16.16387	(3.17261)	.4512845	(.0898695)

Table 3.13: Hours of childcare per child and hours of work:

Model parameter estimates:

		UK		France	
		Parameter	(s.e)	Parameter	(s.e)
β_y :	age	-.1834980	(.1545923)	-.0211404	(.3442384)
	age squared	.3719474	(.3444026)	.0956037	(1.081601)
	London/Paris	-.0051280	(.0745972)	.0634008	(.1172478)
	left school before 16 y.o	.0404415	(.0381775)	-.2830348	(.1394994)
	constant	2.0858813	(.5273075)	2.109509	(1.12682)
β_h:	age	-.0332968	(.0203903)	.0319474	(.0462901)
	age squared	.0993989	(.0518303)	-.1739887	(.1488431)
	London/Paris	.0150711	(.0214734)	.0328435	(.017699)
	age of youngest kid 0 to3	-.0602280	(.0057956)	.0005985	(.009133)
	age of youngest kid 3 to6	-.0603199	(.0057129)	-.0153598	(.0079)
	number of dependent kids	-.0226926	(.0018464)	-.0355333	(.003013)
	left school before 16 y.o	-.0147232	(.0062411)	.0513159	(.0207549)
	constant	1.0998930	(.9433046)	-.5106735	(.1581345)
α_y:		.000814	(.0011100)	-.038754	(.006096)
α_h:		-.0218845	(.0184523)	.005777	(.0009167)
α_{yh}:		-.0056113	(.0005466)	.0079727	(.0016939)
ρ:		1.1959939	(.1865373)	.0268267	(.1254705)

Note: income was divided by 100 in France and 100 in the UK

Table 3.14: Utility functions

	UK		France	
	Parameter	(s.e)	Parameter	(s.e)
FC constant	8.7093683	(7.5448630)	-1.834302	(.3826994)
London/Paris	1.5886867	(.7622172)	.9096733	(.2218583)
age of youngest kid 0 to3	-0.5395082	(.1713858)	.2855556	(.2106917)
age of youngest kid 3 to6	-0.5970919	(.1690701)	.0210882	(.1884332)
number of kids	-0.2858000	(.0595358)	-.4555657	(.0764048)
FC full-time	-4.7899996	(2.9549559)	-.5366605	(.079718)

Table 3.15: Fixed costs of work

	UK		France	
	Parameter	(s.e)	Parameter	(s.e)
Local unemployment rate	6.8421918	(3.8711417)	-11.70016	(2.183749)
Age	-.1855728	(.0762443)	.2319446	(.0923116)
Constant	1.6983575	(.3842822)	1.40013	(.3432415)

Table 3.16: Employment probabilities

	20h				30h				Full-Time			
	UK		France		UK		France		UK		France	
	Parameter	(s.e)	Parameter	(s.e)	Parameter	(s.e)	Parameter	(s.e)	Parameter	(s.e)	Parameter	(s.e)
age	.1797204	(.0698588)	.2371632	(.0675548)	.3869782	(.07179540)	.358264	(.0558788)	.2450351	(.0431479)	.2224444	(.0356379)
age squared	-.7188035	(.2386504)	-.4812559	(.2367231)	-1.3424600	(.2450427)	-.7985752	(.1874229)	-.8319619	(.1532826)	-.3205765	(.122926)
education level 1	.1303374	(.0303953)	.1075927	(.034765)	.1315195	(.0355870)	.2648197	(.028717)	.1089998	(.0213786)	.1990309	(.0172641)
education level 2	.2313748	(.0328424)	.262981	(.0383732)	.2774545	(.0368067)	.4737279	(.0301698)	.2225928	(.0227142)	.3709876	(.0186775)
education level 3	.4309811	(.0351203)	.484299	(.0407547)	.4631704	(.0389987)	.7157483	(.0316969)	.3665571	(.0260833)	.5664776	(.0206242)
education level 4	.6339323	(.0318374)	.7256793	(.0384898)	.6778342	(.0356632)	.7534219	(.0320046)	.6031576	(.0230628)	.6853334	(.0205663)
London	.1992062	(.0431470)	.1515614	(.0294207)	.2124984	(.0398270)	.1204044	(.0218267)	.2244540	(.0234467)	.1632867	(.0139533)
constant	1.4848442	(.2202612)	1.551913	(.2133865)	.7600619	(.2292850)	1.056542	(.1781169)	1.2620465	(.1335693)	1.590163	(.1120138)
$\ln(\sigma_j)$	-.8448947	(.01460279)	-.9512379	(.0248307)	-.9275483	(.0199113)	-1.060558	(.0218378)	-.9604426	(.0117009)	-1.110474	(.0134714)

Table 3.17: Wage equations

Income tax calculation in France: The taxable income is the net salary and other sources of income (especially financial, and/or housing) that we will ignore. To be more precise, you are taxable on your net salary, to which the CRDS need be included and part of the CSG.

To understand the calculations, the best thing is to look at the tax form. I will attempt to explain clearly the procedure here. From the sum of your net salary and your partner's (if any), 10% are deducted as non taxable (this deduction is a minimum of 401€ and cannot exceed 13,501€). From there, an extra 5.8% are deducted (part of the CSG). Further deductions apply but will not be considered. By applying these deductions we have now defined the taxable income.

Now, the specificities of the French system kick in. First of all, you are assigned a number of "parts" linked to your household demographics (for example, a married couple has 2 parts, a single person 1 part, the first kid brings an extra half part, the second kid as well, and every other kid brings a full part). With the taxable income and the number of parts N, you obtain your family ratio "Quotient familial" as the ratio of taxable income on the number of parts. If your taxable income is below a part-specific level, you are not taxable (for instance, with 2.5 parts, if household income is $<$ 19,300€).

If your household is entitled to pay taxes, its family ratio has to be multiplied by a specific rate (that increases by thresholds) to which is taken out a constant sum (specific to the rate) multiplied by the number of parts. For example if your family ratio is below 5,687€ you pay nothing. If it is between 5,687€ and 11,344€ (11,673€), your income tax is:

$$(taxable\,income * .055) - (321.86 * N)$$

If it is above 67,546€ (69,505€) your taxable income is multiplied by .4 and the number of parts by 12,063€ .

That income tax is now subject to a maximum value ("plafonnement") or roof. If your income tax is above the "plafonnement" C you pay the income tax, if C is higher than that income tax obtained previously, you pay C. To determine C, you have to calculate the income tax you would be liable to, if you did not have children in the

household, from which is deducted a constant term that varies with the number of people in the household. For instance, a married couple with two kids will take out 3,852€ + 4,454€ . This "plafonnement" affects the top end of the income distribution only.

Last but not least, for low income households, if your taxable income is below 838€, you are entitled to a discount equal to:

$$419€\text{-}\frac{income\,tax}{2}$$

Your final income tax is then the previous value to which the discount is taken out.

Social contributions paid by the employee: These contributions vary with a threshold called "plafond". In 2007, the threshold for monthly salary was 2,682€. On their gross salary, employees pay 6.65% for "old age insurance" below the threshold, .75% for "sickness, invalid insurance", and .10% for "widow insurance" on the entire salary. Regarding unemployment insurance, workers pay 2.40% up to 4 times the threshold, 0.024% between 1 and 4 times the threshold, and 7.72€ a year for APEC. For retirement, she pays 3% up to the threshold, and 8% between 1 and 3 times the threshold (7.70% between 1 and 8 times the threshold if not an executive).She pays .80% up to the threshold and .90% between 1 and 3 times the threshold (4 times the threshold if an executive) towards AGFF. Finally, on 97% of the gross salary, workers pay 2.40% for the CSG (which are not deductible from income tax), 5.10% for the CSG (deductible from income tax), and 0.50% of CRDS.

Social contributions paid by the employer: The employer pays 12.80% of the gross salary for the "sickness, invalid,death insurance" on the entire salary . For the "old age insurance", 8.30% up to the first threshold and 1.60% on the whole salary. Also pays 5.40% for family benefits (allocations familiales). All companies pay .10% until the threshold towards the National housing fund. Regarding unemployment insurance, employers pay 4% up to 4 times the threshold.

As to retirement, for non-executives they pay 4.50% up to the threshold and 12% between 1 and 3 times the threshold. For executives the pay 1.50% and 4.50% up to

the threshold, and 12.60% between 1 and 8 times the threshold. They also pay .22% of CET up to 8 times the threshold. Firms pay 1.20% up to the threshold and 1.30% between 1 and 3 (4 for executives) times the threshold to the AGFF.

The following graphs shows the total social contributions on hourly productivity at full-time work:

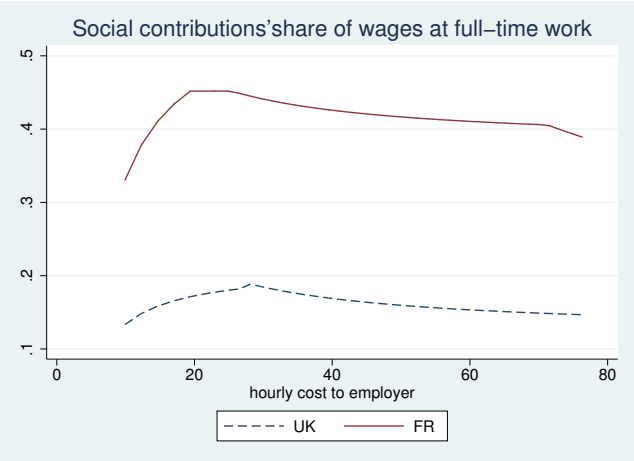

Figure 3.34: Social contributions as a share of total compensation

Housing benefits in France:

General introduction: There are 3 different types of housing benefits that can be paid to people renting their house or paying mortgage interests. The "Allocation de logement social" and "Allocation de logement familial" for people in private housing, and the "Allocation personnalisee au logement" for people in public housing.

The calculation of resources takes into account: taxable income (impot sur le revenu) of which the RMI is deducted.

The size of the transfer is equal to the rent and housing costs of which are taken out a personal participation ("Participation personnelle du beneficiaire"). So the important part is this personal participation calculated as the sum of a minimum participation (min(30€, 8.5%(applicable rent + charges)) and a complement ("participation personnalisee") that depends on the household demographics, the rent and resources. This

complement is calculated by adding a family rate, and a rent rate both multiplied by a coefficient linked to the pull of resources. To sum up:

$$\begin{aligned} AL &= rent\,and\,charges\,(L+C) - Personal\,Participation \\ Personal\,Part. &= min.participation + complement \end{aligned}$$

I will assume that all household are renting. This will simplify the calculation (already complicated) of the benefits (assuming some are owners repaying mortgages would imply different assumptions about the mortgage type, rates and more).

Rent and charges allowances: The maximum ("roof") monthly rent L for someone in a zone 2 area (urban outside Greater Paris) are in 2007: 229.07€ if you live alone, 280.38 € if in couple, household (couple or not) with one child 315.50€, two children 361.41€, three children 407.32€, and 45.91€ per extra kid.

The charges C are 47.82€ for households with no children, 58.64€ with one child, add 10.82€ for every extra kid.

Personal participation: It is obtained by the formula:

$$P_p = P_0 + T_p * R_p$$

Where P_0 is the minimum participation defined as:

$$P_0 = \min(30,\, 8.5\%\, of\, (L+C))$$

Also, $R_p$is the difference between the household's resources and threshold R_0 defined as a percentage of the yearly RMI and BMAF 2007 from which are deducted 10% and 20%. To be clearer, in 2007, R_0 was for a single person 3,234€, for a couple 4,631€, with one kid 5,525€, with 2 kids 5,627€, with 3 kids 5,818€ and an extra 190€ per extra kid.

Last but not least is T_p, the rate applicable. It is defined as:

$$T_p = T_f + T_l$$

where T_f depends on the household size (3.54 if alone, 3.94 if couple, 3.38 with one kid, 2.97 with 2 kids, 2.51 with 3 kids, 2,31 with 4 kids, 2.24 with 5 kids, and -0.07 per extra kid). Now, for T_l, first you need to calculate the ratio $RL = \frac{Rent\,paid\,or\,max\,rent\,allowed}{reference\,rent}$ if that ratio is below .45 it is equal to $T_{l.}$, if it's between .45 and .75 it has to be multiplied and subtracted to specific constants provided in the calculation form.

Final transfer: Once AL has been calculated, it is taxed by the CRDS at 0.5% so the final benefit you are entitled to (which will be directly transferred to your landlord and deducted from your rent due!) is equal to .995*AL.

	Hours	UK tax+ UK childcare	UK tax+ FR childcare	FR tax+ UK childcare	FR tax+ FR childcare
All	0	.265	.256	.359	.355
	20	.233	.235	.218	.220
	30	.119	.120	.118	.119
	Ft	.382	.388	.304	.306
% change in hours			+0.99%	-14.64%	-14.11%
Youngest kid 0 to 3	0	.431	.385	.640	.619
	20	.256	.267	.188	.198
	30	.085	.093	.054	.058
	Ft	.227	.254	.116	.123
% change in hours			+9.12%	-39.98%	-36.49%
Youngest kid 3 to 5	0	.372	.365	.465	.457
	20	.319	.320	.288	.292
	30	.102	.102	.094	.096
	Ft	.207	.210	.151	.153
% change in hours			+1.08%	-21.08%	-18.52%
Youngest kid >5	0	.229	.230	.294	.294
	20	.257	.257	.252	.252
	30	.140	.140	.145	.145
	Ft	.372	.372	.307	.308
% change in hours			+0.00%	-18.04%	-11.92%
No kids	0	.156	.156	.218	.218
	20	.144	.144	.159	.159
	30	.120	.120	.134	.134
	Ft	.578	.578	.487	.487
% change in hours			+0.00%	-9.92%	-9.92%

Table 3.18: French system on UK data

	Hours	FR tax+FR childcare	FR tax+ UK childcare	UK tax+FR childcare	UK tax+UK childcare
All	0	.271	.284	.201	.226
	20	.114	.113	.091	.092
	30	.142	.140	.122	.117
	Ft	.472	.462	.586	.563
% change in hours			-1.84%	+12.59%	+8.84%
Youngest kid 0 to 3	0	.431	.491	.270	.341
	20	.099	.099	.086	.094
	30	.107	.096	.114	.104
	Ft	.360	.312	.529	.460
% change in hours			-11.43%	+32.46%	+18.12%
Youngest kid 3 to 5	0	.305	.313	.269	.343
	20	.131	.131	.112	.115
	30	.147	.145	.125	.113
	Ft	.416	.410	.492	.492
% change in hours			-1.23%	+7.33%	-4.23%
Youngest kid >=6	0	.238	.238	.189	.189
	20	.131	.131	.104	.104
	30	.157	.157	.131	.131
	Ft	.473	.473	.575	.575
% change in hours			-0.00%	+9.59%	+9.59%
No kids	0	.183	.183	.125	.125
	20	.081	.081	.054	.054
	30	.138	.138	.107	.107
	Ft	.597	.597	.713	.713
% change in hours			0.00%	+9.69%	+9.69%

Table 3.19: UK system on French data

	Hours	UK tax+ UKchildcare	FR income at 0h+ UK childcare	FR income at 0h+ FR childcare
All	0	.265	.258	.247
	20	.233	.229	.232
	30	.119	.120	.121
	Ft	.382	.393	.399
% change in hours			+1.52%	+3.11%
Youngest kid 0 to 3	0	.431	.429	.373
	20	.256	.255	.270
	30	.085	.085	.094
	Ft	.227	.229	.261
% change in hours			+0.44%	+11.46%
Youngest kid 3 to 5	0	.372	.356	.350
	20	.319	.319	.321
	30	.102	.105	.106
	Ft	.207	.220	.223
% change in hours			+3.29%	+4.42%
Youngest kid >5	0	.229	.220	.220
	20	.257	.252	.252
	30	.140	.141	.141
	Ft	.372	.385	.385
% change in hours			+1.97%	+1.97%
No kids	0	.156	.151	.151
	20	.144	.140	.140
	30	.120	.120	.120
	Ft	.578	.588	.588
% change in hours			+1.00%	+1.00%

Table 3.20: French outside work income on UK data

	Hours	FR tax+FR childcare	UK income at 0h+ FR childcare	UK income at 0h+ UK childcare
All	0	.271	.283	.318
	20	.114	.113	.111
	30	.142	.142	.135
	Ft	.472	.462	.435
% change in hours			-1.62%	-7.82%
Youngest kid 0 to 3	0	.431	.430	.538
	20	.099	.101	.096
	30	.107	.108	.088
	Ft	.360	.360	.278
% change in hours			0.06%	-20.00%
Youngest kid 3 to 5	0	.305	.324	.431
	20	.131	.128	.125
	30	.147	.145	.122
	Ft	.416	.403	.320
% change in hours			-2.80%	-19.54%
Youngest kid >=6	0	.238	.253	.253
	20	.131	.130	.130
	30	.157	.156	.156
	Ft	.473	.460	.460
% change in hours			-2.10%	-2.09%
No kids	0	.183	.190	.191
	20	.081	.081	.081
	30	.138	.140	.140
	Ft	.597	.589	.589
% change in hours			-0.95%	-0.85%

Table 3.21: UK outside work income on French data

Estimated employment probabilities in France and the UK:

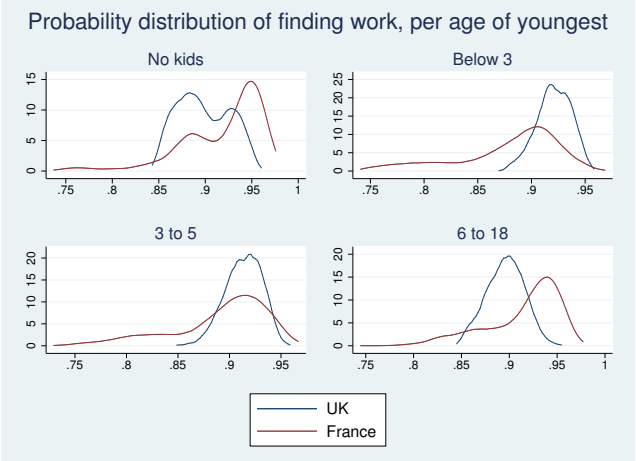

Figure 3.35: Employment probabilities

4 Marriage penalty in France

4.1 Overview

In this chapter, I study the impact of the marriage penalty on labour supply choices of married women with working husbands. Using the model estimated in the previous chapter, I simulate a revenue-neutral reform that would cancel the tax penalty or gain associated with being married. I find that the the participation rate of these women would increase by 0.7 percentage point and their overall labour supply would increase by 1.2%. As expected, the changes would be larger for highly educated women and those married to a high-earner.

4.2 Introduction:

In the UK, the debate around joint-taxation was recently revived with the Conservative party's proposition to introduce a small tax-break for married couples where one of the spouses does not work. The UK moved from a joint taxation to an individual taxation system for couples in 1990. The desire to come back to a non-neutral treatment of marriage in the tax system appears driven by pure politics more than economics.

France provides an interesting environment to study how the specific treatment of marital status may affect wives' labour supply decisions. This chapter focuses on the impact of joint-taxation on married women's tax rates and how it depresses their labour supply. I simulate a revenue-neutral reform that would treat married and cohabiting couples equally. I find that under such a system, the employment rate of married women would increase by 0.7 percentage points and the total hours worked

by married women would increase by 1.2%. This effect comes not only from the decrease in marginal (and average) tax rates in households where the wife earns less than her husband, but also from the increase in the first threshold for taxable earnings simulated for the revenue-neutrality. Such a change in the tax schedule would also impact workers in non-married households (and maybe husbands's labour supply as well as intra-household allocations), but the labour supply model used, does not allow me to address these issues. The results here are slightly more modest than what was found in the literature. The reform I simulate cannot be thought of as a full move from joint to individual taxation in the French tax system. It is best described as a decrease in the jointness of the system for married households.

The empirical evidence on the impact of joint-taxation on married women labour supply is relatively scarce. This is mainly explained by the lack of available tax reforms. LaLumia (2008) studies the U.S. switch to joint taxation in 1948. She finds a small and statistical significant reduction in the labour force participation of married women (about 2 percentage points) and no changes in the labour supply of husbands. The reform happened in 1948 and women attitudes to work have dramatically changed since (as reflected by the increase in their participation rates observed in the 1970's and 1980's). In Canada, Crossley and Jeon (2007), exploit a reduction in the jointness of the Canadian tax system in 1988. In an approach similar to Eissa (1995), they compare the reaction of women married to higher income husbands with those married to lower income husbands. Their results suggest that the reform increased the labour force participation of low education women married to higher income husbands by 9 to 10 percentage points. Bach et al (2010) simulate a move from joint to individual taxation in Germany and predict and increase by about 2.4 percentage points of married women participation, while for men it would decrease by about 0.3 percentage points. The average working hours of women would increase by about 7.4 percent and decrease by 1.5 percent for men. Selin (2009) focuses on the shift from joint to individual taxation in Sweden in 1971. He estimates a labour supply model and then simulates the effects of the reform to recover very large effects (about 10 percentage points). More recently, Kaliskova (2013) focuses on the Czech move from individual to joint taxation in 2005. She uses a Diff-in-Diff method where the treated groups are married women with children and the control groups unmarried and childless or Slovak

married women. Her results suggest that the reform decreased the participation rate of women by 2.9 percentage points, with higher effects for women married to earners in the top quartile of the wage distribution.

Section 3 of the chapter describes how the French tax system may increase or decrease the tax bill of married households depending on their characteristics. Section 4 simulates the labour supply reaction of married women to a potential reform removing the difference between cohabiting and married couples in the tax system.

4.3 Impact of the marriage penalty/gain on the labour supply of married women:

In France, the family-based income tax system was established in 1945 through the Quotient Familial. The details of the Quotient familial are described in chapter 3. Its creator Adolphe Landry summarised it as follows: "An equal tax rate for equal living costs". It aims to ensure horizontal equity, that is tax neutrality among households having a globally equivalent revenue, whatever their composition. By providing tax incentives in connection with marriage and birth rate it also aims to affect fertility. I described the details of the calculation in the third chapter. Married couples may benefit from that Quotient Familial, especially when the intra-household earnings' inequality is wide or only one adult works. The taxe d'habitation (council tax) also includes a discount for married households. The tax rebate increases with the number of parts in the households, and it is important to account for it, especially for low-income households who are not subject to the income tax but are still subject to the taxe d'habitation. These two specificities of the French system are likely to affect the labour supply decision of married women as the marginal tax rates they face depends on their husbands earnings.

4.3.1 Context

The sample from Enquete Emploi en Continu 2007 is the same as the one used in the previous chapter to compare the French and British systems. The joint taxation, may

affect the tax rates paid by women, compared to the situation where the couple would not be married. It could increase the marginal tax rates (if the husband has a very income say), or it could also decrease it (the Quotient familial is a rebate on taxable income). To illustrate this point, I impute the tax rates that married working women in my sample would face if there were living in unmarried couples. I subtract it to the observed tax rate and recover a distribution of this marriage penalty/gain. In figures 4.1 and 4.2 positive number means that her tax rate is higher when she is married (marriage penalty). About half of working married women, face a higher marginal tax rate because of their marital status. 21% are neither penalized nor benefiting, and 29% face a lower marginal tax rate. Among the non-working women, should they work full-time, the respective numbers are 60%, 0%, 40%. In order to calculate their expected tax rate penalties, I have inferred their wages at Full-time work and assumed they were working Full-time.

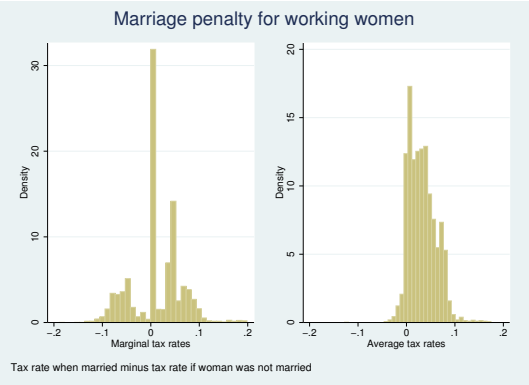

Figure 4.1: Distribution of marriage tax penalties for working women

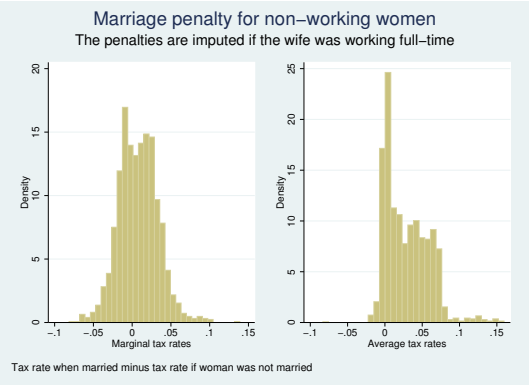

Figure 4.2: Distribution of marriage tax penalties for non-working women if they worked full-time.

Looking at the distribution of intra-household wage inequality in the sample helps to visualize better what share of married women might be concerned. In the following, I calculate the ratio of husbands' hourly wage to his wife's hourly wage. The wage represents the cost of work to the employer (the productivity of the worker). I report the intra-household wage inequality distribution only for couples where the wife is employed. It is interesting to note that the proportion of households where the wife earns more than the husband is not negligible.

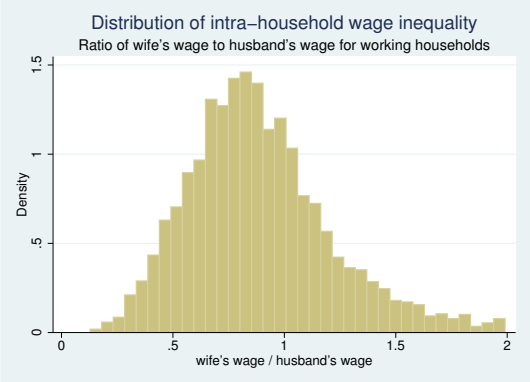

Figure 4.3: Distribution of intra-household wage inequality for married couples with two workers

4.3.2 results:

In this section I simulate a revenue-neutral reform where married and cohabiting couples are now taxed similarly. Overall, this would increase the participation rate of married women with working husbands by 0.7 percentage points, and increase their total hours of work by 1.2%. As discussed earlier, one might expect that most of the labour supply responses would be concentrated among households with large intra-household wage inequality, or where the husbands' earnings are large. I report the results along different household characteristics in Tables 4.1 to 4.4 in the appendix.

Along the age of the youngest child dimension:

Women with a pre-school age child respond most strongly to the reform (which could be expected as their labour supply elasticity is the largest). The size of the response is very similar when the youngest is above six years old or when there are no dependent children.

Across different education groups:

As the education level increases, the reform's impact becomes larger. More educated women tend to be married to educated husbands and are more likely to be affected

by the income tax than low educated households (whose earnings are probably too low to be liable to the income tax).

Along different husband earnings groups:

Here it appears that women with high-earnings husbands would have lower marginal and participation tax rates if not married. In households where the husbands is in the upper-quarter of the wage distribution, wives would increase their participation rate by nearly 2.2 percentage points.

Along different intra-household earnings inequality groups:

For women observed not-working, I predict their wages at each draw, take the ratio of that predicted wage to her husband's and then average it out over all the draws. I separate the groups into four groups of roughly the same size. It might appear surprising that women who earn more than their husband increase their labour supply, but imposing the revenue-neutrality condition through higher thresholds for taxable income, decreases the average tax rates for women in this group, and induce some of them to increase their labour supply.

4.4 Conclusion:

This chapter, simulated a revenue-neutral tax reform canceling the difference in tax treatments between married and cohabiting households. It appeared to have small positive effects on the overall labour supply of married women with working husbands. The policy simulations suggests that the joint taxation of married couples diminishes overall hours worked by 1.2% for this group of women. The simulated impact of the reform are lower than what the limited literature on the subject suggests. This can probably be explained by the difference in the reforms studied. While most studies focus on the transition from a joint to individual system, this chapter only focused on reducing the jointness of the French tax system. It may be important to keep in mind that the model used did not allow for any reaction of husband's labour supply.

Appendix:

Predicted Frequency	Overall		0-3 y.o		3-6 y.o		6-18 y.o		No dep. child	
	Base	*Reform*	*Base*	*Reform*	*Base*	*Reform*	*Base*	*Reform*	*Base*	*Reform*
0h	0.279	0.272	0.435	0.426	0.308	0.303	0.248	0.241	0.193	0.186
20h	0.114	0.111	0.099	0.099	0.133	0.132	0.131	0.129	0.081	0.076
30h	0.138	0.140	0.113	0.115	0.144	0.145	0.150	0.152	0.135	0.136
35h	0.469	0.476	0.353	0.359	0.416	0.420	0.471	0.479	0.592	0.603
% change in hours		1.203		1.622		0.839		1.186		1.195
% change in participation		0.995		1.514		0.759		0.976		0.863

Table 4.1: Labour supply responses by age of the youngest child

Predicted Frequency	Overall		Below BEPC		BEPC		High-School		Higher edu.		University	
	Base	*Reform*	*Base*	*Reform*	*Base*	*Reform*	*Base*	*Reform*	*Base*	*Reform*	*Base*	*Reform*
0h	0.279	0.272	0.442	0.438	0.283	0.277	0.231	0.223	0.188	0.179	0.240	0.229
20h	0.114	0.111	0.106	0.104	0.120	0.116	0.114	0.112	0.118	0.117	0.100	0.102
30h	0.138	0.140	0.093	0.093	0.134	0.136	0.153	0.156	0.180	0.183	0.136	0.139
35h	0.469	0.476	0.359	0.366	0.463	0.472	0.502	0.510	0.514	0.521	0.524	0.530
% change in hours		1.203		1.042		1.111		1.267		1.231		1.462
% change in participation		0.995		0.715		0.808		1.050		1.134		1.482

Table 4.2: Labour supply responses by education group

Predicted Frequency	**Overall**		**1st Quantile**		**2nd Quantile**		**3rd Quantile**		**4th Quantile.**	
	Base	*Reform*	*Base*	*Reform*	*Base*	*Reform*	*Base*	*Reform*	*Base*	*Reform*
0h	0.279	0.272	0.322	0.320	0.282	0.279	0.253	0.246	0.261	0.244
20h	0.114	0.111	0.125	0.125	0.135	0.136	0.144	0.146	0.149	0.153
30h	0.138	0.140	0.125	0.125	0.135	0.136	0.144	0.146	0.149	0.153
35h	0.469	0.476	0.441	0.445	0.468	0.474	0.488	0.495	0.477	0.491
% change in hours		1.203		0.387		0.734		1.150		2.460
% change in participation		0.995		0.244		0.505		0.920		2.235

Table 4.3: Labour supply responses by husband's earnings distribution

Predicted Frequency	**Overall**		**w__ratio<0.6**		**0.6≤w__ratio<0.8**		**0.8≤w__ratio<1**		**w__ratio≥1**	
	Base	*Reform*	*Base*	*Reform*	*Base*	*Reform*	*Base*	*Reform*	*Base*	*Reform*
0h	0.279	0.272	0.307	0.290	0.258	0.250	0.235	0.230	0.297	0.291
20h	0.114	0.111	0.115	0.111	0.117	0.113	0.115	0.112	0.111	0.111
30h	0.138	0.140	0.137	0.140	0.142	0.144	0.146	0.147	0.135	0.137
35h	0.469	0.476	0.441	0.459	0.483	0.493	0.504	0.511	0.457	0.461
% change in hours		1.203		2.922		1.454		0.855		0.817
% change in participation		0.995		2.468		1.115		0.627		0.726

Table 4.4: Labour supply responses by intra-houshehold wage inequality distribution

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