Is There Any Added Worker Effect from the Reduction in Standard Working Hours? The "Aubry's Law" in France as a Natural Experiment

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Abstract

Added Worker Effect (AWE) implies increased labor force participation of married women when their husbands become unemployed or face working hour restriction without any compensation. However, this incidence of AWE has been documented mostly in terms of unemployment spells faced by the husbands. This is the first attempt which empirically investigates the existence of AWE using mandatory reduction in standard working hours in France (*Aubry's Law 1998*) as a natural experiment. This enables to obtain better estimates which otherwise may be biased because of endogeneity problem from omitted variables. The results show that the exogenous reduction in standard work hours for husbands does not lead to any unemployment to employment transition of wives but increases the number of hours worked by wives who are already in the market and are not affected by the law themselves. It is also found that in terms of hours worked, AWE is more prominent in low income families and for families with more members as family size is positively correlated with the degree of credit constraint.

JEL Classification: D10, J22, K31
Keywords: Female labor force participation, Added worker effect, Standard working hours

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I. Introduction

There is a popular belief among the policy makers that the reduction in standard working hours would lead to increased employment. The underlying idea is that, if each worker works fewer hours, the demand for labor input being fixed, the available work may be redistributed among more people. Recently, in many countries in Europe, such as France, Belgium, Italy and Germany, there have been considerable declines in the standard working hours. Empirical research based on micro-data, in evaluating the effectiveness of such policy, mostly looked at the impact on people who were directly affected by the policy, ignoring possible spillover effects. In a household decision setting, it is possible that even though the husband is directly affected, the labor supply response of the wife may change as a by product of such policy. Not much is known about this possible spillover effect.

The main purpose of this paper is to investigate the married women's labor force participation due to an exogenous restriction on the hours worked by husbands. With an exogenous decrease in the standard hours worked in a week, there is a possibility that employment will decrease owing to both scale effect and substitution of workers with hours and capital (Hunt, 1996, Crepon and Kramarz, 2002). An increase in the risk of unemployment of the primary bread earner, or the possibility of a decrease in income from exogenous working hour restrictions; may induce households to send more of its family members to search for paid work, as an insurance against such risk. This is known as "The Added Worker Effect (AWE)". The literature investigating AWE asserts that when the husband loses his job, there is a decline in the family income which induces the wife to actively participate in the labor market (if her leisure is a normal good). Again, the unemployed husband can spend more time in home production, and this substitution effect again reduces the relative value of the wife's nonmarket time and induces her to work for wage[1]. But the extent to which husband and wife's nonmarket time are substitutes or compliments is an empirical question. The AWE became a topic of considerable empirical research and debate. The empirical results are mixed. Heckman and MaCurdy (1980) showed that in a life cycle context, inter-temporal allocation of wife's labor is not affected by transitory unemployment shock of the husband. This is because wives of husbands who face greater risk of unemployment will always work more hours, not necessarily when husbands face unemployment at a point in time. As long as the income loss

[1] See Ashenfelter (1980) for a detailed theoretical analysis.

from a short spell of unemployment is small relative to husband's life time earnings, the studies that look at the long run relationship between husband's annual hours of unemployment and wife's labor supply will not observe any AWE. But these long run measures fail to capture how households respond in the short run to smooth out fluctuations in income and consumption due to transitory unemployment of the husband. There are some studies which uncover some significant but small magnitude of AWE (Mincer 1962; Lundberg, 1985; Gruber and Cullen, 1996). Mincer (1962) in his classical paper noted that a transitory reduction in income due to husband's brief spell of unemployment has a stronger effect on the wife's labor supply than a permanent one. Lundberg (1985) in her seminal paper, studies the AWE in terms of employment transition probabilities of wives rather than static measure of labor supply. She looks at the unemployment uncertainty of husbands and credit constraints in generating short run participation of wives and finds a small but significant AWE for white couples. Gruber and Cullen (2000) discussed the importance of unemployment insurance (UI) program, while investigating the AWE in households. Their results indicate that in the absence of UI, wives' total hours of work would increase by 30% during the unemployment spells of their husbands. As is seen, these papers investigate AWE when the husband becomes unemployed.

There is only one paper (Hunt, 1998) which addresses AWE when the spouse is affected by reduction in standard working hours. Hunt, using a German panel of 1984-1994 found that reduction in standard hours of fulltime male manufacturing workers seem to have no effect on the employment rate of women, but have caused a small reduction in the hours of their female partners who were in the labor force, possibly due to complementarity of leisure between the couples. The German standard work hour reduction was mostly initiated by labor unions in particular industries and was a gradual process and was always accompanied by full wage compensation. Thus it is unlikely to find any income effect for females whose husbands'/partners' hours are reduced. The initiative to reduce hours from 40 by labor unions in metal and related industries, started in 1978, gained momentum in 1982-83 and were successful in 1985 (38.5 hour week). They kept on negotiating and in 1995 they successfully reduced the work hours to 35. Hunt (1998) in her fixed effect estimates of partner's hours on wife/partner's hours uses the male partner's standard hours as an instrument for his actual hours. But the instrument might be weak. The reduction in hours in Germany in a particular industry is agreed on in advance and could not be renegotiated. Her decision to participate is dependent on her expectation about her husband/partner's standard hours. This expectation, a part of the error term, is correlated with the instrument. Moreover, the individual

fixed effect estimates may be biased if there are individual specific components that vary over time and affect both the wife and husband's hour choice decision.

The mandatory reduction in weekly working hours in France known as "Aubry's Law I" provide an excellent platform for empirical investigation of AWE due to reduction in standard hours worked by husbands, where the estimates do not suffer from such bias. That is, this exogenous assignment of treatment, which in other situations may be endogenously related to the outcome of interest, enables to obtain better estimates of AWE. This paper uses the "Aubry's Law I" as a natural experiment to identify the two dimensions labor supply response of women when their husbands are subject to work hours restrictions: (1) probability of participation in the labor market by unemployed or inactive wives, and (2) changes in the hours worked by the wives who are already in the labor market. Since this law is implemented across the whole economy, there is no scope of endogenous placement. As far as I know, this is the first attempt that uses natural experiment to estimate the possible AWE attributed to the work week reduction. Most of the previous studies in their empirical estimation of AWE used micro level data sets from as early as 1950 to 1994 at the latest. This paper uses more recent data.

II The Reduction of the Workweek (Aubry's Law): A Natural Experiment

The Law Aubry I (June 13, 1998) stipulated that the standard work week of enterprises with more than 20 employees had to be reduced to 35 fom 39 hours by February 2000 (not including civil servants: state personnel, hospital stuff and local authorities), while the deadline for firms with less than 20 employees was set to January 1, 2002. The firms were provided subsidies (reductions in social security contribution) for reducing the standard working time; by at least 10% of its original length. According to Government sources, this would increase employment by at least 6%. Overtime is paid to workers after the threshold of 35 hours per week. In January 19, 2000, Law Aubry II; confirmed the deadlines for the legal working week under Aubry I. It introduced new methods of work organization, calculation of effective workweek, and limits and rules governing over time hours. Maximum weekly hours limit is set at 48 hours, hourly overtime premium pay between June 1998 and January 1, 2000 period will be 10% for 36-39th hours, 25% for 40-43rd hours and 44 onwards would receive 50% premium. It also guaranteed a minimum monthly income for employees receiving the minimum monthly wage (SMIC). In order to prevent employees on the minimum wage from being penalized by working 35 hours, the government introduced a transitional guaranteed wage provision.

This monthly minimum wage, calculated on hourly basis and set by the government, is adjusted for inflation rate and economic growth of the country. The law of 35 hour week asserted that reduction in working time would not lower the real income of the minimum wage earners on a 35 hour week, requiring a rise of 11.4% in the wage rate. By July 2000, even with a rise of 3.2% in the SMIC, the workers working a 35 hour week are receiving FRF 119.92 less than people working a 39 hour week[2]. The Government's objective is to make a series of readjustments to these minimum wage rates in order to achieve a single minimum wage rate on July 1st, 2005. The law will have the effect of increasing the minimum hourly rate by 11.4% at the end of the period of minimum wage harmonization[3]. By 2000, according Government sources, 40,293 enterprise agreements have been registered allowing more than 4.1 million employees to switch over to 35 hour week[4]. We are interested the first part of the legislation, i.e., where the large firms with more than 20 employees need to reduce their hours by January 2000. This is mostly due to data availability and also because the Government was more flexible in case of smaller firms adopting the law and reducing hours by the deadline of 2002.

III Estimation of the AWE in France

Identification Strategy

A transparent exogenous source of variation in the explanatory variable that determines the assignment of treatment is essential for a natural experiment study. It is clear from the discussion on Aubry's law that people who were working more than 35 hours in large firms (with more than 20 employees) are affected by this law in 2000. Thus our potential treatment group consists of people who used to work more than 35 hours in the large firms in June 1998. Our control group consists of households where the household head works 35 or less hours in a small firm. Thus the identification conditions are, (1) people working 35 or less in a small firm are not affected by the law (control group); (2) the transition from unemployment to employment (or vice versa) or increase or decrease in working hours of the wives of the control group identify what the transition of wives of workers working more than 35 would have been in the absence of reduction in work week. This implies that only the policy change affects the treatment and control differently but everything else is same for both groups. It is important that the share of the treatment and control group in the labor force do not fluctuate radically over time.

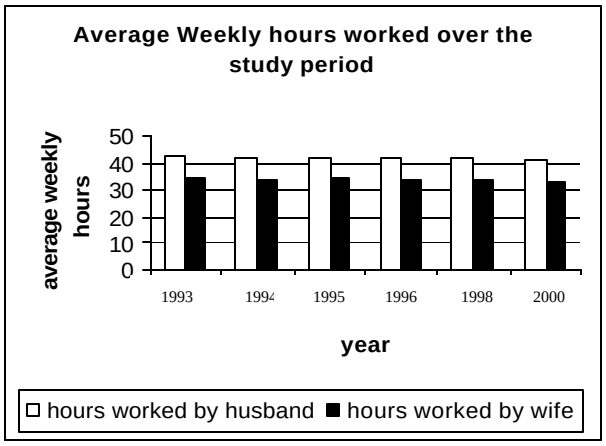
[2] European Industrial relations observatory online (http://www.eiro.eurofound.ie/2000/01/feature/fr0001137f.html)
[3] The Law on a Negotiated Shorter Working Week in France, Assemble'e Nationale, October 15th 2002.
[4] Official Website of French Ministry of Labor and employment

Table 1: Fractions of Husbands Working in Period t.					
Fraction of Husbands Working	1993	1994	1995	1996	1998
35 or less in small firm	0.024	0.025	0.023	0.025	0.024
36 or more in large firm	0.546	0.587	0.563	0.582	0.613
35 or less in large or 36 or more in small firm	0.429	0.387	0.413	0.391	0.362

Table 1 shows composition of private sector workers working different hours in small or large firms over our sample periods. It is seen that size or our treatment and control group over time does not vary much. The efficiency of the Difference-in-Difference estimates rely on the fact that labor supply of the husbands and wives are stable over time and there were no contemporaneous shocks to the labor market over the study period[5]. Figure 1 shows the average weekly working hours by husbands and wives over the range of the study period. Husbands and wives worked approximately 42 hours and 34 hours per week respectively until 1998. In 2000 the average weekly hours respectively are 40.91 and 33.09. There is no fluctuation in the observed averages, except for the small but expected decline in the average working hours in 2000.

Table 2 depicts average hours worked by wives conditional on belonging to the treatment or control group. It is observed that average hours worked by wives from treatment and control households are also more or less stable over time. We thus observe no differential trend in the treatment and control groups. It is hypothesize that Aubry's law changed the labor supply behavior of wives between 1998 and 2000 whose husbands worked more than 35 hours in large firms in 1998. Figure 2 reveal the frequency distribution of hours worked by wives in 2000 conditioned on her hours in 1998 and also belonging to either treatment or control households.

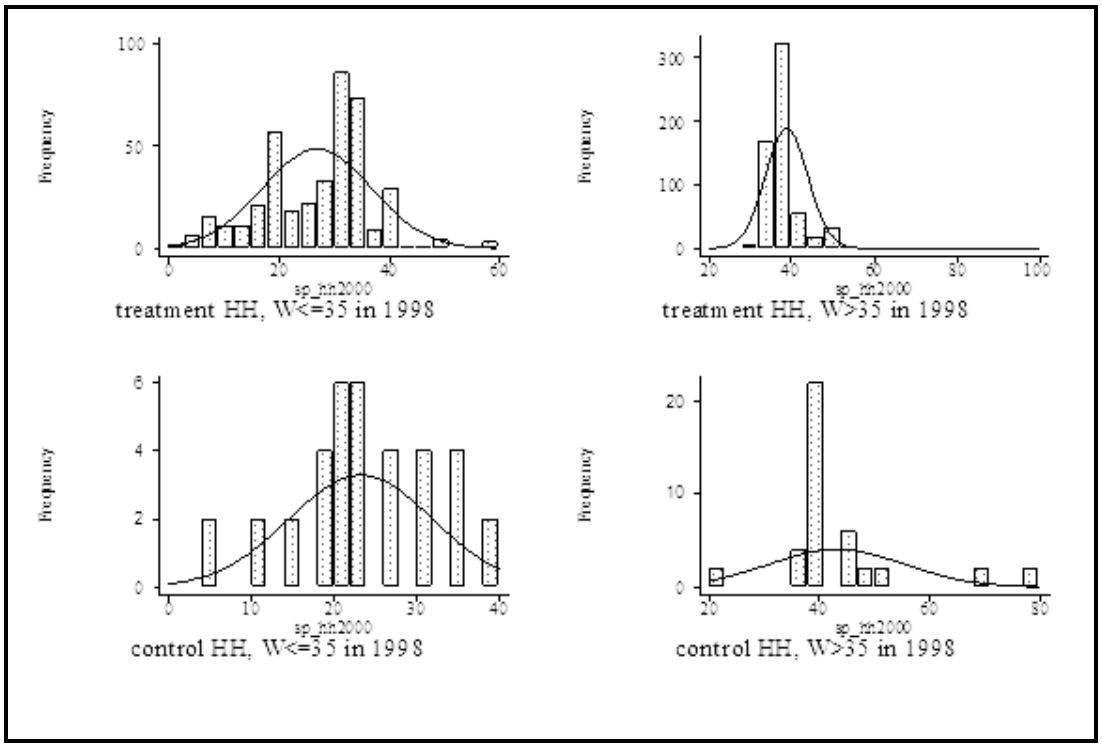
Figure1: Average Hours Worked Over the Study Period



[5] It is observed from the table 28 and the graphs in Appendix B that the average usual hours worked, total employment and composition of employment in different industries for all males and females in the economy were more or less stable over the study period.

Table 2: Average Hours Worked by Wives		
year	Husband work more than 35 hours	Husband works less than 35 hours
1993	35.05	33.53
1994	34.04	33.72
1995	34.44	33.58
1996	33.96	32.96
1998	34.33	33.62
2000	33.87	33.21

Figure 2: Frequency Distribution of Hours Worked by Wives in 2000 Conditioned on Being from the Treatment and Control Households and Her Hours of Work in 1998



It is observed in Figure 2 that some of the wives who were working 35 or less than 35 hours in 1998 ($W \leq 35$) and from the treatment households work more than 35 hours in 2000. All most all wives from treatment households who worked more than 35 hours in 1998 (W>35), are also affected by the law themselves; did not reduced their hours below 35 in 2000. Almost all wives from the control households do not change their labor supply in terms of hours in 2000. Figure 3 shows frequency distribution of different numbers of hours worked by husbands in 2000, given they worked specific ranges of hours in 1998. It is seen that almost all husbands reduced their hours of work in 2000 from their usual hours in 1998, except for husbands working exactly 35 hours. Thus a reduction in standard working hours have affected treatment households and labor supply behavior of wives, where as, there were not much effect in the control households.

Table 3 in appendix A shows the summary statistics of the treatment and the control group. The mean hours worked by wives in two groups are not very different from each other. The average family size is about the same and 50% of both groups earn low income[6] (less than 1.3*SMIC). The husbands and wives in the control group are on an average 4 years older than the couples in the treatment group but the age gap between the couples are same at about 2 years. There is a small difference in monthly salary earned by wives in the two groups. In terms of educational qualifications both groups are more or less similar. 39% of wives from the treatment households and 37% of wives from the control group have post baccalaureate or technical degree respectively[7]. About 22% wives in each group do not have any formal diploma. About 20% husbands in the sample from both groups do not have any diploma. The majority of the husbands have post baccalaureate or technical education, about 42% in the treatment group and 45% in the control group. Overall, the treatment and control group have similar educational back ground and income status and family size.

The size of the control group is very small, only 2.5% of the population. This might be a problem in terms of preciseness of the estimates. To test the robustness of our results, we used different control groups and different years of data which is discussed later.

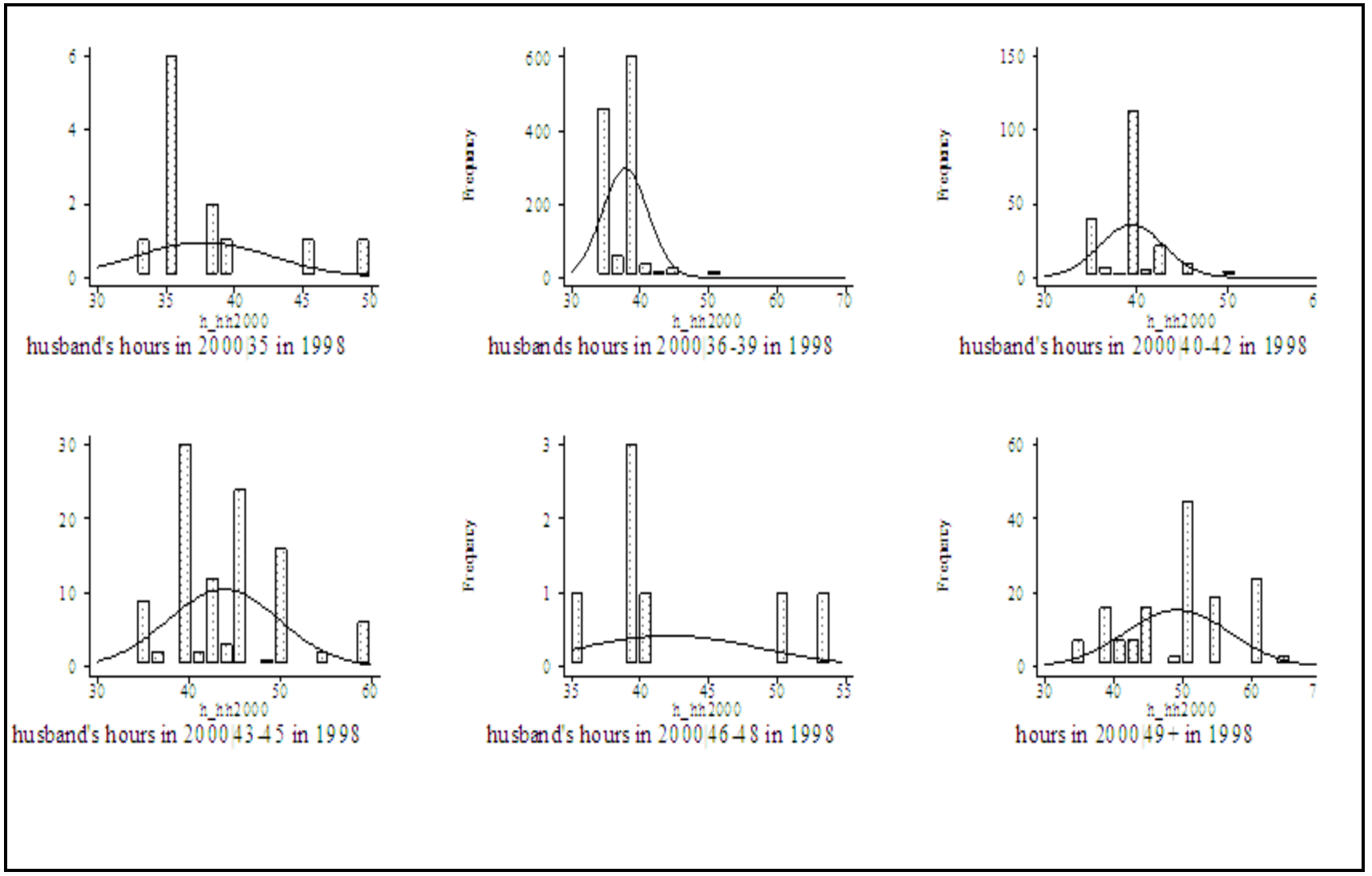
IV. The Data

The data from yearly French Labor Force Survey, *Enquete Emploi* (EE) for the years 1993-2000 will be used for this purpose. Approximately, 65,000 households are surveyed each year in March with one third of the sample replaced each year. Hence all of the members in nearly 22,000 households are followed at most three times provided they do not move during this three year period. The data set includes individual specific information on demographic characteristics (e.g. age sex marital status, number of children present at home, level of education etc.) and labor market characteristics (e.g. labor force participation status, net monthly salary, usual hours worked in a week, region of residence etc.).

Only married couples were selected for the regression analysis. We also excluded workers employed as civil servants or in the public sector since they were not affected by the law in 2000.

[6] This definition is chosen following Kramarz & Philippon (2001), "The impact of differential payroll tax subsidies on minimum wage employment" Journal of Public Economics, 82(1), 115-146.
Also Coninck and Estevao (2003) and Crepon Kramarz (2002) used the same definition of low wage workers.
[7] For a detailed analysis of determinants and patterns of labor force supply of women in France , see Riboud, Michelle (1985).

Figure 3: Frequency Distribution of Different Numbers of Hours Worked by Husbands in 2000, Given They Worked Specific Ranges of Hours in 1998



All young workers employed in publicly funded programs that support subsidized low wage employment or combine education with training are also excluded. The age limit for participation in these programs is 25 or less. We only kept individuals who were in the 26 to 65 age range. This sample also avoids school to work transitions of wives. All the self employed and unemployed husbands are also excluded. The households where the husbands work 36 or more in a small firm or 35 or less in a large firm were excluded as well. This leaves us with only treatment and control groups in the sample.

The control variables include education, age, age squared, regional dummies and regional unemployment rate. There are six education categories: Junior High School (6-16 years), basic vocational/technical school (18 years), Baccalaureate, Baccalaureate plus two years, graduate level (Baccalaureate plus 4 years), leaving no education as the reference category. The French Labor Force Survey definition of employment is the same as International Labor Office (same as US BLS definition). The data on minimum wages, and price indices for different years were taken from the INSEE monthly bulletin[8].

For estimation, data on individual married women in a specific year is matched with their employment status data two years later. For example, using the individual and household ID we match married females in the 1998 survey with their employment status in 2000. Only the usual weekly hours worked and the employment status variables are collected from the year t+2 while all the other control variables come from period t. The dependent variable "change in wife's hours from t to (t+2)" was created as a difference between reported usual hours worked in the two periods. The Aubry's Law I came into being in June 1998 and the deadline for reducing hours by large firms was February 2000. We omitted the year 1999 as the adjustment period In the same manner all the other panels (93-95, 94-96, 95-97, 96-98 were created. Finally we append these datasets to create a pooled data set which allows us to investigate the changes in the wife's response before and after the implementation of the new standard work week. We expect a different pattern in the wife's behavior in the 1998 panel (98-2000) compared to other panels. I am interested in how the wife's hours change between 1998 and 2000 if the husband is working 36 or more hours in a large firm in 1998. It is hypothesized that wives from treatment households would increase their hours of work, at least they will not lower their working hours. There is no obvious reason to believe that wives would significantly alter their hours of work prior to 1998

[8] National Institute of Statistics and Economic Studies (http://www.insee.fr/en/home/home_page.asp)

between t and t+2 if husbands work 36 or more hours in large firms in period t. The same argument holds for participation of unemployed and inactive wives when husbands are affected by hour reduction policy.

Regression Framework:

"Difference-in Difference" Estimates of the Added Worker Effect

The reduced form participation equation:

$$(5) \qquad prob(employment\_wife_{t+2} \mid X_t, H_t, t) = a + b_1 X_t + b_2 H_t + b_3 Yr98 + b_4 Treatment_t + b_5 Treatment_t * Yr98$$

The reduced form changes in hours equation is:

$$(6) \qquad E(\Delta hours\_wife_t^{t+2} \mid X_t, H_t, t) = a + b_1 X_t + b_2 H_t + b_3 Yr98 + + b_4 Treatment_t + b_5 Treatment_t * Yr98$$

Where,

Treatment is set equal to one if the husband works 36 or more hours in a large firm and zero otherwise. *Yr98* is set to one if the year is 1998 and zero otherwise. In this framework the *Treatment* control for the general time series trend of hour changes of wives when their husbands work more than 36 hours in large firms compared to the control group. *Yr98* captures how overall economic situation affect wives of the treatment and control group in the particular year. The interaction *Treatment*Yr98* , the Difference-in-Difference (DID) estimator captures the responses of wives whose husbands were affected by Aubry I compared to the wives whose husbands worked 35 or less in smaller firms and were not affected the hours restriction[9]. The dependent variable in equation (5) is the employment dummy in period t+2. In equation (6), the dependent variable is the difference in hours worked by wives from period t+2 and t. The estimate b_5 indicates the AWE estimate, i.e. how wives respond in terms of hours worked when husbands are affected by the policy compared to the control group and other years. Even if there were no relative changes in group characteristics, controlling for wife's and husband's characteristics (H) and other variables capturing surrounding labor market and household

[9] For a detailed definition of DID, see Wooldridge, J.M., Econometric Analysis of Cross Section and Panel Data, The MIT Press, Cambridge, MA, 2002

conditions (X) might increase the precision of the coefficient of interest. We included year effects to capture any national trends in changes in hours worked by wives of treatment group.

V. AWE Results

AWE in Terms of Hours Worked By Wives:

Table 4 shows, how wives' hours of work change if husbands are affected by Aubry's Law. It is hypothesized that a wife from the treatment household, if she is not subject to the law, would increase her hours, at least she would not reduce it. The first column reports estimates for the whole sample wives who are already in the labor force. Then the sample is split according to the status of the wives. They themselves may be subject to this work week restriction. The second column reports estimates for wives who work more than 36 hours in large firms. The third column shows estimates for wives who work 35 or less hours or in small or large firms in period t. The estimates indicate that if the husband is subject to the hours restriction, women significantly increase their weekly hours of work by more than 3 hours compared to the control group. In column 2, women who are directly affected by the Aubry's Law themselves do not respond to husband's hours restriction as the coefficient of *Treatmentr98* is not significant. This is probably due to the fact that most women in France work in the service sector and there is not much scope of over time for full time workers. For the sample of women who works 35 or less or in small firm, who themselves are not subject to hours restriction, increase their weekly hours of work by 5 and a half hour as a response to reduction in husband's standard hours[10]. The estimate is significant at 10% level. This finding is partly similar to Hunt's (1998) finding. She also found that reduction in standard hours of fulltime male workers had no effect on employment rate of women but lowered the hours of working women. This is possibly because in Germany, the reduction in standard hours was accompanied by full wage compensation and thus any income induced AWE is unlikely. But in France, the affected workers will receive full wage compensation by the end of 2005 and it is likely that they suffered some income loss during the study period due to this restriction. Moreover, Coninck and Estevao (2003) found that Aubry's law increased the transition probability from employment to unemployment by 1.5 percent for those who worked 36 or more in large firms in 1998. Crepon and Kramarz (2002) found similar

[10] The Socialist Government in their election campaign in April 1997, committed a mandatory 35 hour work week. Separate specifications (with interaction term Treatment*Year96) were run to investigate the possibility of any anticipatory effect. The coefficient was not significant.

results when investigating the 1982 reduction in standard working hours in France**.** The AWE in France in terms of increase in weekly working hours by wives may also stem from the potential risk of unemployment of the husbands who were affected by the new standard.

AWE in Hours Worked and Family Income

Again, the AWE estimate may vary by the income status of the family. We again split the sample of women who themselves were not directly affected by the reduction in standard hours according to husband's salary. It is hypothesized that AWE is more prominent in families with a credit constraint. In Column 1 in table 5, AWE estimate for low income workers is presented. Column 2 shows parameter estimates for high income group. We find that married women increase their hours of work by 5 hours in a week when their husbands are subject to reduction in standard working hours in case of low income families where as no significant response is seen from the wives from high income households. Crepon and Kramarz (2002) found that due to the 1982 hours reduction in France, more low wage workers lost their jobs compared to high wage group. Even though the Government discouraged lay off of workers and promised to increase the monthly wage to compensate the hours cut, it is possible that the income loss in low income families due to this law induced increased hours of work by wives who were not directly affected by the law.

AWE in Hours Worked and Family Size

AWE may vary by family size. Wives may be more responsive as the credit constraint rises with family size. This is because family consumption may be less flexible in larger families (fixed consumption needs that are tied to children and dependent senior member). We split the sample of not directly affected wives according to family size. The first column of table 6 shows estimates for couples without children or any other family member. We observe no significant response from wives when their husbands work 36 or more hours in large firm. The second and third column show the estimates for sub sample of families with exactly 3 members and 4 or more members respectively. The Difference-in-Difference (DID) estimate reveal that women increase their hours of work by 6 hours and 6.34 hours respectively in a week for families with 3 members and 4 or more members. AWE is stronger for families with more dependent members

as family size is positively correlated with the degree of credit constraint. Gruber and Cullen (2000), also found large UI effect in the presence of younger children.

Same calculations were carried out for women who were directly affected by the reduction in hours as shown in table 7 and 8. The coefficient of interest is not significant in any of one of the specifications.

AWE in Terms Participation in the Labor Force:

Table 9 presents the probit estimates of participation in the labor market in period t+2, of an unemployed or inactive wife whose husband is subject to the hours restriction compared to a wife of an employee who is not affected. The first column reports the likelihood of participation in (t+2) of all non-participant (unemployed + inactive) wives from period t. The coefficient of the *Treatment98* is negative and significant for the full sample of non-participants. These non-participant wives may have preference for not working. Also, they may find it difficult to find employment in the presence of high unemployment in the economy. The second and third column separately report estimates for the samples of unemployed and inactive wives in period t respectively. It is seen that the unemployed or inactive wives are unlikely to participate the labor market if the husband is subject to the hours restriction compared to wives of employees who are not affected by the policy. The estimates are not significant. Since wives have the information that the husband's hours cut will be fully compensated in 2005, they adjust consumption instead of their labor force participation decision. Hunt (1998) in case of Germany also found that the hours reduction had no impact on labor force participation where the hours cut was accompanied by full wage compensation. Gruber and Cullen (2000) found the likelihood of participation to increase by 12.7% when a woman's husband faces unemployment. But for France, the reduction in the standard hour of the husband does not induce unemployment to employment transition of a wife but increases the number of hours worked by a wife already in the market.

Table 10 and 11 present probit estimates of participation in t+2 for all non-participants in period t, for different income categories and family sizes respectively. One important result is that non-participant wives from low income households are unlikely to participate in the market when their husband's hours are subject to restriction, as the coefficient *Treatment98* is negative and significant at 5%. This result is unexpected. One possible explanation is that, these wives with husbands who are low wage workers, have less labor market skills (due to assortative

mating). With a rise in minimum wage, as a part of the law, these wives are less likely to find employment. Lundberg (1985) also found similar result for the black families in the United States. Also in the presence of a child or dependent members, the non-participant wives are less likely to participate. Larger family size (4 or more members) has no significant impact on participation decisions of non-participant wives.

Almost all of the other coefficients in all the specifications have the expected signs. The husband's wage is negatively related to wife's hour changes. But it is not significant which generally is the case as found in the literature. Lundberg (1985) also found a similar pattern. The wife's university degree and compulsory schooling is positively correlated with hour changes. Presence of children in the household is negatively associated with changes in wife's hours. Wife's age increases her hours of work but husband's age does not have any significant influence over wife's hour changes except for the participation equation. The wife is less likely to participate with rise in husband's age. The regional unemployment rate and region dummies are not significant in all of the regression except for the participation equation. The regional unemployment is negatively related with likelihood of participation.

The results from French data confirm Mincer (1962) and Lundberg's (1985) central conclusion that AWE is seen in credit constrained families due to a temporary drop in family income. This significant AWE in terms of increased hours worked by wives who are already in the market and not affected by Aubry's law can be attributed to an income decrease in the treatment households. These wives are better capable compared to non-participant wives to adjust to this income shock and increase hours and thereby maintain the optimum level of consumption as before. They find it optimal to increase hours to compensate the household income loss to some extent rather than borrowing or dissaving. But we do not observe positive and significant transitions of unemployed or inactive wives to employment due to this transitory and small income decline. This can be due to the forward looking behavior of unemployed wives and also their labor market characteristics. By 2005, hour reduction will be fully compensated and workers will not suffer any income loss. So probably these families adjusted their consumption expenditure during this short period of income loss and not their labor supply response. Again, it is possible that these unemployed and inactive wives lack certain labor market skills or have other constraints and were discouraged to look for employment for this short period.

VI Robustness Check

It was mentioned earlier that the size of the control group is quite small compared to the treatment group and this might affect the preciseness of the estimates. To test the robustness of the results we estimated the same set of equations but used several different control groups, namely, the following:

1) Husbands working 20-35 hours in smaller firm
2) Same control but used data from different years
3) Husbands working 35 or less, either in large or smaller firms
4) Hours worked during the week before the survey instead of usual weekly hours

The results are presented in Tables 12-35 in Appendix A. It is seen that in case of first control group the results are very similar to the results already discussed. Moreover this control group consists of, husbands who are working longer hours and in this respect they are more similar to the treatment group. But due to the smaller size of the control group in the sample and the arbitrariness involved in the choice, the original control group (less than 35 hours in small firm) was used in the paper. The results are almost exactly same when data from 1993 was dropped. Again in case 4, the reported hours worked in the week preceding the survey for both husband and wife were used to carry out the estimation. The results from all the specifications strengthen the AWE hypothesis, albeit all the coefficients of interest are barely insignificant. In terms of participation, the results are very similar to the ones discussed. Usually in the literature, it is debated that hours worked a week before the survey may suffer from measurement problem and since our assignment of treatment and control group is crucially dependent on hours worked variable, the estimates using such variable is not the optimal way to investigate the AWE issue.

There are two other potential control groups. Husbands working 35 or less hours in large firms and husbands working 35 or more in small firms (as the deadline for smaller firms were February 2002). But there might be large scale effects or redistribution of work in large firms and the people working 35 or less in these firms might be affected. It was documented that some smaller firms adopted the 35 work week by 2000 even though their deadline was 2002. The estimates would be biased if these two groups are used as controls. When households where the husband works only 35 hours or less were (either is larger or smaller firm) used as control, AWE estimates in all specifications, both in hours worked and participation specification, have the desired signs and most of them are significant. But due to the reasons cited, this is not an ideal

control group. Nevertheless, it justifies the presence of AWE in terms of increased hours worked by wives when husband's hours are exogenously reduced and adds to the robustness of the estimates.

VII. Conclusion

This paper adds to the existing literature on added worker effect in several ways. It looks at married women's labor supply decision when their husband's working hours are exogenously constrained. This empirical study emphasizes the role of credit constraint and family size in the labor force participation decision. I use the 1998 Aubry's Law in France as a natural experiment to investigate the married woman's response in terms of participation or changes in her hours of work when her husband is subject to reduction in standard hours. The Law Aubry I determined that the standard work week of enterprises with more than 20 employees had to be reduced to 35 from 39 hours by February 2000 and was implemented at a national level, generating an easily identifiable treatment and control group. Since this policy is mandated by Government and implemented through out the country the estimates do not suffer from endogenous placement or selection bias. I compare the transition to employment of unemployed and inactive wives whose husbands were directly affected by the reduction in standard working hours compared to wives whose husband were not affected by the law. I also compare the hour changes of wives from the treatment households compared to the control group. It was evident from the difference in difference estimation of the probit model, that the unemployed or inactive wives are unlikely to participate the labor market if the husband is subject to the hours restriction compared to wives of employees who are not affected by the policy.

The results on hours changes of wives when their husbands are subject to hours restriction compared to wives whose husbands are unaffected by the policy indicate that women increase their usual weekly hours by almost 3 hours. Again splitting the sample into women who themselves are subject to the restriction and who are not, demonstrates that in the first case, the exogenous reduction of husband's hours has no significant impact on wives' hours of work where as women unaffected by the policy substantially increase their hours of work by as much as 5 hours. The data also reveal that the AWE is more prominent in low income families facing credit constraints. The AWE is also seen to rise with family size as family size may be positively correlated to credit constraint.

It is also possible that even after controlling for all possible observed characteristics, unobserved differences between the treatment and control group exist and hence the estimates suffer from heterogeneity bias. In equation (6) I estimate the impact of reduction of standard hour worked by husbands on changes of hours of work by wives from period t and t+2. It is very difficult to think about any individual specific and family specific variable that would induce wives of treatment groups to systematically change their working hours in between two periods (t to t+2) compared to the control group. Hence wife's hours change equation is less likely to suffer from such bias. But the heterogeneity among treatment and control groups may be an issue in the case of employment transition probabilities. But the extent of the problem is smaller as in each sub sample of people, as the group heterogeneity is likely to be small. Again, if the distributions of unobserved characteristics of the treatment and control groups are time invariant, the estimated coefficients are not contaminated

In the analysis it was not possible to account for the type of salary structure. Obviously salaried workers are different from wage workers and the impact of Aubry's law would be very different across these two groups. But the high income group in the regressions, are probably salaried workers and hours reduction do not induce any AWE in these families. I run the same set of regressions for a different sub set of people based on the employment category and industry of work (not reported here) and no discernible pattern is observed. Finally, as the Enquete Emploi survey is carried out every March, the treatment and control status is assigned by the information provided by people in March. The Law Aubry I came into being on June 1998. It is not possible to account for the people who changed their firm size and working hours between March and June 1998. Since in this data set each person can be traced at most three times, it was observed that no one in the treatment or control group reported any change in his firm size between 1998 and 2000.

The results demonstrates that an exogenous reduction in husband's working hours by 4 hours per week (10%) leads to an increase in wife's hours, who were basically part time workers, by 5 hours per week. This effect is more prominent in poor and larger families. One important objective of this law was to increase the quality of life. But it seems that the law contributed to redistribution of welfare from poorer and larger households to small, more educated and wealthy households. This un-intended effect of the law needs more careful discussion and opens an interesting avenue for further study of the impact of Aubry's law.

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Appendix A

Table 3: Summary Statistics of Treatment and Control Group		
	Treatment	Control
Average Family Size	3.72	3.46
Wife's Characteristics		
Age of Wife	41.09	45.04
Hours Worked: Wife	33.91	34.45
Monthly Salary: Wife	5649.27	5962.65
W_Post Baccalaureate and Technical Diploma (%)	38.62	36.90
W_Baccalaureate (%)	13.19	12.5
W_18 years (%)	9.08	10.71
W_6-16 years compulsory (%)	17.18	17.56
W_No diploma (%)	21.93	22.32
Husband's Characteristics		
Age of Husband	43.25	47.62
Hours Worked: Husband	41.16	23.33
Monthly Salary: Husband	8673.95	5739.11
H_Post Baccalaureate and Technical Diploma (%)	42.05	44.94
H_Baccalaureate	8.80	9.82
H_18 years	5.07	6.55
H_6-16 years compulsory	18.30	19.05
H_No diploma	20.82	19.64
Husband's Salary < 1.3*SMIC (%)	53.52	50.59
N	7545	336

Table 4: AWE in Terms of Hours Worked by Wives Who are Already in Labor Force			
	All Women	Directly Affected by Policy	Not Directly Affected by Policy
Year98	-4.516	-1.180	-6.090
	(0.022)**	(0.609)	(0.047)**
Treatment	-1.118	0.612	-1.189
	(0.174)	(0.642)	(0.225)
Treatment98	3.373	-0.748	5.483
	(0.089)*	(0.748)	(0.076)*
H_lnwage	-0.101	0.117	-0.605
	(0.774)	(0.727)	(0.259)
W_Post BAC	0.550	-0.316	1.264
	(0.242)	(0.499)	(0.073)*
W_BAC	-0.196	0.165	-0.135
	(0.611)	(0.609)	(0.826)
W_Technical Diploma	-0.299	-0.217	0.055
	(0.399)	(0.435)	(0.923)
W_18 Years	0.199	-0.248	1.037
	(0.653)	(0.467)	(0.137)
W_Compulsory 6-16	0.482	-0.103	1.173
	(0.236)	(0.735)	(0.084)*
Age of Wife	0.377	0.529	0.295
	(0.006)***	(0.000)***	(0.159)
Age of Wife Squared	-0.005	-0.006	-0.004
	(0.006)***	(0.001)***	(0.113)
H_Post BAC	-0.402	-0.214	-0.718
	(0.372)	(0.620)	(0.320)
H_BAC	-0.315	-0.545	-0.263
	(0.441)	(0.181)	(0.687)
H_Technical Diploma	-0.356	-0.235	-0.533
	(0.240)	(0.298)	(0.299)
H_18 Years	0.062	0.645	-0.486
	(0.902)	(0.245)	(0.542)
H_Compulsory 6-16	-0.645	-0.466	-0.941
	(0.099)*	(0.169)	(0.145)
Age of Husband	-0.008	-0.028	-0.020
	(0.810)	(0.319)	(0.690)
No Children	-1.290	-0.120	-0.688
	(0.025)**	(0.877)	(0.390)
One Child	-1.010	-0.086	-0.422
	(0.052)*	(0.910)	(0.530)
Two or More Children	-1.165	-0.106	-0.997
	(0.022)**	(0.889)	(0.121)
Regional Unemployment Rate	-0.088	-0.251	0.010
	(0.627)	(0.152)	(0.973)
Urban	0.292	0.282	0.238
	(0.194)	(0.192)	(0.508)
Paris_Suburb	0.249	-0.060	0.578
	(0.708)	(0.925)	(0.613)
Constant	-3.521	-9.357	0.864
	(0.350)	(0.023)**	(0.877)
Observations	4782	2069	2713
R-squared	0.019	0.063	0.023
Robust p Values in Parentheses, Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Table 5: AWE in Terms of Hours in Low Income Families for Women Who are not Directly Affected by Policy		
	Low Income	High Income
Year98	-7.316	-4.267
	(0.084)*	(0.061)*
Treatment	-0.539	-1.692
	(0.667)	(0.279)
Treatment98	5.352	2.386
	(0.083)*	(0.304)
W_Post BAC	1.463	0.678
	(0.169)	(0.467)
W_BAC	-0.223	-0.421
	(0.782)	(0.631)
W_Technical Diploma	0.242	-0.633
	(0.736)	(0.436)
W_18 Years	0.863	1.058
	(0.287)	(0.405)
W_Compulsory 6-16	1.999	-0.537
	(0.022)**	(0.586)
H_lnwage	-2.068	0.913
	(0.126)	(0.260)
Age of Wife Squared	-0.004	-0.008
	(0.299)	(0.037)**
Age of Wife	0.222	0.677
	(0.435)	(0.033)**
H_Post BAC	2.078	-0.925
	(0.146)	(0.412)
H_BAC	0.415	-0.450
	(0.661)	(0.686)
H_Technical Diploma	-0.594	-0.134
	(0.327)	(0.896)
H_18 Years	-0.955	0.374
	(0.308)	(0.803)
H_Compulsory 6-16	-1.342	0.366
	(0.081)*	(0.769)
Age of Husband	-0.005	-0.023
	(0.939)	(0.724)
No Children	-0.114	-1.722
	(0.911)	(0.204)
One Child	0.133	-1.033
	(0.877)	(0.357)
Two or More Children	-0.323	-1.690
	(0.687)	(0.118)
Regional Unemployment Rate	-0.200	0.367
	(0.613)	(0.358)
Urban	0.174	0.068
	(0.719)	(0.897)
Paris_Suburb	0.407	0.411
	(0.839)	(0.760)
Constant	10.357	-18.387
	(0.274)	(0.033)**
Observations	1536	1177
R-squared	0.037	0.048
Robust p Values in Parentheses, Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Table 6: AWE in Terms of Hours in Different Family Size for Women Who are not Directly Affected by Policy			
	2 Members	3 Members	4 or More Members
Year98	1.384	-7.319	-10.847
	(0.650)	(0.093)*	(0.011)**
Treatment	1.196	-1.800	-3.113
	(0.618)	(0.109)	(0.038)**
Treatment98	-0.305	6.099	6.337
	(0.926)	(0.064)*	(0.030)**
W_post BAC	3.280	-0.528	1.186
	(0.118)	(0.680)	(0.150)
W_BAC	0.935	2.149	0.271
	(0.674)	(0.053)*	(0.718)
W_Technical Diploma	2.107	-0.766	-0.238
	(0.313)	(0.446)	(0.716)
W_18 Years	2.425	2.494	1.897
	(0.158)	(0.034)**	(0.021)**
W_Compulsory 6-16	2.430	-0.713	1.688
	(0.209)	(0.535)	(0.031)**
Age of Wife	0.265	-0.022	0.546
	(0.544)	(0.947)	(0.133)
H_lnwage	0.712	0.210	-1.629
	(0.529)	(0.843)	(0.025)**
Age of Wife	-0.004	-0.000	-0.007
	(0.418)	(0.917)	(0.122)
H_Post BAC	-0.533	-1.950	0.136
	(0.785)	(0.106)	(0.880)
H_BAC	-2.584	0.915	-0.003
	(0.208)	(0.436)	(0.997)
H_Technical Diploma	-0.351	-1.002	-0.274
	(0.843)	(0.262)	(0.655)
H_18 Years	-0.555	-2.246	-0.092
	(0.781)	(0.107)	(0.924)
H_Compulsory 6-16	-1.290	-1.210	-0.591
	(0.537)	(0.255)	(0.446)
Age of Husband	-0.016	-0.009	-0.006
	(0.915)	(0.925)	(0.928)
Regional Unemployment Rate	1.033	-0.752	0.001
	(0.198)	(0.199)	(0.998)
Urban	-0.888	2.213	-0.378
	(0.449)	(0.000)***	(0.405)
Paris_Suburb	-3.603	0.221	1.707
	(0.214)	(0.928)	(0.250)
Constant	-17.264	11.759	1.325
	(0.205)	(0.216)	(0.880)
Observations	408	698	1607
R-squared	0.083	0.090	0.040
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Table 7: AWE in Terms of Hours in Low Income Families for Women Who are Affected by Policy		
	Low Income	High Income
Year98	-3.355	4.699
	(0.246)	(0.407)
Treatment	-0.472	5.037
	(0.549)	(0.371)
Treatment98	1.306	-6.635
	(0.652)	(0.247)
W_Post BAC	-0.193	-0.096
	(0.756)	(0.917)
W_BAC	0.388	0.402
	(0.329)	(0.607)
W_Technical Diploma	-0.205	0.060
	(0.515)	(0.937)
W_18 Years	0.262	-0.680
	(0.415)	(0.457)
W_Compulsory 6-16	-0.240	0.405
	(0.491)	(0.616)
H_lnwage	0.195	0.216
	(0.752)	(0.759)
Age of Wife	-0.004	-0.009
	(0.034)**	(0.003)***
Age of Wife Squared	0.430	0.794
	(0.012)**	(0.003)***
H_Post BAC	-1.330	0.991
	(0.194)	(0.106)
H_BAC	-0.685	0.280
	(0.281)	(0.648)
H_Technical Diploma	-0.382	0.669
	(0.150)	(0.163)
H_18 Years	0.755	1.291
	(0.340)	(0.064)*
H_Compulsory 6-16	-0.314	-0.315
	(0.360)	(0.702)
Age of Husband	-0.050	0.011
	(0.154)	(0.816)
No Children	-1.130	2.903
	(0.202)	(0.044)**
One Child	-1.184	-2.974
	(0.179)	(0.036)**
Two or More Children	-0.946	-2.586
	(0.283)	(0.067)*
Regional Unemployment Rate	-0.221	-0.274
	(0.290)	(0.399)
Urban	0.441	0.009
	(0.092)*	(0.981)
Paris_Suburb	1.006	-0.771
	(0.248)	(0.396)
Constant	-6.540	-23.594
	(0.180)	(0.017)**
Observations	1271	798
R-squared	0.090	0.079
Robust p Values in Parentheses, Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Table 8: AWE in Terms of Hours in Different Family Size for Women Who were Affected by Policy			
	2 Members	3 Members	4 or More Members
Year98	-8.055	-1.213	2.975
	(0.217)	(0.532)	(0.346)
Treatment	-1.353	-1.786	2.837
	(0.486)	(0.003)***	(0.356)
Treatment98	6.572	-1.423	-4.605
	(0.316)	(0.468)	(0.149)
W_Post BAC	1.730	-1.639	-0.470
	(0.151)	(0.074)*	(0.455)
W_BAC	0.825	0.708	-0.365
	(0.373)	(0.269)	(0.408)
W_Technical Diploma	0.215	-0.005	-0.642
	(0.766)	(0.994)	(0.072)*
W_18 Years	0.257	-0.073	-0.701
	(0.803)	(0.907)	(0.152)
W_Compulsory 6-16	0.636	-0.159	-0.504
	(0.386)	(0.795)	(0.203)
Age of Wife	0.792	0.453	0.171
	(0.017)**	(0.067)*	(0.417)
H_lnwage	0.933	-0.286	-0.082
	(0.241)	(0.660)	(0.861)
Age of Wife	-0.009	-0.004	-0.001
	(0.009)***	(0.153)	(0.703)
H_Post BAC	-0.227	-0.155	-0.044
	(0.832)	(0.858)	(0.939)
H_BAC	-0.357	-0.786	-0.233
	(0.758)	(0.213)	(0.689)
H_Technical Diploma	0.021	-0.143	-0.370
	(0.975)	(0.723)	(0.220)
H_18 Years	0.441	0.148	1.183
	(0.653)	(0.810)	(0.199)
H_Compulsory 6-16	-1.032	-0.725	-0.034
	(0.225)	(0.241)	(0.932)
Age of Husband	0.017	-0.041	-0.043
	(0.799)	(0.336)	(0.370)
Regional Unemployment Rate	-0.246	0.086	-0.316
	(0.591)	(0.784)	(0.191)
Urban	0.619	0.407	-0.041
	(0.293)	(0.213)	(0.894)
Paris_Suburb	2.061	0.299	-1.168
	(0.297)	(0.666)	(0.291)
Constant	-21.232	-6.620	-1.568
	(0.006)***	(0.346)	(0.817)
Observations	411	659	999
R-squared	0.137	0.175	0.058
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Tab 9: Probit Estimates of Participation in Period t+2, Given Status in t			
	Unemployed_t+Inactive_t	Unemployed_t	Inactive_t
Year98	0.799	0.665	0.790
	(0.078)*	(0.000)***	(0.167)
Treatment	0.109	0.306	0.306
	(0.599)	(0.396)	(0.256)
Treatment98	-0.799	-0.685	-0.728
	(0.081)*	(0.563)	(0.208)
W_Post BAC	0.529	0.117	0.773
	(0.000)***	(0.656)	(0.000)***
W_BAC	0.402	0.483	0.212
	(0.001)***	(0.033)**	(0.212)
W_Technical Diploma	0.330	0.249	0.353
	(0.000)***	(0.101)	(0.001)***
W_18 Years	0.337	0.454	0.301
	(0.002)***	(0.024)**	(0.040)**
W_Compulsory 6-16	0.251	0.194	0.274
	(0.007)***	(0.262)	(0.024)**
Age of Wife	-0.014	0.009	-0.023
	(0.047)**	(0.521)	(0.014)**
H_lnwage	-0.143	0.076	-0.066
	(0.090)*	(0.583)	(0.593)
H_Post BAC	-0.098	0.074	-0.307
	(0.487)	(0.764)	(0.111)
H_BAC	0.118	-0.048	0.211
	(0.382)	(0.846)	(0.210)
H_Technical Diploma	0.050	0.232	-0.101
	(0.533)	(0.098)*	(0.335)
H_18 Years	-0.114	-0.395	-0.004
	(0.464)	(0.159)	(0.985)
H_Compulsory 6-16	0.058	0.161	0.017
	(0.574)	(0.416)	(0.897)
Age of Husband	-0.027	-0.030	-0.024
	(0.000)***	(0.025)**	(0.013)**
No Children	-0.092	-0.526	-0.025
	(0.354)	(0.003)***	(0.846)
One Child	0.168	-0.282	0.175
	(0.056)*	(0.087)*	(0.127)
Two or More Children	0.090	-0.422	0.184
	(0.264)	(0.007)***	(0.069)*
Regional Unemployment Rate	0.033	0.055	0.023
	(0.411)	(0.475)	(0.669)
Urban	-0.172	-0.012	-0.218
	(0.011)**	(0.918)	(0.015)**
Paris_Suburb	-0.268	-0.048	-0.357
	(0.328)	(0.934)	(0.257)
Constant	0.088	-0.017	0.722
	(0.108)	(0.989)	(0.412)
Observations	3099	623	2476
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Tab 10: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women in t, at Different Income Levels

	Low Income	High Income
Year98	0.077	-0.094
	(0.036)**	(0.000)***
Treatment	0.126	0.311
	(0.589)	(0.483)
Treatment98	-0.062	0.979
	(0.042)**	(0.568)
W_post BAC	0.148	0.589
	(0.594)	(0.003)***
W_BAC	0.407	0.406
	(0.025)**	(0.032)**
W_Technical Diploma	0.396	0.175
	(0.000)***	(0.277)
W_18 Years	0.492	-0.029
	(0.000)***	(0.894)
W_Compulsory 6-16	0.229	0.235
	(0.036)**	(0.188)
Age of Wife	-0.013	-0.017
	(0.138)	(0.217)
H_Post BAC	0.375	-0.263
	(0.194)	(0.242)
H_BAC	0.106	0.129
	(0.645)	(0.566)
H_Technical Diploma	0.050	0.068
	(0.580)	(0.733)
H_18 Years	-0.158	-0.117
	(0.444)	(0.670)
H_Compulsory 6-16	0.141	-0.128
	(0.218)	(0.606)
Age of Husband	-0.025	-0.036
	(0.004)***	(0.010)***
No Children	-0.071	-0.022
	(0.563)	(0.902)
One Child	0.108	0.337
	(0.320)	(0.036)**
Two or More Children	0.129	0.052
	(0.184)	(0.735)
Regional Unemployment Rate	0.058	-0.009
	(0.249)	(0.899)
Urban	-0.186	-0.120
	(0.027)**	(0.310)
Paris_Suburb	0.607	-0.703
	(0.285)	(0.045)**
Constant	-0.834	0.408
	(0.294)	(0.153)
Observations	1716	1383

Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%

Tab 11: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women at t and Different Family Sizes			
	2 Members	3 Members	4 or More Members
Year98	-0.824	0.455	0.530
	(0.000)***	(0.106)	(0.305)
Treatment	-0.525	0.379	-0.005
	(0.285)	(0.405)	(0.983)
Treatment98	0.806	-0.563	-0.484
	(0.768)	(0.088)*	(0.354)
W_Post BAC	-0.006	0.842	0.511
	(0.986)	(0.007)***	(0.003)***
W_BAC	-0.103	0.369	0.485
	(0.780)	(0.177)	(0.000)***
W_Technical Diploma	0.453	0.299	0.324
	(0.115)	(0.154)	(0.000)***
W_18 Years	-0.074	0.427	0.323
	(0.845)	(0.115)	(0.008)***
W_Compulsory 6-16	0.505	0.278	0.191
	(0.087)*	(0.216)	(0.076)*
Age of Wife	-0.050	-0.017	-0.005
	(0.007)***	(0.250)	(0.601)
H_Post BAC	0.646	-0.368	-0.351
	(0.067)*	(0.209)	(0.016)**
H_BAC	-0.226	0.017	0.040
	(0.560)	(0.957)	(0.787)
H_Technical Diploma	0.080	-0.010	0.047
	(0.778)	(0.961)	(0.592)
H_18 Years	-0.613	0.060	-0.073
	(0.249)	(0.860)	(0.669)
H_Compulsory 6-16	0.488	-0.054	0.021
	(0.120)	(0.833)	(0.861)
Age of Husband	-0.036	-0.029	-0.027
	(0.071)*	(0.080)*	(0.002)***
Regional Unemployment Rate	0.190	0.008	0.026
	(0.179)	(0.935)	(0.573)
Urban	-0.210	-0.430	-0.072
	(0.253)	(0.007)***	(0.349)
Paris_Suburb	-0.978	0.559	-0.026
	(0.198)	(0.000)***	(0.932)
Constant	0.860	-0.252	-0.049
	(0.315)	(0.784)	(0.938)
Observations	493	603	2003
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Robustness Check in Hours Worked: Husbands Working 20-35 Hours in Small Firm as Control Group

Table 12: AWE in Terms of Hours Worked by Wives Who are Already in Labor Force			
	All Women	Directly Affected by Policy	Not Directly Affected by Policy
Year98	-5.555	-1.592	-8.128
	(0.025)**	(0.577)	(0.051)*
Treatment	-0.744	0.901	-0.794
	(0.451)	(0.605)	(0.495)
Treatment98	4.407	-0.326	7.508
	(0.077)*	(0.910)	(0.073)*
Observations	4758	2063	2695
R-squared	0.019	0.063	0.022
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Table 13: AWE in Terms of Hours in Low Income Families for Women Who are not Directly Affected by Policy		
	Low Income	High Income
Year98	-11.911	-3.161
	(0.027)**	(0.211)
Treatment	0.116	-1.752
	(0.938)	(0.325)
Treatment98	11.989	1.244
	(0.027)**	(0.625)
Observations	1523	1172
R-squared	0.038	0.047
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Table 14: AWE in Terms of Hours in Different Family Size for Women Who are not Directly Affected by Policy			
	2 Members	3 Members	4 or More Members
Year98	1.478	-8.075	-13.396
	(0.708)	(0.147)	(0.007)***
Treatment	2.598	-2.271	-3.015
	(0.300)	(0.067)*	(0.093)*
Treatment98	-0.404	8.869	11.846
	(0.926)	(0.111)	(0.017)**
Observations	404	694	1597
R-squared	0.082	0.089	0.040
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Robustness Check: Dropping 1993's Data

Tab 15: AWE in Terms of Hours Worked by Wives Who are Already in Labor Force			
	All Women	Directly Affected by Policy	Not Directly Affected by Policy
Year98	-3.865	-1.196	-5.391
	(0.060)*	(0.618)	(0.086)*
Treatment	-1.162	0.861	-1.554
	(0.244)	(0.554)	(0.204)
Treatment98	3.437	-0.967	5.950
	(0.095)*	(0.685)	(0.059)*
Observations	3768	1652	2116
R-squared	0.021	0.078	0.027
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Tab 16: AWE in Terms of Hours in Low Income Families for Women Who are not Directly Affected by Policy		
	Low income	High income
Year98	-8.954	-1.906
	(0.034)**	(0.393)
Treatment	-1.341	-0.994
	(0.333)	(0.682)
Treatment98	8.344	2.180
	(0.049)**	(0.440)
Observations	1245	871
R-squared	0.044	0.058
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Tab 17: AWE in Terms of Hours in Different Family Size for Women Who are not Directly Affected by Policy			
	2 members	3 members	4 or more members
Year98	-1.705	-7.360	-10.084
	(0.578)	(0.079)*	(0.019)**
Treatment	-0.734	-1.137	-4.127
	(0.773)	(0.271)	(0.022)**
Treatment98	2.340	7.428	10.220
	(0.473)	(0.080)*	(0.018)**
Observations	320	560	1236
R-squared	0.108	0.096	0.050
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Robustness check: Using the Hours Worked During the Week Before the Survey for Estimation

Tab 18: AWE in Terms of Hours Worked by Wives Who are Already in Labor Force			
	All Women	Directly Affected by Policy	Not Directly Affected by Policy
Year98	-2.319	-1.419	-2.859
	(0.025)**	(0.200)	(0.060)*
Treatment	0.117	0.451	0.174
	(0.770)	(0.306)	(0.765)
Treatment98	1.345	-0.356	2.425
	(0.159)	(0.750)	(0.119)
Observations	4415	1887	2528
R-squared	0.020	0.073	0.025
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Tab 19: AWE in Terms of Hours in Low Income Families for Women Who are not Directly Affected by Policy		
	Low Income	High Income
Year98	-2.358	-4.898
	(0.211)	(0.148)
Treatment	-0.012	0.798
	(0.989)	(0.422)
Treatment98	2.724	2.869
	(0.101)*	(0.398)
Observations	1434	1094
R-squared	0.036	0.050
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Tab 20: AWE in Terms of Hours in Different Family Size for Women Who are not Directly Affected by Policy			
	2 Members	3 Members	4 or More Members
Year98	-2.522	-3.100	-3.299
	(0.554)	(0.219)	(0.135)
Treatment	-0.220	1.000	-0.321
	(0.891)	(0.348)	(0.683)
Treatment98	2.754	4.072	2.107
	(0.527)	(0.116)	(0.349)
Observations	401	650	1477
R-squared	0.090	0.080	0.040
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Robustness Check: Husbands Working 35 or Less Hours in Small or Large Firm as Control Group

Tab 21: AWE in Terms of Hours Worked by Wives Who are Already in Labor Force			
	All Women	Directly Affected by Policy	Not Directly Affected by Policy
Year98	-1.784	-1.566	-2.123
	(0.031)**	(0.124)	(0.082)*
Treatment	-0.432	-0.316	-0.361
	(0.333)	(0.510)	(0.575)
Treatment98	0.683	-0.393	1.601
	(0.157)	(0.702)	(0.102)*
Observations	5016	2148	2868
R-squared	0.019	0.063	0.022
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Tab 22: AWE in Terms of Hours in Low Income Families for Women Who are not Directly Affected by Policy		
	Low Income	High Income
Year98	-2.842	-0.280
	(0.079)*	(0.843)
Treatment	-0.654	0.469
	(0.489)	(0.585)
Treatment98	3.023	-1.512
	(0.066)*	(0.304)
Observations	1621	1247
R-squared	0.036	0.044
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Tab 23: AWE in Terms of Hours in Different Family Size for Women Who are not Directly Affected by Policy			
	2 Members	3 Members	4 or More Members
Year98	0.611	-3.288	-1.908
	(0.839)	(0.118)	(0.285)
Treatment	0.273	0.119	-0.880
	(0.870)	(0.916)	(0.328)
Treatment98	0.375	4.160	0.461
	(0.904)	(0.057)*	(0.800)
Observations	440	739	1689
R-squared	0.094	0.084	0.035
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Robustness Check for Participation of Wives: Husbands Working 20-35 Hours in Small Firm as Control Group

Table 24 : Probit Estimates of Participation in Period t+2, Given Status in t			
	Unemployed_t+Inactive_t	Unemployed_t	Inactive_t
Year98	0.422	0.637	0.484
	(0.431)	(0.000)***	(0.495)
Treatment	0.204	-0.265	0.549
	(0.396)	(0.565)	(0.123)
Treatment98	-0.423	-0.658	-0.428
	(0.434)	(0.544)	(0.550)
Observations	2717	619	2098
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Table 25: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women in t, at Different Income Levels		
	Low Income	High Income
Year98	0.602	-0.003
	(0.308)	(0.000)***
Treatment	0.123	0.406
	(0.648)	(0.482)
Treatment98	-0.587	0.891
	(0.326)	(0.435)
Observations	1702	1015
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Table 26: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women at t and Different Family Sizes			
	2 Members	3 Members	4 or More Members
Year98	-0.982	0.829	-0.149
	(0.000)***	(0.121)	(0.813)
Treatment	-0.686	0.751	0.016
	(0.211)	(0.369)	(0.948)
Treatment98	0.960	-0.934	0.194
	(0.549)	(0.105)	(0.761)
Observations	485	598	1634
Robust P Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Robustness Check for Participation: Dropping 1993's Data

Table 27: Probit Estimates of Participation in Period t+2, Given Status in t			
	Unemployed_t+Inactive_t	Unemployed_t	Inactive_t
Year98	0.009	0.707	0.068
	(0.034)**	(0.000)***	(0.094)*
Treatment	0.290	-0.389	0.616
	(0.279)	(0.450)	(0.129)
Treatment98	-0.007	-0.701	-0.986
	(0.037)**	(0.236)	(0.127)
Observations	2025	469	1556
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Table 28: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women in t, at Different Income Levels		
	Low Income	High Income
Year98	0.407	-0.349
	(0.010)***	(0.000)***
Treatment	0.415	0.058
	(0.201)	(0.907)
Treatment98	-0.382	0.278
	(0.013)**	(0.467)
Observations	1308	717
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Table 29: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women at t and Different Family Sizes			
	2 Members	3 Members	4 or More Members
Year98	-0.588	0.060	0.781
	(0.000)***	(0.323)	(0.132)
Treatment	-0.725	0.367	0.226
	(0.238)	(0.565)	(0.435)
Treatment98	0.605	-0.177	-0.728
	(0.562)	(0.281)	(0.166)
Observations	327	397	1301
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Robustness Check for Participation: Using the Hours Worked During the Week Before the Survey for Estimation

Table 30: Probit Estimates of Participation in Period t+2, Given Status in t			
	Unemployed_t+Inactive_t	Unemployed_t	Inactive_t
Year98	-0.188	-0.543	-0.121
	(0.559)	(0.395)	(0.776)
Treatment	-0.100	-0.290	0.025
	(0.377)	(0.175)	(0.869)
Treatment98	0.166	0.522	0.131
	(0.616)	(0.424)	(0.765)
Observations	2539	577	1962
Robust P Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Table 31: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women in t, at Different Income Levels		
	Low income	High Income
Year98	0.065	-0.531
	(0.850)	(0.000)***
Treatment	0.027	-0.132
	(0.839)	(0.455)
Treatment98	-0.038	0.339
	(0.915)	(0.139)
Observations	1706	833
Robust P Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Table 32: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women at t and Different Family Sizes			
	2 Members	3 Members	4 or More Members
Year98	-0.520	0.354	-0.329
	(0.000)***	(0.595)	(0.288)
Treatment	-0.287	0.047	-0.135
	(0.270)	(0.831)	(0.219)
Treatment98	0.315	-0.452	0.357
	(0.451)	(0.510)	(0.267)
Observations	509	671	1359
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Robustness Check for Participation: Husbands Working 35 or Less Hours in Small or Large Firm as Control Group

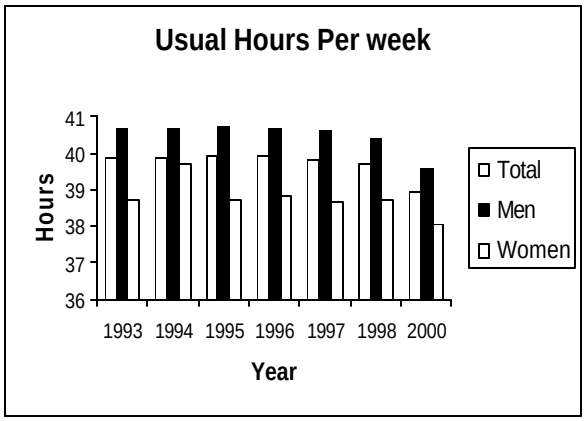
Table 33: Probit Estimates of Participation in Period t+2, Given Status in t			
	Unemployed_t+Inactive_t	Unemployed_t	Inactive_t
Year98	0.485	0.379	0.470
	(0.038)**	(0.403)	(0.125)
Treatment	0.098	-0.049	0.170
	(0.479)	(0.851)	(0.359)
Treatment98	-0.483	-0.408	-0.402
	(0.048)**	(0.389)	(0.210)
Observations	3200	652	2548
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

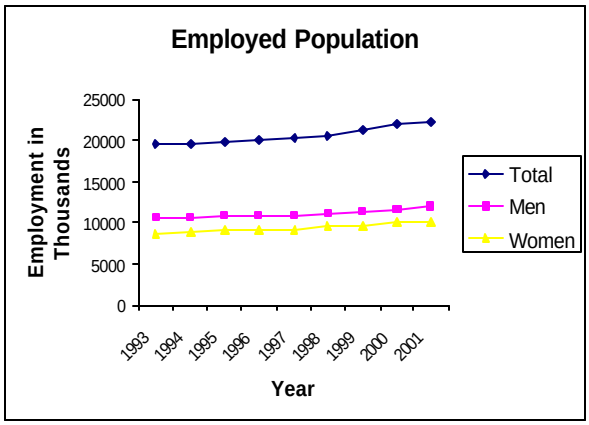
Table 34: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women in t, at Different Income Levels		
	Low income	High income
Year98	0.494	0.162
	(0.051)*	(0.794)
Treatment	0.036	0.290
	(0.818)	(0.327)
Treatment98	-0.466	-0.271
	(0.082)*	(0.670)
Observations	1813	1387
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%		

Table 35: Probit Estimates of Participation in t+2, for Unemployed and Inactive Women at t and Different Family Sizes			
	2 Members	3 Members	4 or More Members
Year98	0.239	0.077	0.412
	(0.668)	(0.082)*	(0.115)
Treatment	-0.309	0.506	0.028
	(0.419)	(0.254)	(0.855)
Treatment98	-0.254	-0.196	-0.365
	(0.677)	(0.065)*	(0.183)
Observations	521	629	2050
Robust p Values in Parentheses, * Significant at 10%; ** Significant at 5%; *** Significant at 1%			

Appendix B

Hours and Labor Force Participation of Women in France:





Source: INSEE and International Labor Organization (ILO)

Tab 28: Wage and Labor Force Participation Statistics:

Labor Force of France	1980	1990	1995	2000
Total (millions)	24	25	26	27
Female (% of total)	40	43	44	45
Employment: Industry				
Male (% of male labor force)	50	41	38	35
Female (% of female labor force)	25	18	15	13
Employment: Services				
Male (% of male labor force)	48	57	61	63
Female (% of female labor force)	75	82	84	86
Female wages (% of male wages)				
Non-agriculture	87	81	..	81
Manufacturing	77	79	..	79
Unemployment				
Male (% of male labor force)	4.1	7	9.8	8.5
Female (% of female labor force)	9.1	12	13.9	11.9

Source: World Bank Country Report