Female Labor Supply Taxes and Bene…ts in France: Policy Experiments Extending the Model INES

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1 Introduction

The impact of the tax and transfer system on labor supply is a recurrent topic debated in academic and political circles in the more advanced countries. A particular attention has been devoted to the female labor supply. Female labor supply decisions are usually found to play a predominant role in determining the size of the labor force, then possibly on the conditions prevailing in the labor market, and are believed to be to a large extent related to the fertility rate within a society. This underlines the necessity to be able to estimate as precisely as possible the impact of policy reforms on labor supply, and specially on female labor supply. Existing theoretical investigations suggest that this partial partial equilibrium approach may lack some consistency in estimating policy reforms impacts. Indeed, it would be always desirable to operate in at least a partial equilibrium framework, that is in our particular case, in a framework allowing to account for both sides of the labor market and their interactions. Nonetheless, when coming to data availability this might result in a too ambitious and even impossible task. Labor demand elements can always enter a labor supply framework however, the approach adopted in the paper remains cautious in that respect and prefers to concentrate on relatively controllable elements, namely labor supply.

The paper treats the case of female labor supply in France and its reaction in front of a number of reform schemes

of two components of the tax and transfer system believed to have, at least potentially, a non negligeable in‡uence on female labor supply decisions. First, we consider the case of extending the so-called Allocation Parentale d'Education (APE) in two directions expected to a¤ect woman labor supply in an opposite manner. On the one hand we simulate the case where the bene…ts would be paid since the …rst child. On the other hand we simulate the complete removal of the mechanism. Second we assess the impact of reforms of the tax credit mechanism (Prime Pour l'Emploi) implemented in 2001. First, we simulate the impact of more generous schemes equal and above that expected to be e¤ective in 2003. Indeed, this tax credit scheme is usually scene as non e¤ective in stimulating labor supply because not generous enough with respect to other existing schemes as such as the Working Families Tax Credit scheme in the UK and the Earned Income Tax credit in the US. We also simulate the impact of the removal of the mechanism giving rise to additional amounts of tax credit paid for family charges. The latter mechanism biases the individual spirit of the scheme and as such can be expected to reduce the overall labor supply of a pluri-member household. We also consider the case where the level of the credit tax depends exclusively on the wage per hour rate meaning that working part or full time gives the same amount of credit for a similar wage per hour rate. This is expected to increase the attractiveness of part time work in which most of the lone women are involved.

The approach adopted is articulated around the estimation of a structural model of labor supply based on individualized data on labor market status, taxes paid and transfers perceived. In order to simulate possible changes in labor market status and inherent earnings due to policy reforms we …rst estimate a wage distribution that accounts for unobserved potential wages of nonworkers. A particular attention is devoted to the treatment of those workers in and out of work who are or would be paid a salary below the legal minimum one. Tax and transfer levels corresponding to each labor market status are obtained through the micro-simulation model INES[1].

The model of labor supply estimated has been chosen in order to deal e¤ectively with estimation di¢culties arising because of the complexity of the tax and bene…t French system. As documented below, beside a typical piece-wise linear tax schedule, there is a non negligeable number of bene…ts, whether means-tested or not, and the combination of all these components inevitably gives rise to strong non-convexities in the households budget constraint. The strategy adopted to circumvent to the largest extent these estimation issues follows Van Soest

[1] The model was …rst developed at the division of Social A¤airs of the INSEE (French national institute of statistics). Since 2001, its developements are the result of the joint work of INSEE and DREES at the French Ministry of Social A¤airs and Labor.

(1995) where the set of hours choice available to each individual is assumed to be …nite. The approach allows not to constrain parameters of the model in order to ful…ll Slutsky satisfaction and allows to test estimated structural parameters against economic theory. The standard modelling strategy treats the labor market status of one household member as given in the hours decision of the other members. This so-called "chauvinist" approach is used as a benchmark for estimation, however, it does not allow to account for potential substitution in hours decision across household members. A unitary structure of the household preferences is then adopted as the core modelling strategy. The unitary approach treats households decisions as being the outcome of a joint decision and income perfectly transferable among household members[2].

Recent works dealing with similar issues in France and using a comparable approach are, inter alia, Laroque and Salanié (2000,2001) and Choné (2001). Nevertheless, the data set used here contains richer and precise information about taxes, transfer and other safety net instruments, making estimation potentially more accurate. Morever, lately cited authors strongly insist on labor demand considerations. Nothing impedes such a step but the appropriateness of the estimation framework and eventually the data set used. We prefer to concentrate on the supply side of the labor market even though some demand side elements are introduced in the estimation. These elements, however, remain strongly associated with labor supply characteristics and do not allow to conclude anything about the intrinsic nature of the (lack of) demand. This takes us to the issue of inactivity and the need to di¤erentiate properly among individuals observed not to work.

Three categories of non working individuals are explicitly considered in the paper: those who do not want to participate; those who desire to work but are not seeking a position because of …xed costs of work that are too high; and the involuntary unemployed. As argued in Cogan (1981), the introduction of …xed costs breaks down the 'all or nothing' character of labor supply choice in the standard approach that relies on the concept of reservation wage exclusively. The presence of …xed costs to work implies that even if the expected wage is above the reservation wage some individuals renounce seeking a position: their earnings net of the …xed costs would fall below their reservation value. Following Van Soest and Callan (1996) …xed costs are instrumented in the estimation which allows to account for an explicit level of households …xed costs. In the presence of children …xed costs are expected to encompass those costs associated with child care but which independent of the number of hours possibly worked. Nonetheless,

[2] As argued by various authors more general collective models with explicit startegic interactions and sharing rule would be more appropriate but are left for future work. See Blundell and MaCurdy (1998) for an extensive review.

the latter component of childcare costs is likely to in‡uence substantially hours decisions. A …rst approximation is accounted for in estimation although further work remains necessary.

The rest of the paper is organized as follows. Next section provides a sketch of the French tax and transfer system. A particular attention is devoted to the instruments used for policy simulations. A brief description of the latter is also given and their expected impact is brie‡y discussed. Section 3 presents the theoretical framework used for estimation and introduces estimation strategy. Model estimates and simulation results are documented and discussed in section 5. Section 6 discusses the technical and policy lines for further research.

2 Labor Supply and the Tax and Bene…t System in France

As in any other developed economy participation rate among females is lower than among males. However, since the early 80's the gap between male and female participation in the labor market has been narrowing. Females are also characterized by higher unemployment rates and higher share of part-time jobs relative to their male peers.

The French tax and transfer system contains various elements that may in‡uence work incentives, in particular among individuals with low potential labor market outcomes. The main argument builds on the fact that because of social transfers individuals with low expected returns from the labor market would face substantially high e¤ective marginal tax rates if they had to decide to return employment.

Females in the core of the labor market (non student aged 25-49) are the most interesting demographic group with respect to the responsiveness of work incentives to modi…cation in the tax and transfer system. Indeed, they are those who show the highest variability in choosing their working hours. As a consequence we may expect a relatively high responsiveness to changes in the tax and allowances scheme . In addition we observe that there is a higher proportion of women than men who are single parents. single parents are often seen as one of the principal client groups for transfers programs.

A major component of the French tax and transfer system is the family component. Indeed, besides allowances that are related to …nancial distress or physical handicap and unemployment bene…ts, …scal deductions and transfers are exclusively related to the family composition. The next sections refer to the 2001 legislation.

Income Tax

The French tax system includes seven marginal tax rates. For values of e¤ective taxable income below households

are exempted from taxation. E¤ective taxable income is obtained for any household by applying deductions to each category of revenue of all the members of the household who declared to be part of a unique …scal entity. As far as labor earnings are concerned, two successive deductions of 10% and 20% respectively are applied. Both deductions, however, are bounded. The e¤ective level of taxation, which is based on a piecewise linear function involving 7 di¤erent marginal rates, is obtained after a deduction that depends on the family characteristics of the …scal entity. More precisely, a number of part, n; is associated with any family con…guration and the deduction, referred to as the quotient familial mechanism, is set as an increasing function of this number of parts n: Again this deduction is bounded. Other tax reductions are allowed for, for instance to compensate for the cost of children eduction. In addition, small amounts of taxes, namely below XX euros, are not recovered by …scal authorities.

Family Bene…ts and Other transfers

The main component of family bene…ts are the so-called Allocations Familiales (AF). These are non means-tested transfers paid to families with at least two children. The very level of the transfer varies with the age of the children.

(Details)

The transfer system includes other family transfers which are however means-tested, the relevant variable being in all cases but one a speci…c de…nition of taxable income that accounts for various family related elements. A very brief description eligibility criteria of each transfer is given in table . A particular attention is paid to the Allocation Parentale d'Education (APE) which contrary to other transfers is contingent on labor market status and history. This speci…city is then expected to induce a relatively high labor supply sensitivity to modi…cations in the eligibility criteria as our policy reform simulations aim to assess. In 2001, the parent of at least two children, either the mother or the father or both in certain circumstances, is eligible to the transfer in case she or he decides to stop its professional activity or reduce its working time after the birth of the second child. Eligibility, however, can be obtained only if the parent has been working at least two years in the …ve years previous to the birth of the second child or in the ten years previous the birth of the third or more child. The transfer is paid for a maximum spell length of three years. The maximum monthly amount (477,38 euros) is obtained in case of the stop of the working activity. In case working hours are reduced and the position is less than a half time position the monthly amount of the transfer falls to 315,65 euros. If the position is between half and 80 percent of the legal full-time

		Eligibility Criteria other than Income	Income Contingency	Transfer w.r.t Income
Family Transfers	AF	At least two dependenpant children under 20	NO	Constant
Complementary Family Transfers	CF	At least three children under 20	YES	Constant/Decreasing
Education Transfer	APE	Reduction of working hours or quit after a birth event Birth should take at two at least the # of children	NO	Constant
Young Child Transfer	APJE	Paid from the fourth month of pregnancy until the third anniversary of the child	YES	Constant/Decreasing
Falmily Support Transfer	ASF	To lone persons with dependent child and families in charge of an orphelin education	YES	Constant
Special Educ. Transfer	AES	Presence of disable child under 20	NO	-
School Year Transfer	ARS	Children at school aged from 6 to 18	YES	Constant
Schooling Grant		At least one child in lower secondary education	YES	Stepwise decreasing
Schooling Grant		At least one child in upper secondary education	YES	Stepwise decreasing
Lone Parent Transfer	API	Paid to lone parents and lone persons	YES	Decreasing

Table 1: Family Bene…ts 2001

work duration the monthly transfer further drops to 238.70 euros. While in the case of a complete stop of activity only one of the two parents can be eligible to the transfer, if both reduce their working hours without ceasing their activity then both are made eligible.

A means-tested subsidy, so called Allocation Logement, is paid to households who rent or still pay interests on the mortgage loan of their own house. A reform has been implemented in 2001 and attempted to merge the social and family components of the transfer on the hand and reduce the e¤ective marginal tax rate inherent to the return to employment of individuals under the minimum income guarantee scheme presented below. Nonetheless the very spirit of the scheme has been preserved and aims to support disable less and least advantaged individuals, and families. The amount of the transfer depends on various elements as such the rent/interests paid, the family composition, more precisely the number of children, and taxable income.

Unemployment Bene…ts and Minimum Safety Net

Since July 2001 unemployment bene…ts are paid at a constant replacement rate for a given period of time. The replacement rate depends on the past level of labor earnings and the eligibility period depends on the number of months (minimum 4 in the previous 18 months) worked previously. Obviously, only individuals who become unemployed involuntary are eligible for the bene…ts. Bene…ts paiement, however, has been made contingent on a various number of conditions as such as active job search and limited job o¤ers refusal.

A minimum income guarantee (Revenu Minimum d'Insertion) scheme also exists since 1989. The scheme

guarantees a minimum level of resources for the least advantaged household. As such the transfer varies in order to guarantee this level implying that an e¤ective marginal rate of 100% can be at work. In order to generate incentives to return to work , various mechanisms have been introduced. The intéressement mechanism allows a RMI recipient to keep his/her level of transfer constant for a given number of months even if his/her return to work increased his/her resources above the RMI threshold. Other mechanisms speci…c to the RMI recipients have been introduced in the same spirit. We refer previously to the AL clause that allows previously RMI recipients to keep their rights for a certain period. The same kind of mechanism is also found in the housing tax legislation. Indeed, RMI recipients are exempted from the tax and they remain exempted the year following the loss of the RMI recipient status.

Tax Credit

Since 2001 a proper means-tested tax credit mechanism so called Prime Pour l'Emploi (PPE) has been introduced. Again it aims to restore incentives to return to work for those workers paid up to 1.4 times the minimum salary per hour net of social contributions, that is up to 7.27 euros (the minimum rate is 5.2 euros per hour). In order to prevent an indirect support of short term and/or seasonal contracts, workers who full…l the previous condition have to earn more than at least 3136.7 euros which are equivalent to 0.3 times the minimum yearly salary of a full-time worker. Those eligible workers who earn between 0.3 and 1 yearly minimum wage cash in 2.2 % of his/her labor earnings. Those who earn more than the minimum wage per hour rate receive a tax credit that is decreasing with labor earnings (it is zero when the per hour wage rate equals 1.4 minimum salary) and proportional to their working time. Namely, the tax credit corresponds to 5.5 % of the di¤erence between the ceiling rate and the declared labor earnings per hour rate times the number of hours worked..

The particularity of the tax credit scheme that makes it possibly e¤ective in stimulating labor supply is its individualistic nature. Indeed, the tax credit received by a household simply corresponds to the sum of the tax credit each individual of the household is expected to get on an individual basis. In the case only one of the spouses is working, the tax credit eligibility criteria are eased. The wage per hour ceiling is increased to 2.1 times the minimum rate. For earnings below 1.4 times a yearly minimum salary, tax credit levels do not change except for a fact that a lump sum credit equal to 76 euros is paid to all eligible households. For earnings between 1.4 and 2 times the yearly minimum salary, the tax credit corresponds to a …xed amount of 76 euros exclusively. Beyond

this threshold, the tax credit equals 5.5% of the di¤erence between yearly earnings and the ceiling. The tax credit is further increased in the presence of children and according the family con…guration. single parents always get a larger amount of additional credit.

3 Modelling Labor Supply and Participation

The following sections mostly draws on Duncan and MacCrae (1999), Blundell and alii (2000) and the references therein.

3.1 Discrete Labor Supply and a Structural Model

The standard approach to the modelling of labor supply considers that hours of work, the decision variable, are continuous and unconstrained. Individuals belonging to some household enjoy utility from net household income Y and leisure. In other words a standard unitary speci…cation is adopted implying that any strategic decisional scheme is not explicitly accounted for as it is the case in the collective approach of household supply[3]. We limit our analysis to case where household working entities are either lone individuals or couples. In a two-person household preferences are given by a utility function with standard properties

$$U = U(Y; l_1; l_2; X) \tag{1}$$

where l_1 and l_2 stand for individual 1 and individual 2 leisure respectively; X represents characteristics of each individual in the household. Individuals choice is constrained to lie within a budget set determined by the set of gross wage rates for each individual $W = fw_1; w_2g$, total household non labor earnings R and the tax and transfer system. Let $H = fh_{1;}h_2g$ denote the set of hours worked by each individual. We have that $h_i = N ¡ l_i$, $i = 1; 2;$ for some time endowment N: Thus, the budget constraint writes

$$Y \cdot w_1h_1 + w_2h_2 + R ¡ T(H; W; V; X) ¡ FC_1(Z_1) ¡ FC_2(Z_2) \tag{2}$$

[3] See Blundell Chiappori and Magnac, Blundell and MacCurdy (2001).

where $T(H;W;V;X)$ represents the tax and transfer system function which depends on all household's revenues and characteristics, and $FC_i(Z_i)$ represents the …xed cost of employment for individual i with characteristics Z_i: In the standard continuous model households are assumed to maximize the household utility function with respect to h_1 and h_2 subject to their budget constraint. That is

$$\max U(Y;N - h_1;N - h_2) \text{ s.t. } Y \cdot \sum_{i=1}^{2} w_i h_i + R - T(H;W;V;X) - \sum_{i=1}^{2} FC_i(Z_i)$$

With continuous hours, the maximization problem may prove not to be straightforward because of the non linearity of the tax and transfer function $T(:)$: In order to circumvent to some extent estimation di¢culties arising from non convexities in the budget set[4], the set of working hours available to individuals is made discrete. Moreover, various authors, have argued that models characterized by a discrete set of choice for hours of work is likely to be more realistic. Indeed, labor market participation often takes the form of …xed wage-hours contracts at least among salaried workers groups. In that context, workers are only able to choose among pre-determined categories of hours (full time versus half time or quarter time position).

The strategy adopted in the discrete approach consists of considering optimization only over a …nite number of discrete point corresponding to a given discrete set of working hours choices. The procedure assumes that hours choices are approximated by the discretised hours level $h_D \in \{h^1;h^2;:::;h^g\}$ according to the aggregation rule

$$\begin{aligned}
h_D &= h^1 \text{ if } h_D \cdot h^{b1} \\
h_D &= h^2 \text{ if } h^{b1} < h_D \cdot h^{b2} \\
&\text{.....} \\
h_D &= h^{g-1} \text{ if } h^{b(g-2)} < h_D \cdot h^{b(g-1)} \\
h_D &= h^g \text{ if } h_D > h^{b(g-1)}
\end{aligned}$$

where g represents the number of discrete alternatives for h_D .

Preferences speci…cation used for estimation allows for random disturbances ε_{h_D} speci…c to household members choice of working hours set $H_D = \{h^1;h^2;:::;h^g\}^2$, that is

[4] See for instance Blundell, Duncan and Meghir (1992) for a comprehensive illustration of the argument.

$$U_{H_D} = U(Y_{H_D}; N - h_{D;1}; N - h_{D;2}; X) + \varepsilon_{H_D}$$

for $h_{D;i} \in \{h^1; h^2; :::; h^g\}$; $i = 1; 2$: The unified quadratic preference function then depends on both the discrete set of hours and household net income $Y_{H(:)} = Y(h_{D;1}; h_{D;2})$. Each ε_{H_D} is assumed to be independently distributed as a Type I Extreme Value. As a consequence, given the observables X, the probability of any chosen set of hours corresponds to the multinomial logit probability, that is

$$P[h_{D;1} = h^m; h_{D;2} = h^n; X] = P\left[U_{fh^m;h^ng} > U_{fh^o;h^pg} \text{ for all } o \neq m; p \neq n; fo; pg \in \{h^1; h^2; :::; h^g\}^2\right]$$

Then,

$$P[h_{D;1} = h^m; h_{D;2} = h^n; X] = \frac{\exp\left[U_{fh^m;h^ng}; N - h^m; N - h^n; X\right]}{\sum_{o=1}^{g}\sum_{p=1}^{g}\exp\left[U_{fh^o;h^pg}; N - h^o; N - h^p; X\right]} \tag{3}$$

The utility function of a household adopted for estimation is quadratic in hours and income and writes

$$\begin{aligned} U(Y; h_1; h_2) = {} & \alpha_Y Y^2 + \alpha_{h_1} h_1^2 + \alpha_{Y h_1} Y h_1 + \alpha_{h_2} h_2^2 + \alpha_{Y h_2} Y h_2 \\ & + \alpha_{h_1 h_2} h_1 h_2 + \beta_Y Y + \beta_{h_1} h_1 + \beta_{h_2} h_2 \end{aligned} \tag{4}$$

for parameters $(\alpha; \beta) = \{\alpha_Y; \alpha_{h_1}; \alpha_{Y h_1}; \alpha_{h_2}; \alpha_{Y h_2}; \alpha_{h_1 h_2}; \beta_Y; \beta_{h_1}; \beta_{h_2}\}$:

Individuals are assumed to be heterogenous in their preferences for income and hours of work. We also consider random preferences heterogeneity. More precisely we set

$$\bar{}_{Y} = \bar{}^{0}_{y} + \bar{}^{0}_{y} X + \acute{}_{y} \quad (5)$$

$$\bar{}_{h_1} = \bar{}^{0}_{h_1} + \bar{}^{0}_{h_1} X + \acute{}_{h_1} \quad (6)$$

$$\bar{}_{h_2} = \bar{}^{0}_{h_2} + \bar{}^{0}_{h_2} X + \acute{}_{h_2} \quad (7)$$

where $\acute{} = i\acute{}_{y}; \acute{}_{h_1}; \acute{}_{h_2}$ ¢ are assumed to be jointly normally distributed around zero with covariance $P_{,}$.Observable characteristics included in the analysis are dummies for age, age squared, the age at which the woman left school, and dummies for the presence of children less than 3 years old a and aged between 3 and 6 years.

Heterogeneity in preferences with correlated random components requires simulation methods when turning to estimation. In that context, the simulated likelihood is conditioned on d draws from the assumed distribution of the random components. The $^{3}(\mathbb{R}; \bar{}^{d}, \acute{})$ set corresponds to the combination of parameters $(\mathbb{R}; \bar{} + \acute{}_{d})$ for d draw from the assumed distribution. In order to simply slightly the simulation exercise, the estimation of covariance parameters is achieved by the parametrization of the Cholesky transformation of $P_{,}$ rather than $P_{,}$ itself.

The log-likelihood contribution for each household h corresponding to (??) including both types of heterogeneity of preferences take the form

$$L = \sum_{d=1}^{D} \sum_{m=1}^{M} \sum_{n=1}^{N} a_{mn} U\left(Y_{f h^m; h^n g}; N - h^m; N - h^n; X; {}^{3}(\mathbb{R}; \bar{}^{d}, \acute{}), \acute{}, \acute{}\right) - \ln \sum_{d=1}^{D} \sum_{o=1}^{O} \sum_{p=1}^{P} \exp\left[U\left(Y_{f h^o; h^p g}; N - h^o; N - h^p; X; {}^{3}(\mathbb{R}; \bar{}^{d}, \acute{}), \acute{}, \acute{}\right)\right]$$

where $a_{mn} = 1[h_{D;1} = h^m; h_{D;2} = h^n]$

3.2 Labor Participation and Non Voluntary Unemployment

The data set used in this study allows to identify various categories of individuals who share however the same labor market status. Participants and non-participants can be easily identi…ed as the standard approach of the reservation wage would suggest but also involuntary unemployed and discouraged workers. Non participants are individuals who declare neither searching for a job nor willing to work. Involuntary unemployed are those individuals who

declare they are looking for a job but have not found anything yet. Finally, discouraged workers declare that they would be willing to work but are not searching.

The assumption made previously regarding the existence of …xed costs inherent to work aims at accounting for the latter category of workers. The level of …xed costs is expected to vary with household characteristics and location. The presence of children is typically expected to increase these costs. However, limited data availability does not allow to account for variable costs associated with childcare. Costs related to location usually refer to transportation costs. Fixed costs are modelled as a once o¤ weekly cost Following Callan and Soest (1996) approach they are taken away directly from net income whenever labor supply choice is non-zero hours. Fixed costs are expressed by

$$FC = X_{FC}:°$$

X_{FC} is a set of observable characteristics. We assume that these costs do not include any stochastic component. Thereafter, household income net of …xed costs will be denoted by lower y: We have

$$y_{fh_{D;1};h_{D;2}g} = Y_{fh_{D;1};h_{D;2}g} ¡ FC$$

Involuntary unemployment among women of the sample is modelled according to the strategy adopted by Blundell, Ham and Meghir (1987). Th latter is based on an employment equation of the form

$$I = X_E± + ´$$

where ± is a parameter vector, X_E a series of factors and characteristics expected to a¤ect the probability of being employed, and where ´ is a stochastic component assumed to be gaussian. Therefore, the probability of being employed is given by $Pr(I > 0; X_E) = ©(X_E±)$: The included characteristics and factors are location dummies, regional unemployment rates to account somehow for conditions prevailing in the local labor market,

years of education and age.

Thus conditioning on the labor market status h_1 of the male companion[5], the probabilities of observing an employed (E), a non participant (NP), an unemployed seeker (U)and discouraged non employed woman (D) are given by respectively

$$\Pr[h_{D;1}; h_{D;2} = h^n = ¤] = ©(X_E : ±) \Pr\begin{pmatrix} \\ U^{\,i}y_{fh_{D;1};h^n g}; N ¡ h^m; N ¡ h^n = X;\ X_{FC};\ (®; \bar{\ })^{¢} > \\ \max_{h_{D;2} \neq h^n} U^{\,i}y_{fh_{D;1};h_{D;2}g}; N ¡ h_{D;1}; N ¡ h_{D;2} = X;\ X_{FC};\ (®; \bar{\ })^{¢} \\ \end{pmatrix}$$

$$\Pr[h_{D;1}; NEI = ¤] = (1 ¡ ©(X_E : ±)) \Pr\begin{pmatrix} \\ U^{\,i}y_{fh_{D;1};0g}; N ¡ h^m; N = X;\ X_{FC};\ (®; \bar{\ })^{¢} < \\ \max_{h_{D;2} > 0} U^{\,i}y_{fh_{D;1};h_{D;2}g}; N ¡ h_{D;1}; N ¡ h_{D;2} = X;\ X_{FC};\ (®; \bar{\ })^{¢} \\ \end{pmatrix}$$

$$\Pr[h_{D;1}; NP = ¤] = \Pr\begin{pmatrix} \\ U^{\,i}Y_{fh_{D;1};0g}; N ¡ h^m; N = X; (®; \bar{\ })^{¢} > \\ \max_{h_{D;2} > 0} U^{\,i}Y_{fh_{D;1};h_{D;2}g}; N ¡ h_{D;1}; N ¡ h_{D;2} = X; (®; \bar{\ })^{¢} \\ \end{pmatrix}$$

$$\Pr[h_{D;1}; D = ¤] = \Pr\begin{pmatrix} \\ U^{\,i}y_{fh_{D;1};0g}; N ¡ h^m; N = X; (®; \bar{\ })^{¢} > \\ \max_{h_{D;2} > 0} U^{\,i}y_{fh_{D;1};h_{D;2}g}; N ¡ h_{D1}; N ¡ h_{D2} = X; (®; \bar{\ })^{¢} \\ \\ et \\ \\ U^{\,i}Y_{fh_{D;1};0g}; N ¡ h^m; N = X; (®; \bar{\ })^{¢} < \\ \max_{h_{D;2} > 0} U^{\,i}Y_{fh_{D;1};h_{D;2}g}; N ¡ h_{D;1}; N ¡ h_{D;2} = X; (®; \bar{\ })^{¢} \\ \end{pmatrix}$$

for $¤ = X; X_E; X_{FC}; (®; \bar{\ })$

[5] This implies that …xed costs of labor become somehow contingent on female activity. Thus we write $Y_{fh_{1(:)};0g} = y_{fh_{1(:)};0g}$:

4 Empirical Results

4.1 Data

Estimation is based on data from the Enquête Revenu Fiscaux (ERF) which is representative of the French population. The survey combines data from the Households Labor Survey (Enquête Emploi) completed in March of the year n and data on revenues earn during the year n ¡ 1. The latter information is provided by the French …scal authority (Direction Générale des Impôts) and as such is not a¤ected by the possible lack of precision a¤ecting earnings declaration in the Households Labor Surveys. Inter alia, the combination of the two surveys allows to separate labor earnings from unemployment insurance when individuals went through unemployment. This is not possible when using exclusively information from the labor survey. In addition, the use of tax return information allows to determine precisely the characteiristics of households of the sample. The year of reference for legislation is 2001, however at the time of the study only the ERF 1997 was available. Sample year representativeness matches the legislation year through an algortihm and adjustment manipulations that allow for an extrapolation of the 1997 sample characteristics to 2000 total population characteristics.

Our sample contains only women who are either in couple or single in the eyes of the …scal administration. Only households with salaried labor earnings exclusively are taken into consideration. Further households where one the members is student or over 60 years old or retired are excluded. This is also the case of households in which the woman is a public servant. We end up with 15273 households among which 12376 are couples and 2897 of lone women. The analysis treats the two sub-samples separately as heterogeneity components are likely to di¤er severely between the two groups of women.

Women in Couples

The proportion of women in couples into salaried work is equal to 64%. This proportion is 65% when the partner is also into salaried work and 43% when he is out of work. Households with a working female and non working male partner represent 7 % of total households of the sample.

women in couples when working are more educated (73% hold the secondary education diploma against 54% among the non employed) and younger (on average they are 38.2 years hold against 40 years hold for the non employed) than non employed women. In addition, 74% of employed women do not have any child and only 4%

of them have at least two children who are less than 6 years hold. As to non employed women, these …gures are 61% and 14% respectively. These di¤erences in the family con…guration inevitably lead to di¤erences in standards of living[6] levels and specially in transfers and taxes. Then, 41% of couples in which the woman does not work pay taxes while this …gure jumps to 76 % when the woman works. When the female partner does not work, half of the households are paid family bene…ts against 31% when the female partner does work. The combination on average of more children and less revenue for couples with a non working woman implies that the former bene…t proportionally more from means-tested transfer schemes. Moreover, only 1% of the couples in which the woman is employed are in the minimum guarantee revenue scheme while this is true for 8% of the couples in which the woman does not work. When both partners are out of work this share increases to 43%.

On average couples in which the woman works have standards of living that represent 116% of the average level. This …gure equals 75% for couples with a non working woman. Once transfers and taxes are taken into account the gap shrinks slightly. The former remains 13 % above the average while the latter gets 20% less. When normalizing by the number of consumption units per household, the level of income tax for couples with a working woman is almost twice as much as for those with a non working woman (120 against 69) and the level of family bene…ts is twice as less (72 against 144).

Lone Women

Around 76 % of lone women are in salaried work. Working lone women are more educated relative to their non-working peers. Almost 76% of working lone women completed secondary education against 48% among non working lone women. Inaddition, 24 % of the former hold a diploma that corresponds to two years of university study while the …gure falls to 19.3% for the latter. Working lone women are younger on average than non working ones (39.3 years against 40.7). 90 % of the former do not have any child under 6 years of age, while it is the case for only 70% of the latter.

As for women in couples, family con…guration a¤ects standards of living, taxes and transfers of the household. For instance, only 7% of the non lone women pay income taxes while 53% of the working lone women do. Around 37% of the non working group do not get any revenue but social transfers: 37 % are in the minimum guarantee

[6] Standards of living are computed according to the INSEE-OECD de…nition: Household Disposable Income divided by the number of consumption units of the household. In that respect the household head counts for 1 unit, each other person above 14 years old 0.5 unit and each child 0.3 unit.

income scheme and 19 % gets the API, the bene…t paid to lone parents.

Before taxes and transfers, non working lone women standards of living represent 29% of average. The corresponding …gure for working lone women is 126%. After taxes and transfers, the ratio between working and non working women becomes equal to 2.

Generally speaking living standards are lower for lone women compared to women in couples: the former earn on average 11800 euros yearly while the latter earn 15500 euros.

4.2 Missing Wages and Imputation

Simulation exercises require the de…nition of the complete wages distribution that is including wages of both working and non-working individuals. As only wages for working individuals e observed, expected wage rates for those non employed have to be estimated.

Expected wages are estimated within a Generalised Tobit model of the logarithm of the wage per hour. By doing so we account for the selection bias believed to be of particular importance in the case of female labor supply. The methodology adopted is the now standard two-step estimation à la Heckman (1979). In the …rst step a probit model is used in order to qualify the probability of being employed. he variables chosen to explain this probability are the age, the professional experience, the highest diploma obtained, citizenship, the number of children under six years of age, taxable non labor earnings and the size of the district of residence. The unemployment rate as well as the ratio of the number of in day nursery and nurses over the number of children of the county standards of living by these care means. The model is estimated separately for women in couples and lone women. The second step consists of estimation a standard wage equation augmented by the Mills ratio that allows to correct for the selection bias. The independent variables used in estimation are professional experience and its square, years of school and their square, the highest diploma obtained, citizenship and the size of the district of residence.

Results are reported in tables 2, 3 for women in couples and 4 5 for lone women.

He have that for both groups only the completed level of education is strongly and positively related to the probability of being employed. On the hand we observe that the presence of children under six years of age signi…cantly and negatively a¤ects this probability. This is particularly true for lone women. Environmental variables as such as the county unemployment rate enter signi…cantly the equation and have the expected sign. Higher unemployment reduces the probability of being in employment and on the contrary a less tense market for

child care is positively related with this probability. The latter result is stronger for lone women.

The probability of being employed is smaller for those women in couples who are married, or when the male partner does not work or when the labor earnings of the working partner increase. As to lone women, the probability of being employed is lower when they receive a food pension.

Wages equations results are somewhat standard in the literature but perhaps for the fact that the returns to experience is lower than usually obtained. This is likely to be the consequence of working hours corrections made for those whose wage per hour rate falls dramatically below the minimum legal rate. We …nd that because notably of lower average levels of education expected wages among non employed women are lower on average than those observed among employed women. For lone women, the average yearly full-time equivalent salary is 12196 euros (around 80000 FF in 1997) for the non employed and 14483 (around 95000 FF in 1997) for the employed. As to women in couples the gap is less pronounced. the respective …gures are 12958 euros (around 85000 FF in 1997) and 13415 euros (around 88000 FF in 1997).

Distibutions before and after wage imputation are pictures in graph GG.

4.3 Net Incomes

To generate net incomes the INSEE-DREES model so-called INES is used. INES is a microsimulation model of the French tax and bene…t system that calculates tax duties and bene…t entitlements for the Enquête Revenu Fiscaux (Fiscal Revenues survey) data. The model allows to calculate returns to employment for each working age individual at all possible hours. Gross and net incomes are generated at each of these levels. The use of INES permits the determination of quite accurate budget constraints that remain at the core of the estimation of the labor supply responsiveness to reforms of the tax and bene…t system.

As far as …nancial returns are concerned, the standards of living of women in work are almost always above those they would face in case they decided not to participate. This is true for 99% of the women in couples and 92.7% of the lone women. We assume that this would correspond to a job quit and as a consequence the worker becomes ineligible to unemployment bene…ts. Among those 7.3% of lone women who would be better o¤ from a strict …nancial point of view by being out of work, a majority hold contracts of less than 25 hours a week. These results are likely to be modi…ed by the introduction of child care costs as reported in the policy experiments section. Table 6 reports the results of purely simulated incomes in the various labor market states considered for

estimation. Namely, we assume that all individuals in unemployment do not get any unemployment insurance. Those who work between 5 and 15 hours a week are attributed 10 hours of work, those who are between 15 and 25 are attributed 20 hours, those between 25 and 35, 30 hours and …nally those who work more than 35 hours are attributed 39 of weekly work. The removal of unemployment insurance inevitably biases labor supply toward activity. As a consequence, 91% of women in couples are ready to work 10 hours a week. The …gure falls to 47.5% for lone women.

Table 7 and 8 contain the variations in standards of living, taxes and transfers amounts that would be faced by couples and lone women respectively due to a move of the woman into employment. The marginal variation refers to the variation in the variable of interest for a unitary increment in the labor supply. For instance for those women who would be better o¤ by supplying 30 hours, the marginal variation corresponds to di¤erence in all the variables considered between 20 hours and 30 hours. We only present some main results.

As to women in couples, a shift to employment is quite often associated with somewhat relatively low rates of implicit taxation de…ned as one minus the ratio between disposable income and gross income. For instance, taking a 10-hour job induces an implicit tax rate higher than 30% for only 10% of the households of the sample and is never larger than 4% for 50% of them. On average, for a 10-hour position, the gain in standards of living represents 88% of the extra yearly labor earnings. For a 20-hour position the gain with respect to a 10-hour position falls to 83%. The implicit rate of taxation is above 70% for less than 10% of the households and below 7% for the majority of them.

The picture is slightly di¤erent for lone women. In general employment appears to be much less rewarding. On average, the standards of living gain due to enrolment in a 10-hour job represents only 52% of yearly extra labor earnings. Around 25% of lone women;en would face an implicit tax rate of more than 80% by taking either a ten hour or a 20 hour position.

4.4 Model estimates

The main series of estimates correspond to a …ve-state labor supply regime for women and a two-state choice set for men. This is justi…ed by the fact that the proportion of men involved in part time position is very small relative to full time positions. Hours choice for women takes one value in the set $h_{(:)} = f0; 10; 20; 30; 39g$: As mentioned previously, we adopt the following allocation rule

$$h(:) = 0 \text{ if } h(:) \cdot 5$$

$$h(:) = 10 \text{ if } 5 < h(:) \cdot 15$$

$$h(:) = 20 \text{ if } 15 < h(:) \cdot 25$$

$$h(:) = 30 \text{ if } 25 < h(:) \cdot 35$$

$$h(:) = 39 \text{ if } h(:) > 35$$

4.4.1 Model estimates: Lone Women

Estimates for the labor supply behavior of lone women are reported in Table 13. The …rst column contains estimates for a model with no controls for employment probability or …xed costs. The second column reports estimates for a model that controls for involuntary unemployment but does not consider the case of discouraged workers. Estimates for a model that controls for all categories of non employment are reported in the third column. The signs of parameter estimates when signi…cant are in coherence with standard theoretical results. Utility is increasing with income but at a decreasing rate. The presence of young children is positively related to income and negatively related to hours of work. An increasing number of children also translates into a positive e¤ect on utility of income and a negative e¤ect of hours of work. Older women retrieve less utility from hours of work and more form income than their younger peers. Further, higher educated women prefer to work longer hours. Fixed costs related estimates lead to an average weekly level of almost 40 euros which represent 13% of average weekly earnings. Fixed costs are found to increase with the presence of pre-school children. They are also higher for individuals leaving in rural areas and urban areas with less than 200000 inhabitants.

4.4.2 Model estimates: Women in Couples

5 Behavioral Responses to Policy Experiments

The adoption of a discrete choice model of labor market status implies accuracy of policy experiments simulations strongly relies on the number of discrete hours bands considered to replicate e¤ective individual labor market status. Although the appropriateness of such approach may not be discussed for some demographic groups it could be reconsidered for demographic groups whose labor market decisions remain somewhat ‡exible and highly responsive to leisure-revenue trade o¤ components.

In order to account for the possible loss of information inherent to the discretization of the labor status choice set, behavioral simulation is based directly on predicted state probabilities[7].

6 Policy Experiments and Labor Supply

The section presents the result of some policy experiments. The two reformed instruments are the bene…ts paid for the rise of young children (under 3 years), the so-called Allocation Parentale d'Education. and the tax credit employment bonus like scheme, the so-called Prime Pour l'Emploi. A brief description of the two schemes is given in section 2. We …rst present some pure …nancial e¤ects of the undertaken experiments that will help qualify the structural model e¤ects. This …nancial e¤ects however do not account for any type of costs inherent to employment. They are exclusively referring to labor earnings, taxes and bene…ts.

6.1 Alternative Scenarios for the APE

The APE scheme has been responsible for a non negligible drop in the female labor supply noticed in particular in the aftermath of its reform in 1994 (Piketty (1998) and Afsa (1999)).

In order to appreciate such a possible labor supply disincentive e¤ect we …rst consider the case of a complete removal of the scheme. As the scheme also includes part time working women we can also expect a rise in the number of hours those women are willing to supply on the market. indeed, from a purely …nancial point of view the removal of the APE should increase the attractiveness of higher labor supply. Nonetheless, households are likely to receive other bene…ts previously excluded by the participation in the APE scheme.

The second experiment goes in the opposite direction. Women would be eligible for the bene…t from their …rst child (Rank 1 APE) while the current scheme becomes active only from the second child (Rank 2 APE). Two versions of the experiment are considered. The …rst requires that the woman to be eligible must have worked three years consequentially while the second version reduces the time spell to two years.

Both experiments aim to assess the very responsiveness of labor supply to the instrument. However, the major response component remains excluded that is fertility behavior. This may bias downward labor supply responses in the context of the model.

[7] See Duncan and MacCrae (1999).

6.1.1 Financial Incentives

The removal of the APE scheme makes as expected employment more valuable than inactivity even at the lowest activity level. In the case of a Rank-1-APE scheme employment still remains …nancially more attractive in general. However, as expected, employment attractiveness is binding at higher numbers of weekly hours of work when compared to the current scheme. Results for women with at least one child under 3 years old are presented in table 11 and 12.

Without the APE part time jobs become relatively more attractive. Women become more willing to take up even 10-hour weekly jobs. In the current APE scheme, 69% of women in couples with at least one child under 3 years old would be willing on a …nancial returns basis to take a 10-hour weekly position. Without APE the percentage increases to 94%. On the contrary, the implementation of a Rank-1-APE scheme is likely to make women in couples more picky in terms of hours of work. Less than two third of the women with at least one child under 3 years of age would face a positive earnings gap between a ten-hour weekly job and non employment (55 % with a less rigid activity constraint).

As far lone mothers are concerned, the withdrawal of the APE modi…es labor supply …nancial incentives only slightly while the Rank-1_APE makes part-time positions relatively more attractive than in the current scheme.

As mentioned previously, these results do not account for the childcare costs and their impact on the …nancial returns of employment. Thus, although e¤ective childcare expenses data are not available yet , some costs are imputed according to public day nursery scales. For households whose earnings remain 2850 euros per month, the cost is in e¤ect proportional to the revenue of the household in order to keep the …nancial e¤ort dedicated to childcare constant across families of a similar composition. The per family rate is equal to 12% for a single child family, 10% for a two-child family, 7.5% for a three-child family. Beyond the previously de…ned earnings threshold, the cost is constant. Estimates indicate an average childcare cost of 2950 euros per year for women in couples with at least on,e child under three years of age. This cost is equal to 973 for lone mothers.

Accounting for child care costs although roughly implies that non employment is now more attractive …nancially for a larger share of women in couples also in the case of a full time position. Non employment remains the most attractive for 2% of the women under the current system. The …gure varies between 2 and 3.5% in the rank-1-APE schemes. The percentage is nil when the APE is removed despite the inclusion of child care costs. Lone women never …nd non employment …nancially more appealing than employment whatever the number of hours worked.

As expected, the inclusion of childcare costs increases the number of weekly hours of work requires to induce a gain in earnings with respect to non employment. In the 2001 socio-…scal regime, if childcare costs are not taken into account 26.2% of women in couples with at least one child under 3 years would be …nancially better o¤ when working 20 hours or more. The inclusion of childcare costs reduces the previous …gure to 18.9%.

The removal of the APE scheme has a dramatic impact on the relative attractiveness of employment for women in couples. While in the 2001 situation, without including childcare costs, 68.7% face a …nancial interest in employment, the proportion increases to 93.5% with the removal of the APE scheme. These …gures are 67.3% and 91.9% when childcare costs are considered. As far as lone women are concerned, the reform would only slightly modify hours preferences. Empirical results indicate that the share of lone women who would be …nancially better o¤ in employment falls slightly. This possibly unexpected result is likely to be the outcome of social transfers interaction and supplementarity.

The Rank-1-APE reform would induce women in couples to choose jobs with higher number of hours of work relative to the 2001 scheme. This e¤ect becomes even more apparent when childcare costs are included. For instance, the share of women who would get higher returns by working 30 hours than staying inactive is 8.8% without childcare costs and 15.3 when the latter are counted. Similar patterns can be observed for lone women.

All in all the simulated schemes as far as …nancial incentives are concerns, are likely to generate expected results. The removal of the APE scheme should rise women labor supply and this rise is likely to be biased towards short weekly duration jobs. On the contrary, the implementation of a Rank-1-APE scheme could be expected to lower labor supply as …nancial attractiveness only appears at relatively longer weekly duration jobs.

6.1.2 Labor Supply Response

Lone Women

Women in Couples

6.2 Alternative Scenarios for the PPE

As argued in various studies notably Cahuc (2001) the PPE tax credit scheme has not been e¤ective in creating labor supply incentives mainly because of its relatively low generosity. This is particularly true if compared with

other existing schemes like the WTFC in the UK or the EITC in the US. Exsiting estimates of the impact of the PPE scheme on labor supply reveal a very small in‡uence (see Laroque and Salanié (2000, 2001)). Indeed, on average the amount of tax credit received by the eligible households is equal to 12 euros per month which represents less than 1.5 % of the minimum monthly salary.

We …rst simulate the impact of the 2003 scheme in which the amount of the credit should be multiplied by three. In a recent publication the INSSE presented the fact that the family component of the tax credit, scheme in which couples with only one spouse working are given a substantial incremental …nancial support, has a priori an ambiguous e¤ect on the spouse labor supply. In that context we simulate the impact of a fully individualized scheme without any family component. The level of the tax credit is the 2003. Finally, we consider a scheme where the credit is exclusively computed on the basis of the per hour salary and is not related to any extent to the duration of work.

6.2.1 Financial Incentives

In all the simulated schemes, employment for some number of hours supplied is more rewarding than inactivity. Hours choice ranking remains the same in the 2003 PPE scheme. As shown in tables 9 and 10, however, the 2003 scheme increases the proportion of women who would be better o¤ …nancially by working 10 or 20 hours with respect to 30 and 39 hours. In general the impact remains relatively weak and might thus lead to non signi…cant labor supply responses. Results indicate that lone women are in general more sensitive to the simulated reforms than their peers with a partner.

The removal of the family component of the tax credit scheme could induce women to become more picky with respect to low hours jobs. Again the e¤ect is stronger for lone women. While initially 47% and 47.4% of them were …nancially better o¤ by taking up a 10-hour and 20-hour job respectively, in the purely individualized scheme these …gures become 46.6% and 51.8% respectively. Table 10 further indicates that the level of gains induced by the reform increases for low duration positions with respect to higher duration ones. The e¤ect is stronger on lone women because of the extra credit associated with the status of lone parent in the benchmark scheme.

In the third simulated scheme, where the amount of the credit is never proportional to the amount of hours worked yearly, 10-hour jobs are again attractive …nancially. An again the impact is stronger among lone women. In this scheme 59 % of lone women would …nd …nancially attractive to work 10 hours weekly against 47% in the

benchmark scheme.

As already shown in previous work, the PPE scheme is expected to generate almost disappointing results in terms of labor supply incentives. Indeed, as suggested by the previous static analysis, earnings improvements are very weak. Except perhaps in the case of the last experiment in which duration of work and tax credit amount are completely dissociated. In this scheme, labor supply is expected to respond sensitively because of an increased attractiveness of short duration positions.

6.2.2 Labor Supply Response

Lone Women 2003 scheme

Table 14 contains the simulated work responses to the PPE 2003 scheme of lone women of our sample in the context of model 1. Upper out of diagonal …gures express the percentage of lone women increasing their labor supply. On aggregate the impact of the scheme remains almost insigni…cant as only 0.33 % among the lone women would be willing to increase their labor supply as a consequence of the scheme. The strongest response comes from non participating women. Indeed, 1.6 % of them would be willing to work at least 30 hours. Among the employed only 0.2% would be expected to respond positively.

Individualized scheme

Compared with the previous scheme, lone women labor supply appears to respond slightly more at least as far as non participating lone women are concerned. Indeed, as can be seen from Table 15 2.1 % among the latter would be ready to participate in the labor force again preferring long hours of work. On the other hand the response of lone women already at work remains exactly the same.

Hourly-salary-based-individualized scheme

As expected this reform makes short time jobs more attractive as reported in Table 16. Indeed, while the percentage of non participating lone women willing to work 10 hours per week is nil in the previous schemes, it is equal to 0.6% in the scheme under consideration. The percentage of non participating women interested in entering the labor market here amounts to 2.6%. As to employed lone women, 0.1 % of them are willing to increase their labor supply. However, because lower duration positions has become more attractive the sa;e percentage is

now willing to reduce supplied hours of work. As a consequence the positive net impact of the reform is found exclusively among non participants.

Women in Couples

7 Conclusions and Further Research

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A Tables

Table 2: Employment Equation (PROBIT) for Women in Couple

Variables	Estimate	STD	Wald Chi2	Pr>Chi2
Constant	0.8808	0,2132	17,0642	<,0001
Age	-0.00569	0,00764	0,5547	0,4564
BEPC,CAP,BEP	0.3297	0,0316	108,7043	<,0001
BAC +2	0.6322	0,0468	182,5321	<,0001
University	0.7022	0,0823	72,7162	<,0001
Experience	0.116	0,082	2,001	0,1572
... Squared	-0.0438	0,0107	16,8954	<,0001
Foreigner	-0.531	0,049	117,5903	<,0001
Nb. of children < 3	-0.6237	0,0297	440,6943	<,0001
Nb. of children < 6	-0.4094	0,0293	194,5948	<,0001
Married	-0.1764	0,0333	28,0312	<,0001
Employed Partner	1.8436	0,133	192,0545	<,0001
Partner's wage	-0.359	0,0306	137,7694	<,0001
Non Labor Earnings	-0.1427	0,0892	2,5594	0,1096
Day Nursery	0.014	0,00382	13,4814	0,0002
Nurses	0.00401	0,00172	5,434	0,0197
Unemp. Rate	-0.0372	0,00532	48,8787	<,0001
<5000 inhab.	-0,1671	0,0581	8,2819	0,004
5000-20000 inhab.	-0,2659	0,063	17,8175	<,0001
20000-20000 inhab.	-0,2654	0,0597	19,7373	<,0001
> 200000 inhab. (Paris out)	-0,2221	0,0573	15,0449	0,0001
Test Likelihood Ratio	Chi-Square 1789		DF 20	Pr > ChiSq <0,0001
Percent Concordant	71,3			

Table 3: Wage Equation (OLS) for Women in Couple

Variables	Estimate	STD	Wald Chi2	Pr>Chi2
Constant	2,9057	0,0845	34,39	<,0001
Experience	0,33497	0,02549	13,14	<,0001
... Squared	-0,04095	0,00573	-7,14	<,0001
Education	0,22536	0,11426	1,97	0,0486
... Squared	0,03995	0,04246	0,94	0,3467
BEPC, CAP, BEP	0,12352	0,0187	6,6	<,0001
BAC+2	0,34025	0,02529	13,46	<,0001
University	0,59311	0,04061	14,61	<,0001
Foreigner	-0,14663	0,0344	-4,26	<,0001
<5000 inhab.	-0,16183	0,02061	-7,85	<,0001
5000-20000 inhab.	-0,19134	0,0255	-7,5	<,0001
20000-200000 inhab	-0,20274	0,02245	-9,03	<,0001
>200000 inhab. (Paris out)	-0,13385	0,02293	-5,84	<,0001
Mill's Ratio	0,05408	0,03421	1,58	0,114
R^2	0,2165		Root MSE	0,4684

Table 4: Employment Equation (PROBIT) for Lone Women

Variables	Estimate	STD	Wald Chi2	Pr>Chi2
Constant	0,9105	0,5427	2,8148	0,0934
Age	0,00303	0,0155	0,0381	0,8452
BEPC,CAP,BEP	0,4769	0,0699	46,5988	<,0001
BAC +2	0,8197	0,103	63,3146	<,0001
University	0,6875	0,1703	16,3043	<,0001
Experience	0,1438	0,1703	0,7126	0,3986
... Squared	-0,0675	0,0214	9,9258	0,0016
Foreigner	-0,1543	0,1273	1,47	0,2253
Nb. of children < 3	-0,9967	0,0921	117,219	<,0001
Nb. of children < 6	-0,564	0,0812	48,2265	<,0001
Widow	-0,0219	0,1529	0,0205	0,8861
Divorced	0,0331	0,0669	0,2443	0,6211
Non Labor Earnings	-0,0965	0,359	0,0723	0,7881
Pension	-0,1911	0,0746	6,5658	0,0104
Day Nursery	0,0123	0,00828	2,2002	0,138
Nurses	0,0116	0,00413	7,9214	0,0049
Unemp. Rate	-0,0447	0,0121	13,595	0,0002
<5000 inhab.	0,0155	0,1399	0,0124	0,9115
5000-20000 inhab.	0,0373	0,1453	0,066	0,7972
20000-20000 inhab.	-0,1832	0,1354	1,8317	0,1759
> 200000 inhab. (Paris out)	-0,1207	0,1258	0,9213	0,3371
Test Likelihood Ratio	Chi-Square 508		DF 20	Pr > ChiSq <0,0001
Percent Concordant	75,8			

Table 5: Wage Equation (OLS) for Lone Women

Variables	Estimate	STD	Wald Chi2	Pr>Chi2
Constant	3,06579	0,14587	21,02	<,0001
Experience	0,32931	0,0388	8,49	<,0001
... Squared	-0,03876	0,00869	-4,46	<,0001
Education	0,32681	0,18485	1,77	0,0772
... Squared	-0,03593	0,06132	-0,59	0,558
BEPC, CAP, BEP	0,11971	0,03522	3,4	0,0007
BAC+2	0,28841	0,04697	6,14	<,0001
University	0,54282	0,06267	8,66	<,0001
Foreigner	-0,14393	0,05958	-2,42	0,0158
<5000 inhab.	-0,27261	0,03556	-7,67	<,0001
5000-20000 inhab.	-0,1943	0,03909	-4,97	<,0001
20000-200000 inhab	-0,18296	0,03139	-5,83	<,0001
>200000 inhab. (Paris out)	-0,20691	0,03241	-6,38	<,0001
Mill's Ratio	-0,1633	0,06843	-2,39	0,0171
R^2	0,1645		Root MSE	0,5292

Table 6: Financial Returns and Labor Supply Preferences

	In Couple	Lone
Total	100	100
Employment 3 Non Employment	100	100
Reservation Hours of Work		
10 hours	91.1	47.0
20 hours	7.2	47.4
30 hours	1.6	5.4
39 hours	0.1	0.2

Table 7: Marginal Income Variations due to Employment : Women in Couple

	Total		Reservation h=10		Reservation h=20	
	% of households	Average Marginal Var.	% of households	Average Marginal Var.	% of households	Average Marginal Var.
Positive Var. per c.u.						
Standards of Living	100,0	980	100,0	1 017	100,0	621
APJE	1,0	602	0,6	882	5,3	258
Taxes	37,5	321	39,1	328	20,3	221
PPE	20,6	29,3	15,7	27,9	65,6	36,0
Negative Var. per c.u.						
RMI	5,3	-976	3,2	-1 074	25,5	-964
API	0,7	-929	0,2	-1 870	6,8	-652
APE	3,8	-1 178	4,2	-1 184	0,4	-347
APJE	2,1	-599	2,2	-609	0,7	-277
CF	1,8	-432	2,0	-433	0,2	-270
PPE	24,8	-35	27,1	-35	1,4	-9
Grants	5,4	-69	5,3	-69	6,0	-59
ARS	4,2	-180	4,4	-182	3,6	-160

Table 8: Marginal Income Variations due to Employment : Lone Women

	Total		Reservation h=10		Reservation h=20	
	% of households	Average Marginal Var.	% of households	Average Marginal Var.	% of households	Average Marginal Var.
Positive Var. per c.u.						
Standards of Living	100,0	1 717	99,9	1 800	100,0	1 727
APJE	0,0	513	0,1	513	0,0	0
Taxes	2,2	622	4,3	541	0,2	1 034
PPE	40,3	55,2	12,3	37,5	61,2	63,4
Negative Var. per c.u.						
RMI	66,0	-2 058	64,6	-3 291	70,0	-1 035
API	10,3	-1 037	3,7	-1 834	14,4	-957
APE	0,9	-1 129	1,8	-1 154	0,1	-513
APJE	0,0	0	0,0	0	0,0	0
CF	0,0	-114	0,1	-114	0,0	0
PPE	0,0	0	0,0	0	0,0	0
Grants	11,2	-84	9,6	-89	11,7	-77
ARS	0,0	-188	0,1	-188	0,0	0

Table 9: PPE : Earnings variation due to Employment: Women in Couple

All Women in Couple

	Initial				2003 scheme				Individualized scheme				Hourly salary based scheme			
	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h
Ens:	100	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
] ¡ 1 ; ¡ 15]	5,1	0,6	0,0	0,0	5,1	0,4	0,0	0,0	5,1	0,4	0,0	0,0	4,8	0,4	0,0	0,0
] ¡ 15; 0]	3,8	1,3	0,2	0,0	3,7	0,6	0,0	0,0	4,2	0,8	0,1	0,0	3,6	0,5	0,1	0,0
]0; 150]	49,8	13,2	5,0	1,2	49,6	13,4	4,6	1,0	48,5	13,2	4,6	1,0	48,3	13,1	4,5	1,0
]150; 300]	36,9	43,3	20,2	11,8	37,4	42,5	19,6	11,3	37,8	42,2	19,4	11,1	38,8	41,5	19,2	11,1
]300; 450]	3,8	29,2	33,5	23,7	3,8	30,5	33,4	23,0	3,8	30,9	33,0	22,9	3,8	32,0	33,0	22,9
]450; 600]	0,4	8,3	23,9	25,8	0,4	8,3	25,0	26,1	0,4	8,4	25,5	25,9	0,4	8,4	25,8	25,9
]600; + 1 [	0,1	4,1	17,3	37,4	0,1	4,1	17,3	38,5	0,1	4,1	17,4	39,1	0,1	4,1	17,4	39,1

Women in Couple with at Least one Child under 3

	Initial				2003 scheme				Individualized scheme				Hourly salary based scheme			
	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h
Ens:	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
] ¡ 1 ; ¡ 15]	24,0	2,4	0,1	0,1	23,9	1,6	0,1	0,1	23,9	1,6	0,1	0,1	22,4	1,4	0,1	0,1
] ¡ 15; 0]	7,4	2,8	0,2	0,0	7,2	1,8	0,0	0,0	7,9	1,9	0,1	0,0	8,0	1,0	0,0	0,0
]0; 150]	47,4	34,1	16,1	2,6	46,9	35,3	14,5	1,9	45,8	35,3	14,6	1,8	45,7	35,9	14,2	1,8
]150; 300]	19,3	37,6	29,2	28,6	20,2	37,4	29,6	28,2	20,5	37,1	29,2	28,3	22,0	35,6	29,4	28,3
]300; 450]	1,7	17,0	30,7	26,1	1,7	17,7	31,5	24,9	1,7	18,0	31,4	24,7	1,7	19,9	31,4	24,7
]450; 600]	0,2	4,2	14,6	22,7	0,2	4,2	15,2	24,8	0,2	4,2	15,5	25,0	0,2	4,2	15,7	25,0
]600; + 1 [	0,0	1,9	9,1	19,9	0,0	1,9	9,1	20,1	0,0	1,9	9,1	20,2	0,0	1,9	9,1	20,2

Reading note: in an individualized PPE scheme based on hourly salary, 4,8% of women in couple taking a 10 hour position would loose at least 15 euros of living standards (versus 5,1% in the current scheme).

Table 10: PPE : Earnings variation due to Employment: Lone Women

All Lone Women

	Initial				2003 scheme				Individualized scheme				Hourly salary based scheme			
	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h
Ens:	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
] ¡ 1 ; ¡ 15]	5,5	0,5	0,1	0,0	5,4	0,3	0,1	0,0	5,4	0,3	0,1	0,0	5,4	0,2	0,1	0,0
] ¡ 15; 0]	47,6	5,1	0,2	0,0	45,0	0,9	0,0	0,0	48,0	1,3	0,0	0,0	35,5	0,6	0,0	0,0
]0; 150]	23,8	26,5	7,9	1,8	26,4	29,6	7,1	1,4	23,4	29,2	7,2	1,5	35,7	27,4	7,0	1,5
]150; 300]	16,0	24,4	17,3	9,1	16,0	25,6	17,2	8,3	16,0	25,5	17,3	8,4	16,0	28,0	17,3	8,4
]300; 450]	5,1	17,6	17,5	13,8	5,1	17,5	17,6	13,7	5,1	17,4	17,4	13,6	5,2	17,4	17,1	13,6
]450; 600]	1,7	12,7	17,7	13,7	1,7	13,0	18,0	13,1	1,7	13,0	18,0	13,1	1,7	13,2	18,6	13,1
]600; + 1 [	0,4	13,2	39,5	61,6	0,4	13,2	40,0	63,4	0,4	13,2	40,0	63,4	0,4	13,2	40,0	63,4

Lone Women with at least one child under 3

	Initial				2003 scheme				Individualized scheme				Hourly salary based scheme			
	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h
Ens:	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
] ¡ 1 ; ¡ 15]	12,4	0,3	0,0	0,0	12,4	0,3	0,0	0,0	12,4	0,3	0,0	0,0	12,4	0,3	0,0	0,0
] ¡ 15; 0]	66,6	12,2	0,5	0,0	62,1	0,0	0,0	0,0	67,1	1,3	0,0	0,0	56,9	1,0	0,0	0,0
]0; 150]	16,2	65,6	24,6	7,7	20,7	76,5	22,9	7,0	15,6	75,9	23,6	7,0	25,8	75,4	23,6	7,0
]150; 300]	4,3	12,4	46,1	28,6	4,3	13,8	47,8	26,0	4,3	13,0	47,1	27,4	4,3	13,9	46,3	27,4
]300; 450]	0,6	5,2	15,9	34,7	0,6	5,2	16,4	36,3	0,6	5,2	16,4	35,2	0,6	5,2	17,1	35,2
]450; 600]	0,0	1,5	6,4	13,7	0,0	1,5	6,4	15,5	0,0	1,5	6,4	15,2	0,0	1,5	6,4	15,2
]600; + 1 [	0,0	2,9	6,6	15,3	0,0	2,9	6,6	15,3	0,0	2,9	6,6	15,3	0,0	2,9	6,6	15,3

Reading note: in an individualized PPE scheme based on hourly salary, 5,4% of lone women taking a 10 hour position would loose at least 15 euros of living standards (versus 5,5% in the current scheme).

Table 11: APE : Earnings Variations due to Employment: Women in couple with at least one child under 3

	Initial				no APE				rank one APE				rank one APE			
	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h
Ens:	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
] ¡ 1 ; ¡ 15]	24,0	2,4	0,1	0,1	0,5	0,2	0,0	0,0	38,6	5,3	0,1	0,1	27,6	3,1	0,1	0,1
] ¡ 15; 0]	7,4	2,8	0,2	0,0	6,1	1,1	0,2	0,0	6,9	3,8	0,2	0,0	6,9	2,8	0,2	0,0
]0; 150]	47,4	34,1	16,1	2,6	63,5	12,8	3,7	1,1	46,6	46,3	21,7	3,7	52,8	39,1	17,4	3,0
]150; 300]	19,3	37,6	29,2	28,6	27,4	55,1	23,9	9,1	7,3	32,8	39,1	39,3	10,9	39,1	33,5	33,3
]300; 450]	1,7	17,0	30,7	26,1	2,3	22,6	42,6	32,8	0,6	9,0	24,4	32,2	1,7	12,0	30,7	31,3
]450; 600]	0,2	4,2	14,6	22,7	0,2	5,8	17,9	31,1	0,0	1,9	9,2	14,1	0,2	2,5	11,5	19,2
]600; + 1 [	0,0	1,9	9,1	19,9	0,0	2,3	11,7	25,9	0,0	0,9	5,3	10,5	0,0	1,5	6,6	13,2

Reading not: without APE, 0,5% of women in couple with at least one child under 3 would loose …nancially by taking a 10-hour job(24,0% would loose in the current scheme) and 29,9% of them would increase their earnings by more than 300 euros per month per consumption unit (versus 21,2% in the current scheme).

Table 12: APE : Earnings Variation due to Employment: Lone Women with at least one child under 3

	Initial				no APE				rank one APE				rank one APE			
	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h	10h	20h	30h	39h
Ens:	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
] ¡ 1 ; ¡ 15]	12,4	0,3	0,0	0,0	0,0	0,0	0,0	0,0	14,2	0,3	0,0	0,0	13,1	0,3	0,0	0,0
] ¡ 15; 0]	66,6	12,2	0,5	0,0	79,4	11,3	0,5	0,0	60,2	11,0	0,5	0,0	60,2	11,0	0,5	0,0
]0; 150]	16,2	65,6	24,6	7,7	16,8	63,6	22,5	7,3	20,1	66,3	24,2	7,7	20,4	65,2	24,2	7,7
]150; 300]	4,3	12,4	46,1	28,6	3,8	16,5	45,9	24,7	4,4	12,7	47,9	28,6	5,2	13,0	46,8	28,6
]300; 450]	0,6	5,2	15,9	34,7	0,0	4,3	17,7	37,6	1,2	4,9	14,2	35,5	1,2	5,7	14,5	35,0
]450; 600]	0,0	1,5	6,4	13,7	0,0	2,0	6,8	15,1	0,0	1,6	6,7	13,7	0,0	1,6	7,5	13,4
]600; + 1 [	0,0	2,9	6,6	15,3	0,0	2,3	6,6	15,3	0,0	3,3	6,6	14,5	0,0	3,3	6,6	15,3

Lecture : Without APE, no lone mother with at least one child under 3 would loose …nancially by taking a 10-hour job(12,4% would loose in the current scheme) and 3,8% of them would increase their earnings by more than 300 euros per month per consumption unit (versus 4,9% in the current scheme).

Table 13: Model Estimates: Lone Women

	Model (1)		Model (2)		Model (3)	
	parameters	s-e	parameters	s-e	parameters	s-e
$100*\Re_{yy}$	-0.00102	(0.00032)	-0.00102	(0.00035)	-0.00100	(0.00028)
$\Re_{hh}$	0.001190	(0.00024)	0.001190	(0.00026)	0.00123	(0.00021)
$100*\Re_{yh}$	0.009330	(0.00387)	0.009330	(0.00444)	0.01005	(0.00328)
$\bar{y}$	0.011920	(0.00185)	0.011930	(0.00253)	0.011824	(0.00322)
(one child under21)	-0.002870	(0.00177)	-0.00287	(0.00197)	-0.04692	(0.01920)
(two children under21)	-0.00399	(0.00182)	0.003990	(0.00213)	-0.002308	(0.00504)
(three children under21)	0.001820	(0.00165)	0.001820	(0.00797)	-0.005027	(0.00430)
(one child under3)	0.005000	(0.00242)	-0.005010	(0.00299)	-0.001768	(0.00508)
(one child btw 3 and 6)	-0.00178	(0.00205)	-0.00178	(0.00463)	0.00888	(0.00213)
(Education-2)/10	0.000060	(0.00007)	-0.00008	(0.00010)	-0.00658	(0.00429)
$((\text{Education-2})/10)^2$	-0.00497	(0.00322)	-0.00497	(0.00250)	0.001636	(0.00181)
(Age-39)/10	0.00439	(0.00080	0.00439	(0.00095)	-0.00880	(0.00195)
$\bar{h}$	-0.04205	(0.01177)	-0.04205	(0.01653)	0.003537	(0.00119)
(one child under21)	0.01840	(0.01006)	0.01840	(0.01150)	0.01568	(0.03052)
(two children under21)	0.00609	(0.00981)	0.00609	(0.01251)	0.01047	(0.02704)
(three children under21)	-0.02691	(0.01039)	-0.02691	(0.03588)	-0.01389	(0.03130)
(one child under3)	-0.05735	(0.01199)	-0.05735	(0.01489)	-0.07504	(0.00919)
(one child btw 3 and 6)	-0.01577	(0.01071)	-0.01577	(0.02037)	-0.002262	(0.02579)
(Education-2)/10	0.06424	(0.01220)	0.06424	(0.01241)	0.05098	(0.01357)
$((\text{Education-2})/10)^2$	-0.02111	(0.01710)	-0.02111	(0.01648)	0.00565	(0.00788)
(Age-39)/10	-0.03194	(0.00430)	-0.03194	(0.00523)	-0.02828	(0.00701)
Emp. Prob.			1.32311	(0.15145)	1.32311	(0.15145)
County Unemp. Rate			-0.06850	(0.01096)	-0.06850	(0.01096)
Sec. School Dip.			0.40227	(0.06733)	0.40227	(0.06733)
High School Dip.			0.88909	(0.08514)	0.88909	(0.08514)
University Dip.			0.77040	(0.13104)	0.77040	(0.13104)
Fixed Costs*100					0.00799	(0.00792)
(younger child under 3)*100					0.03376	(0.01638)
(younger child 3-6)					0.002603	(0.00211)
(rural area)*100					0.01307	(0.00963)
(urban area<200000)*100					0.006648	(0.01085)

	Post-Reform					
Pre-Reform	0	5h-15h	15h-25h	25h-35h	>=35h	Total
0	8.69	0	0	0.09	0.05	8.82
5h-15h	0	3.86	0.05	0	0	3.9
15h-25h	0	0	13.42	0.05	0.05	13.56
25h-35h	0	0	0	11.38	0	11.38
>=35h	0	0	0	0	62.24	62.33
Total	8.69	3.86	13.47	11.52	62.47	100

Table 14: PPE 2003 (Model 1)

	Post-Reform					
Pre-Reform	0	5h-15h	15h-25h	25h-35h	>=35h	Total
0	8.59	0.05	0	0.09	0.09	8.82
5h-15h	0	3.86	0.05	0	0	3.9
15h-25h	0	0	13.52	0	0.05	13.56
25h-35h	0	0	0	11.38	0	11.38
>=35h	0	0.05	0	0.05	62.24	62.33
Total	8.59	3.95	13.56	11.52	62.38	100

Table 15: Individualized PPE(Model 1)

	Post-Reform					
Pre-Reform	0	5h-15h	15h-25h	25h-35h	>=35h	Total
0	8.64	0	0	0.09	0.09	8.82
5h-15h	0	3.86	0.05	0	0	3.9
15h-25h	0	0	13.42	0.05	0.09	13.56
25h-35h	0	0	0	11.38	0	11.38
>=35h	0	0	0	0	62.33	62.33
Total	8.64	3.86	13.47	11.52	62.52	100

Table 16: Hourly PPE (Model 1)