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a Conditional Preferences Approach

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Abstract

In the context of the unitary model of household labour supply we test whether the husband's work is separable from consumption and the wife's work. We apply a conditional preferences approach to derive a conditional labor supply function for the wife consistent with a unitary model with non-separable preferences. Our main results are that consumption and wife's work hours are not separable from the husband's labour supply. Furthermore we find that the wife's and husband's work hours are complements when men tend to work longer hours than a typical full-time contract.

Keywords: Conditional preferences, non-separability, income taxation, married women labor supply

JEL Codes: D13, H24, H31, J22

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1 Introduction

The study of labor supply is important to evaluate the impact of fiscal reforms on labor markets, especially the estimation of responses of labor supply to wages and income changes. In this respect the literature has particularly focused on married women labor supply since this latter has been judged to be more responsive to these variables (see Blundell and Macurdy [5] and Salanié [20] , chapter 2). Also according to Browning et al.[8], it is still important to study the interaction of labor supply between men and women since we still need to match the general equilibrium modelling with the micro empirical evidence. In this respect, it seems that this question has been overlooked in modern macroeconomic modelling. For example, the usual assumption of separability of leisure with respect to consumption in dynamic stochastic general equilibrium models is based on the stylized fact that per-capita leisure has stayed constant over time. However this masks different trends for male and female labor supplies which are not consistent with this latter assumption [8].

Many studies on married women's labor supply assume that a woman's work hours are influenced by the labor supply of her spouse only through an income effect. In such a case we implicitly assume that in the context of the unitary model of household labor supply, the leisure of the husband is separable from consumption and his wife's leisure. This assumption is not very plausible and its violation will bias the estimates due to a misspecification of the model. For example the presence of fixed costs of working will invalidate this assumption. Moreover this assumption excludes any complementarity or substitutability between the labor supply of the two household members. When we relax this assumption the wife's work hours not only depends on the earnings of her husband but also on his work hours. It has thus different policy implications in terms of optimal taxation since we have to take into account these aspects of the households behavior besides the income effects (Browning and Meghir [9] and Salanié [20], chapter 5).

We test in the context of the unitary model of household labor supply whether the husband's labor supply is separable from consumption and the wife's work hours. In order to test this assumption, we apply a conditional demand approach (see [18]) to obtain a conditional labor supply function for the wife which is consistent with a unitary model where preferences are non-separable. We estimate the wife's conditional labor supply and perform a statistical test on whether male's labor supply enters significantly into the regression. This approach is especially suited when the conditioning good is in predetermined quantity (Browning and Meghir [9]) and we also check to a certain extent the validity of this assumption. As far as we are concerned this is the first time this research question is asked.

The integration in the empirical analysis of the progressivity of income taxation is an important source of identification of the wage responses. More specifically when the tax authorities consider the household as a unique entity and apply a joint filing to determine taxation rates of married couples, the two spouses experience the same marginal tax rate and the distribution of earnings within the household is an important determinant of labor supply. Therefore we implement an empirical model which takes into account this feature.

The results of the empirical model show that we can reject the hypothesis that the husband's labor supply is separable from consumption and his wife's work hours. Moreover we find that for men who tend to work longer hours than a conventional full-time contract, their wife tends to work longer hours as well suggesting their leisure are complements. We have also found that the wage elasticities with respect to female labor supply are lower and that the negative impact of an increase of the husband's hourly wage is increased when we assume non-separability. This suggests the existence of a bias in the estimates when we assume separability.

This paper is organized as follows. In section 2 we present the theoretical framework and show with the concept of conditional preferences how we can obtain a conditional labor supply function which allows to test the separability assumption. Section 3 presents the specification of the empirical model and how we test separability of male's labor supply from consumption and female's labor supply. In section 4 we present the results of our empirical analysis. We used cross-section data from the Swiss family expenditure survey *Enquête sur les Revenus et la Consommation 1998* (ERC 98). Section 5 gives some concluding comments.

2 Theoretical framework

In order to understand the benefits of using the conditional approach we first present a simple static model without taxation. In section 2.2 we consider a more realistic setup where we introduce taxation and the aspects of life-cycle labor supply.

2.1 Household unitary model of labor supply and conditional preferences

Consider the following unitary and static labor supply model

$$\begin{aligned} & \max_{c,h_f,h_m} U\left(c, h_f, h_m\right) \\ s.t.\ c &= w_f h_f + w_m h_m + N, \end{aligned} \tag{1}$$

where c is consumption, h_f the wife's work hours, h_m the husband's hours and N is the household's nonlabor income. The household maximizes its utility under its budget constraint. In this model, the household chooses simultaneously the work hours of its two members[1]. We define f_x as the partial derivative of f with respect to x. The first order conditions of problem (1) are $-U_{h_f}/U_c = w_f$ and $-U_{h_m}/U_c = w_m$ and allow us to find marshallian labor supply functions $h_f^* = h_f\left(w_f, w_m, N\right)$ and $h_m^* = h_m\left(w_f, w_m, N\right)$.

We can also obtain labor supply functions for the wife conditional to the husband's labor supply[2]. Assume that in problem (1) h_m is in a predetermined quan-

[1] Blundell and MaCurdy [5] point out that many people tend to interpret this model as a situation where the individuals choose their work hours for a given wage with a unique employer. Actually, we can think of a situation where the workers choose their work hours in selecting different employers offering different wage opportunities. In this case the labour supply function approximates the average relationship for agents' preferences between consumption and leisure.

[2] For an exposition of the conditional preferences, on can refer to Pollak [18], Pollak and Wales [19] and Browning and Meghir [9].

tity $\overline{h}_m$. The optimization problem can be rewritten as follows.

$$\begin{aligned} & \max_{c,h_f} U\left(c, h_f; \overline{h}_m\right) \\ s.t.\ c &= w_f h_f + w_m \overline{h}_m + N \end{aligned} \tag{2}$$

The first order condition is similar to the one obtained with the unconditional approach, i.e.

$$-\frac{U_{h_f}\left(c, h_f; \overline{h}_m\right)}{U_c\left(c, h_f; \overline{h}_m\right)} = w_f \tag{3}$$

Substituting the budget constraint in (3), we obtain the wife's labor supply function conditional on her husband's work hours which we denote by $\widehat{h}_f$

$$h_f = \widehat{h}_f\left(w_f, w_m \overline{h}_m + N, \overline{h}_m\right). \tag{4}$$

The relation between the conditional and the unconditional labor supply function is obtained by substituting $\overline{h}_m$ by h_m^* in (4). We obtain

$$\begin{aligned} h_f &= \widehat{h}_f\left(w_f, w_m h_m + N, h_m\left(w_f, w_m, N\right)\right) \\ &= h_f\left(w_f, w_m, N\right). \end{aligned} \tag{5}$$

Note that when h_m is separable from c and h_f we can write (4) more simply as

$$h_f = \widehat{h}_f\left(w_f, w_m \overline{h}_m + N\right) \tag{6}$$

As suggested by Browning and Meghir [9], we can implement a simple test for separability. When h_m is separable from the other variables, the work hours of the husband only enter in the wife's labor supply via the resources $w_m\overline{h}_m + N$.

As the latter authors [9] notice, there are several advantages in applying the conditional preferences approach. First it is particularly suited when the conditioning good is rationed. Second, this approach allows a simple test of separability between consumption and leisure of one member from the leisure of his spouse. Third, we do not have to model explicitly the determination of the conditioning good. It is important to understand that the conditional approach does not imply that the conditioning good is considered as exogenous. It only consists in a rewriting of the unitary model.

However, there exists one drawback to this approach. All the implications in terms of policy evaluation will be conditional on the husband's work hours. We define $\mu_f \equiv w_m\overline{h}_m + N$ as the nonlabor income of the wife. In a unitary model a variation in the wife's wage will have an effect on her labor supply as shown by the differentiating (7)

$$\frac{d\widehat{h}_f}{dw_f} = \frac{\partial\widehat{h}_f}{\partial w_f} + \left(w_m\frac{\partial\widehat{h}_f}{\partial\mu_f} + \frac{\partial\widehat{h}_f}{\partial h_m}\right)\frac{\partial h_m}{\partial w_f}. \tag{7}$$

The conditional approach implies we can only recover $\partial\widehat{h}_f/\partial w_f$. Similarly, an increase in the husband's wage rate will have an effect on the wife's labor supply only through the earnings of the man, i.e.[3]

$$\left.\frac{d\widehat{h}_f}{dw_m}\right|_{h_m} = w_m\frac{\partial\widehat{h}_f}{\partial m_f} \tag{8}$$

However the assumption of predeterminedness of men's work hours may justify the

[3]In the unconditional case $\frac{dh_f}{dw_m} = h_m\frac{\partial\widehat{h}_f}{\partial m_f} + w_m\frac{\partial\widehat{h}_f}{\partial m_f}\frac{\partial h_m}{\partial w_m}$.

predictions given by economic policy reforms implemented with this approach. We can obtain $\partial\widehat{h}_f/\partial w_f, \partial\widehat{h}_f/\partial h_m$ and $\partial\widehat{h}_f/\partial\mu_f$ by regressing h_f on w_f, μ_f and h_m. With this regression we can test three hypothesis. First we can test whether c and h_f are separable from h_m and second if h_f and h_m are complements or substitutes. Third we can check if h_m is exogenous in the labor supply decision of her spouse, that is if he is subject to some rationing in his labor supply.

2.2 Taxation and life-cycle allocation

In this section we show how the analysis is modified when we introduce taxation and life-cycle allocation of labor supply.

If we assume that preferences are intertemporally weakly separable, we can apply the concept of two-stage budgeting (see Blundell and Walker [7], Arrellano and Meghir [2] and Blundell and MaCurdy [5]) where in a first-stage the full-income of the household is allocated over the life-cycle and in a second stage labor supply is determined for a given full income[4]. Blundell and MaCurdy [5] show the importance of taking into account the life-cycle aspects of labor supply decisions. This is especially important if we want to give an economic meaning to the estimates of the labor supply elasticities. Let s^* designate household's savings and T the amount of taxes paid by the household. In the second stage, once the household members have determined their assets, the within-period budget

[4]In other words current savings is a sufficient summary statistics about past and future information held by the household on the allocation of resources over the life-cycle.

constraint may now be written as[5]

$$c = w_f h_f + w_m h_m + N - T - s^*. \tag{9a}$$

We define $\omega_f = w_f (1-t)$ as the wife's marginal wage rate, where t is the marginal tax rate of the household[6]. The marginal rate of substitution between leisure of wife and consumption is equal to her marginal wage rate, i.e.

$$-\frac{U_{h_f}(c, h_f, h_m)}{U_c(c, h_f; h_m)} = \omega_f. \tag{10}$$

We can rewrite the within-period budget (9a) constraint as

$$c = \omega_f h_f + m_f, \tag{11}$$

where $m_f \equiv t w_f h_f + w_m h_m + N - T - s^* = c - \omega_f h_f$ is the virtual non-labor income of the wife as defined by Hausman [16]. We can define the wife's labor supply conditional on the husband's work hours (12). It results from the maximization of the household's utility function conditional on the husband's labor supply under a budget constraint where the non-labor income is m_f and the price of leisure is the marginal wage rate ω_f. Equation (4) is modified as

$$h_f = \widehat{h}_f \left(\omega_f, m_f, \overline{h}_m\right) \tag{12}$$

ω_f and m_f are endogenous variables which depend on the wife's work hours, the

[5]This result has been shown by Blundell and Walker [7]. One can also refer to Blundell and MaCurdy [5].

[6]We consider only joint infling.

earnings of the husband, the non labor income, the amount of income tax and savings. From the budget constraint we can directly observe m_f since this quantity is the difference between consumption and the marginal wage rate times work hours.

3 Data and specification

3.1 Data

In our empirical analysis, we have used the data of a Swiss family expenditure survey the *Enquête sur les Revenus et la Consommation 1998* (ERC 98). This survey provides detailed information about consumption and income data for swiss households. We also find information on labor supply of the household, occupation status, the structure of the household and housing. In particular, the ERC 98 provides the number of work hours for each member of the household. But the data on earnings were only collected for workers. We selected households consisting of married couples where the wife was either a worker or outside of the labor force and the husband was working. We excluded from the sample people who were self-employed because of measurement error in earnings, and households where children worked for pay. Finally on the basis of additional criteria we have obtained a sample of 2795 households. Consumption is defined as the sum of non durable consumption expenditures. We provide in appendix A further details about the data.

3.2 Testing separability

We have chosen to estimate the following labor supply equation[7].

$$h_{f,i} = \alpha \ln \omega_{f,i} + \beta m_{f,i} + f\left(h_{m,i};\theta\right) + \mathbf{z}_i \gamma + u_{h,i} \tag{13}$$

where $\omega_{f,i}$ is the marginal wage, $m_{f,i}$ the virtual nonlabor income, the vector $\mathbf{z}_i$ is a set of demographics, whose choice is discussed in the appendix, and $u_{h,i}$ is an error term which can be interpreted as the unobserved taste factor for work (Blundell and MaCurdy [5]).

The term $f(\cdot;\cdot)$ is a function of h_m and θ is the vector of parameters associated with this function. Given that the conditional approach imposes quite weak restrictions on how the conditioning goods interact with the other commodities (see Browning and Meghir [9]), we can choose a rather flexible functional form for $f(h_m;\theta)$. In section 2.1 we have seen under the assumption that h_m is separable from consumption and h_f, that once we have conditioned the labor supply function on the wage and the nonlabor income, h_m should not enter in the labor supply equation. This suggests that a simple test of separability consists in estimating the equation (13) and test if θ is equal to zero. A natural way to start is to specify a linear function in h_m. However, it is likely that the preferences of the couples are better described by a non-linear function of h_m. We propose to include dummy variables for different intervals of the distribution of h_m as well as a cubic spline using these dummy variables.

[7] The indirect utility function associated with this labour supply equation is $v\left(w_f, m_f; h_m, \mathbf{z}\right) = \frac{\exp(\beta w_f)}{\beta}\left(\beta m_f + f\left(h_m;\theta\right) + \mathbf{z}\gamma + u_h + \alpha \ln w_f\right) - \frac{\alpha}{\beta}\int_{\beta w_f} \frac{\exp(t)}{\beta} dt$

This specification of the labor supply has been used by Blundell et. al. [4].

3.3 Estimation method

We face two problems. First, as shown in section 2.1, the marginal wage and the virtual nonlabor income are endogenous and need to be instrumented. Second, since work hours and the virtual wage are observed only when the wife works there is a self-selection problem. As shown by Cogan [11] when fixed costs of work are present, the wife will work if her desired number of work hours is above her reservation level Therefore we have decided to estimate the labor supply function through a generalized tobit model. In this context and in order to take into account the endogeneity problem mentioned above we have used generalized residuals of the marginal wage and the virtual nonlabor income (see Chesher and Irish [10], Gourieroux et al. [15]). In appendix B we provide the details of the estimation procedure and describe the instruments we used. We also provide details about how we compute the marginal tax rates of the household.

4 Results

In this section, we present the empirical results of our test of whether male's labor supply is separable from consumption and female's labor supply.

In order to test the separability hypothesis we have estimated four different specifications for the functional form with respect to male's labor supply. In table 1 we present the results of the estimation of the labor supply equation. In the appendix C we give the details of the estimation results of the conditional labor supply function for married women. In specification (1) we have estimated the separable case where h_m is excluded from the model. Specification (2) is the linear case where we condition the model linearly on h_m. Then in column (3) we have estimated the model by including dummy variables for h_m in different categories, i.e. less than 40 hours a week, between 40 and 42 hours a week and more than 42 hours a week[8]. Finally, in column 4 we have estimated the model with a cubic spline in h_m using the dummy variables described above.

- Insert Table 1 -

The main finding of our empirical analysis is that we are able to reject that male's work hours are separable from non-durable consumption and the wife's work hours. We can see in column 2 of table 1 that once we have controlled for the wife's wage and non-labor income, h_m enters significantly in the model. It appears that the parameters of the dummy variables are statistically different from zero at a significance level of 5%. For the cubic spline we find that the effect of h_m is significant at 5% for wives whose husband work more than 42 hours a week.

Our second finding suggests that on average male and female hours are complements. An increase in the male hours increases ceteris paribus the incentive for the wife to work more. This is supported by the fact that the effects of h_m all else equal (particularly the marginal tax rate and the earnings of the husband) on the labor supply of the wife is positive. Furthermore, the specification (3) on table 2 with dummy variables reveals that ceteris paribus females tend to work longer hours when their husband works more than 42 hours a week and work less if their husband work less than 40 hours a week. This suggests also that leisure of both spouses are complement. The cubic spline reveals the same phenomenon (column (4)). Males' hours above 42 hours a week have a positive impact on female labor supply. The other parameters are not significant. In particular the parameter of

[8]According to typical swiss labour contracts a full-time job corresponds to 42.5 hours a week.

the dummy variables for men working less than 40 hours a week looses its significance. We reestimated the model by including only the dummies $1[h_m < 40]$ and $1[h_m > 42]$ and the number of hours for men working above 42 hours a week, i.e. $h_m[h_m > 42]$

In table 2, we report the elasticities of married women labour supply with respect to her own wage, the husband's wage and the non-labor income of the household. It is interesting to note that the wife's wage elasticity is lower when we include the variables related to the male's labor supply compared to the separable case. This suggests that once we have controlled for the wife's wage and non-labor income if we omit to condition the model on the labour supply of the husband we tend to bias these elasticities. We see that it is also the case for the elasticity with respect to the husband's wage. This elasticity appears to be lower in the non-separable case. This shows that taking non-separabilities into account changes the effect on the hours of the wife due to a change in the husband's labor supply. This also suggests that the estimates in the separable case are biased.

- Insert Table 2 -

Finally, we tested whether h_m was exogenous in the wife's labor supply equation. We used the same type of exogeneity test developed by Blundell and Smith [6] and used education of the husband as an instrument. Since the coefficient did not appear to be significantly different from zero, we concluded that the assumption of exogeneity could not be rejected.

In table 2, the elasticity of the female's labor supply with respect to her gross hourly wage ranges from 1.33 to 1.016. The results are quite close to what Gerfin[9]

[9]The elasticity with respect to nonlabor income ranges from -0.26 to -0.32 and is also close

has found in previous studies on married women labor supply in Switzerland [13], [14]. Note that these results are not fully comparable with ours especially because his models are derived in a static framework[10].

5 Conclusions

In this paper, using a sample of Swiss married couples we have tested whether male's work hours were separable from consumption and his wife's labor supply. In order to do that we have applied the concept of conditional demand and shown how we could obtain a labor supply function for the wife conditional on his husband's work hours which is consistent with the household unitary model. We would like to point out that few empirical studies on the married women labor supply consider explicitly the interaction among the household for the allocation of labor supply. The idea of estimating a labor supply function without conditioning on the husband's work hours seems to rely else on the implicit assumption that men's hours are separable from the other argument of the utility function or that men's labor supply is relatively inelastic and does not contain enough variability. However these assumption are never explicitly described. We have taken income taxation into account since in the context of the labor supply it is an important source of identification of wage and income labor supply responses. We have also used a life-cycle consistent measure of non-labor income in order to get some interpretable wage and income elasticities.

Our main result is the rejection of the separability assumption. Specifications of

to what Gerfin found.

[10]We also have to say that the treatment of the taxation function is different. He approximates the Swiss tax system by a single piece-wise linear function with 12 brackets.

the conditional labor supply which are either linear in h_m, include dummy variables for h_m or a cubic spline in male's work hours allow to reject the separability hypothesis. When we assume separable preferences we obtain different estimates of the wage and income responses compared to the non-separable case. We may conclude that assuming non-separable preferences matters for policy evaluation. The second result is that male and female labor supply are complements for couples where the husband works more than 42 hours a week. We could not reject the assumption of weak exogeneity of the husband's work hours. Although we have estimated conditional elasticities, this former result gives to our empirical findings more relevance for policy implications on the labor market, since the husband's work hours have been found to be exogenous to the wife.

A Data

We give here further details about the data. We report in table A1 the descriptive statistics of the variables used in the model.

- *Insert Table A1* -

The figure *1* shows the distribution of monthly work hours for the wives and figure *2* the distribution for the husbands. Approximately 50 % of the married women population are outside of the labor force and around 30% are working full-time. Working wives tend to work shorter hours than their husbands who tend to concentrate around 160 hours (40 hours a week). It also emerges that the typical number of hours for a female's part-time job is around 20 hours a week.

Non durable consumption expenditures are defined as monthly sum of usual groups like food, tobacco and alcohol, clothing, transports, communication, leisure, education and other goods. Since we make the assumption of intertemporal separability of preferences, we excluded durable goods and housing. We also excluded health expenses, because they are supposed to help to maintain the welfare of the household rather than to increase its utility[11]. We also excluded expenses for health insurance since it constitutes a reduction in income rather than an increase in welfare.

- Insert figures 1 and 2 -

B Econometric model

In this section of the appendix we give the details of our econometric model. First we describe our estimation procedure. Then we provide details about the specification. Finally, we detail the estimation method in order to obtain the households marginal tax rates.

B.1 Estimation

Our goal is to estimate equation (13). First note that h_{fi} and ω_{fi} are only observed for the women who participate to the labor force. Let d_{fi} denote an indicator function which takes the value 1 if the wife works and 0 otherwise. Let I_i^* designate a measure of the difference in utilities of working and not working (see Mroz [17]), $W_{f,i}$ the set of the determinants of the participation decision, s_f as a vector of parameters and $u_{S_f,i}$ an error term with zero mean. We have $d_{f,i} = 1\left[I_i^* = W_{f,i}\phi + u_{S,i} > 0\right]$ and h_{fi} and ω_{fi} are observed if and only if $d_{f,i} = 1$.

[11]Moreover it was impossible to distinguish between the actual amount paid by the household and the amount of the invoice.

As we have shown in section 2.1, the marginal wage and the virtual non-labor income due to the progressivity of income tax are endogenous and are functions of the number of work hours and the earnings of their husband. When we come to estimate the model, we have to instrument these two variables. One solution is to formulate the model as a simultaneous equation model where errors are distributed jointly normal and to estimate it by full information maximum likelihood. Another solution would be to use the properties of joint normality to derive a limited information maximum likelihood estimator. We opt for the latter approach. We assume that the log of the marginal wage and the virtual income are described by the following equations

$$\ln \omega_{f,i}^{*} = \mathbf{h}_i \eta_w + u_{w,i} \tag{A1}$$

and

$$m_{f,i} = \mathbf{h}_i \eta_m + u_{m,i}, \tag{A2}$$

where η_w and η_m are vector of parameters and $u_{w,i}$ and $u_{m,i}$ are error terms. We assume that the vector $u_i' \equiv (u_{h,i}, u_{w,i}, u_{m,i}, u_{S,i})$ is normally distributed with zero-mean and covariance matrix Σ. From joint normality we can write

$$u_{h,i} = \varphi_w u_{w,i} + \varphi_m u_{m,i} + \epsilon_i \tag{A3}$$

where φ_w and φ_m are functions of the elements of Σ, and ϵ_i is an error term with $E\left[\epsilon_i | \, u_{w,i}, u_{m,i}\right] = 0$. Substituting (A3) in the labor supply function (13) we get

$$h_{f,i}^{*} = \alpha \ln \omega_{f,i}^{*} + \beta m_{f,i} + f\left(h_{m,i}; \theta\right) + \mathbf{z}_i \gamma + \varphi_w u_{w,i} + \varphi_m u_{m,i} + \epsilon_i. \tag{A4}$$

We estimate this equation in two steps. First we estimate the two equations which explains the two endogenous variables in order to obtain generalized residuals from these estimation which we denote $\widetilde{u}_{w,i}$ and $\widetilde{u}_{m,i}$ (see Chesher and Irish [10], Gourieroux et al. [15])[12]. In a second step we estimate the labor supply equation via the maximum likelihood estimator of Heckman's selection model including the generalized residuals and using the selection equation described above. Since $\ln \omega^*_{f,i}$ is not observed for women outside of the labor force, $\widetilde{u}_{w,i}$ are obtained by the maximum likelihood estimator of the generalized tobit model (A1). The residuals $\widetilde{u}_{m,i}$ are obtained by estimating (A2) by OLS. Note that we are using a two-step maximum likelihood estimator since the generalized residuals are also obtained by a maximum likelihood estimation procedure. This implies that we correct the asymptotic covariance matrix of this estimator (see Wooldridge [21] for the computation of this matrix). The generalized residuals take the following form

$$\widetilde{u}_{w,i} = \widehat{\sigma}_w^{-1}\left[\widehat{u}_{w,i}/\widehat{\sigma}_w - \left(\widehat{\rho}_w/\sqrt{1-\widehat{\rho}_w^2}\right)\widehat{\lambda}_{w,i}\right] \tag{A5}$$

and

$$\widetilde{u}_{m,i} = m_{f,i} - \mathbf{h}_i\widehat{\eta}_m \tag{A6}$$

where $\widehat{\lambda}_{w,i}$ is the inverse mills ratio derived from the estimation by maximum likelihood of model (A1) and $\widehat{u}_{w,i} = \ln \omega^*_{f,i} - \mathbf{h}_i\widehat{\eta}_w$. The parameters $\widehat{\sigma}_w$ and $\widehat{\rho}_w$ are respectively the estimates of the variance of u_w and the correlation coefficient between u_w and the error term of the selection equation u_S.

[12]The idea of generalized residuals has been applied for example by Blundell et al. [3] and Duncan and Giles [12] on studies on the impact on lone-mothers labor supply of welfare programs in the UK.

B.2 Specification

We have included in the labor supply equation demographics such as the number of children in some categories of age, the age and the age squared of the wife, the number of years of education, dummy variables for her occupation status and a dummy variable for swiss nationality as control variables. In the selection equation, we included in the regression some demographics such as the number of children in some categories of age, dummy variables for the age of the youngest child, the potential experience of the wife[13], the squared of this variable, the number of years of education squared, dummy variable for swiss nationality as control variables, dummy variables for the regional location of residency and a dummy variable for whether the household lives in one the most populated area of Switzerland[14]. We also included the gross earnings of the husband.

Finding instruments for the marginal wage and the virtual non-labor income is a difficult task (see Mroz [17]). Obvious candidates for the marginal wage are education and potential experience. The fact that education is truly exogenous has been discussed in the literature (see Mroz [17]). It seems that in our model and with our data education was correlated with the unobserved taste factor since once we had introduced this variable in the model the associated parameter was statistically different from zero. One other candidate for the marginal wage is the gross wage rate but since it is computed as the wife's earnings divided by her number of hours it will be measured with error and correlated with the error term. Therefore we did not retain it. For the virtual nonlabor income we used

[13]It is defined as the wife's age less her number of years of education.

[14]Zurich, Geneva, Basel and Bern

the gross earnings of the husband. It could be that labor supply of both spouses are determined jointly meaning that h_m is not exogenous to the wife. In this case this variable will not be a valid instrument[15]. Education and potential experience of the husband could be used as instruments for the virtual nonlabor income. It seems plausible that these variables are correlated with virtual nonlabor income (and the husband's earnings) but is uncorrelated with the taste factor for work of the wife.

Finally we have instrumented the marginal wage and the virtual nonlabor income with the wife's number of years of education squared, the number of children older than 15, the gross earnings of the husband and his number of years of education. As discussed above the education is suspected to be endogenous and therefore we have included it in the labor supply equation. Once we have conditioned female's hours on education, education squared could be used as a valid instrument. From the value of the Hansen J-statistic[16] it seems that these instruments are valid. We tried other instruments but they were judged weak or the Hansen test-statistic for overidentifying restrictions lead us to reject their validity.

We have also tested the exogeneity assumption of the husband's work hours for the specifications proposed in this paper. This test is particularly important since the conditional approach has more sense for policy evaluation when the spouse's work hours are exogenous. First we have obtained residuals from a regression of the male hours on the set of exogenous variables plus some instruments correlated

[15]The husband's hourly wage could be used as an instrument but since it is computed as earnings divided by the number of work hours this will not solve the problem

[16]We have obtained the Hansen test-statistic for overidentifying restrictions in order to judge the validity of our instruments, by modifying the Heckman's two-step estimator by a GMM estimator in order to use instrumental variables.

with the hours of the husbands but uncorrelated with the woman's taste factor. We have chosen the age, the numbers of years of experience and his number of years of education. Then we have reestimated the model by plugging these residuals into the wife's hours equation.

B.3 Taxation function

In order to estimate our econometric model we have to approximate the taxation function $T(Y)$ where Y is gross income In Switzerland, income tax is collected at the municipality, "canton" (i.e. regional) and federal state level. Taxation profiles are different for each "canton". Consider first the direct federal income tax. The Swiss tax authorities provides data points for typical married households (without child and with two children) between gross income and tax burden (see *Administration Fédérale des contributions* [1]). We used these points for estimating our taxation function. The tax authorities provide the same kind of data for each canton for tax burden at the municipality and the canton levels. We selected a functional form where the average tax rate is non-decreasing in income to ensure progressivity. We chose the following generalized logistic function (14)

$$\begin{aligned} \tau(Y) &= \frac{T(Y)}{Y} = \tau(Y) = t_o + \frac{(t_1 - t_o)}{1 + e^{-(\alpha + \beta Y)}}, \\ \alpha &> 0 \text{ and } \beta > 0 \\ \tau'(\cdot) &> 0 \text{ and } \tau''(\cdot) > 0 \text{ if } Y > \overline{Y} \end{aligned} \tag{A8}$$

where τ is the average tax rate. In order to take into account of the possible deductions due to the presence of children in the household, we estimate the function $\tau(Y - C\delta) = T(Y, C)/(Y - C\delta)$, where C is the number of children present in the household and δ is a parameter to be estimated. Equation (14) has been estimated by standard non-linear least squares. The functional form satisfies the following properties $T_Y > 0$, $T_{YY} > 0, T_C < 0$, $T_{CC} > 0$ and $T_{YC} < 0$.

The Swiss tax system is very heterogenous. Not only we have got 26 different tax schedules, but there are also a lot of differences in how deductions for the presence of children and general lump sum deductions are applied[17]. More importantly, there are also differences between municipalities by the application of different taxation coefficient. Obviously this function will only be an approximation of what really are the marginal tax rates, but considering for instance differences in taxes due to municipality residence would be a tremendous task and far beyond the scope of our analysis.

- Insert Tables A2a to A4 -

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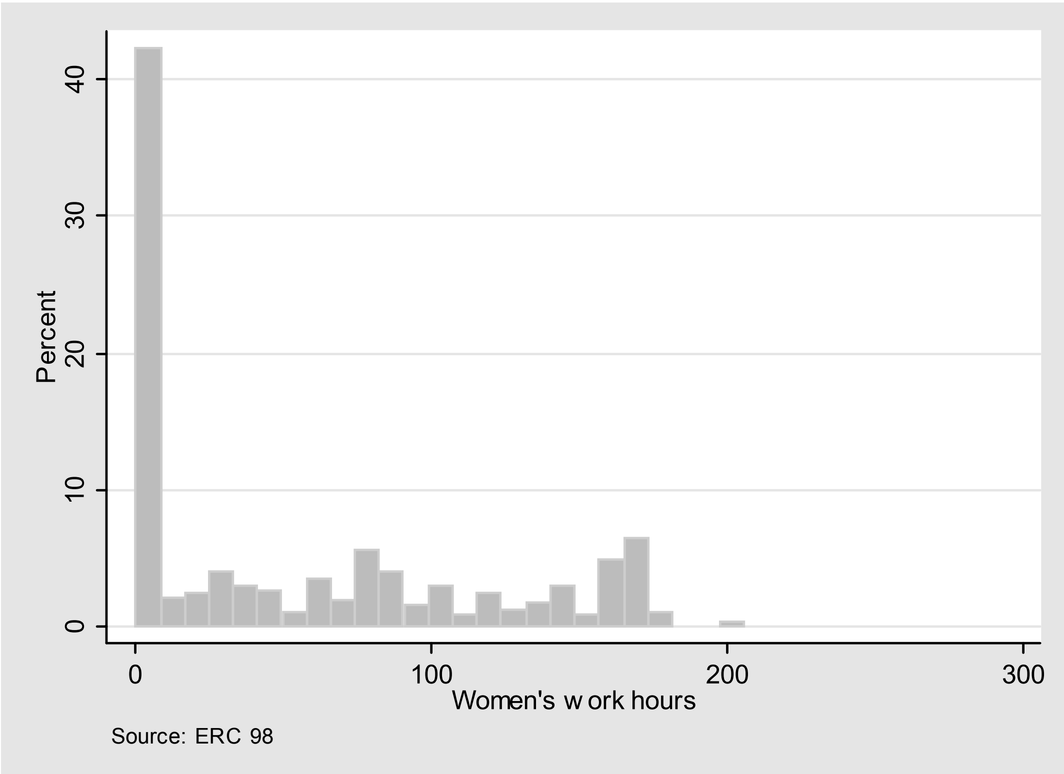

Figure 1: Distribution of women's work hours

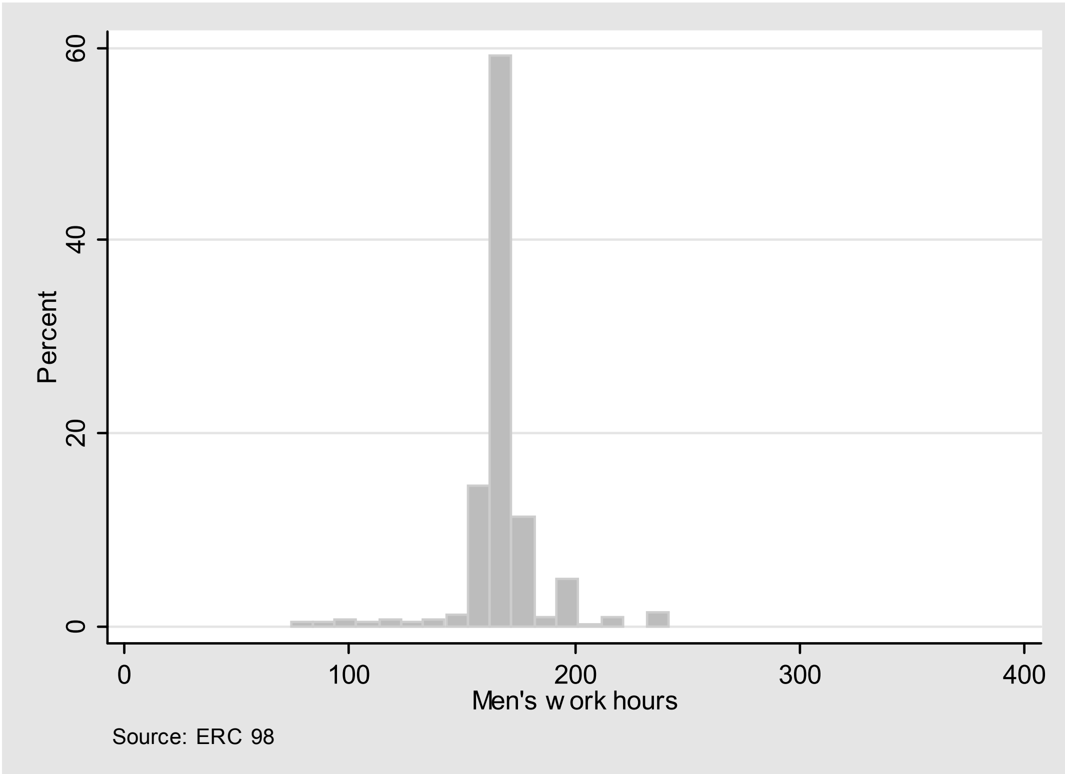

Figure 2: Distribution of men's work hours

Table 1: Labour supply regressions

	(1)	(2)	(3)	(4)
$\ln(\omega_f)$	80.917	65.556	71.621	64.950
	(2.82)**	(2.48)*	(2.50)*	(2.37)*
m_f	-0.007	-0.008	-0.008	-0.008
	(3.82)**	(5.15)**	(4.86)**	(5.20)**
h_m		0.142		
		(2.27)*		
$1[40 \leq h_m \leq 42]$			10.364	9.352
			(1.81)	(1.68)
$1[h_m > 42]$			13.160	-33.979
			(2.05)*	(1.83)
$h_m \cdot 1[h_m > 42]$				0.244
				(2.33)*
u_w	-16.802	-14.392	-15.308	-14.278
	(3.94)**	(3.70)**	(3.63)**	(3.55)**
u_m	-0.005	-0.003	-0.003	-0.003
	(2.54)*	(1.90)	(2.09)*	(1.88)
Constant	62.523	61.308	62.727	74.749
	(1.23)	(1.10)	(1.11)	(1.38)
Observations	2795	2795	2795	2795
Uncensored observations	1633	1633	1633	1633
Log-likelihood	-9768.57	-9769.40	-9769.17	-9769.04
J-statistic p-value	0.927	0.768	0.774	0.766
Root MSE	52	48	49	48
Akaike criterion	6.991	6.991	6.991	6.991

Absolute value of z-statistics in parentheses
* significant at 5% level; ** significant at 1% level

Table 2: Within period elasticities

	(1)	(2)	(3)	(4)
$E_{hf,wm}$	1.33	1.028	1.143	1.016
	(1.86)	(1.50)	(1.64)	(1.49)
$E_{hf,wm}$	-1.142	-1.383	-1.325	-1.392
	(1.702)	(2.06)	(1.98)	(2.09)
$E_{hf,N}$	-0.259	-0.313	-0.3	-0.316
	(0.481)	(0.583)	(0.558)	(0.586)

Note: standard deviation in parentheses

Table A1: Descriptive Statistics

	Mean[a]	Standard deviation
h_f[b]	96.62	52.33
Wife's gross wage [b]	33.08	18.25
Wife's participation rate	0.59	0.49
Marginal tax rate	0.26	0.08
Average tax rate	0.14	0.05
Non-labor income	1636.98	2466.12
$\ln(earings_m)$	8.80	0.37
Husband's earnings ($earnings_m$)	7120.89	2843.47
Husband's gross hourly wage	42.61	17.16
Number of children younger than 5	0.44	0.71
Number of children aged between 5 and 10	0.36	0.65
Number of children aged between 10 and 15	0.25	0.56
Number of children older than 15	0.26	0.60
$1[h_m<40]$	0.06	0.24
$1[40 \leq h_m \leq 42]$	0.68	0.47
$1[h_m>42]$	0.26	0.44
h_m	168.61	21.55
Wife's age	39.65	9.56
$(\text{Wife's age})^2$	1663.29	801.75
Wife's education	12.17	1.71
$(\text{Wife's education})^2$	150.95	41.47
$(\text{Husband's education})^2$	12.94	2.05
Wife: unskilled worker	0.05	0.23
Wife: skilled worker	0.01	0.09
Wife: clerical	0.14	0.34
Wife: intermediate position	0.15	0.36
Wife: intellectual profession	0.05	0.22
Wife: intermediate position	0.15	0.36
Wife: German speaking	0.63	0.48
Wife: French speaking	0.21	0.40
Wife: Swiss nationality	0.81	0.39
Husband: Swiss nationality	0.80	0.40
Mittelland region	0.24	0.43
Lemanic region	0.19	0.39
North-western Switzerland	0.13	0.34
South-East Switzerland	0.15	0.36
Central Switzerland	0.09	0.28
Wife's potential experience	21.48	9.78
$(\text{Wife's potential experience})^2$	556.98	471.46
$(\text{Wife's education})^2$	150.95	41.47
1[youngest child younger than 2]	0.19	0.39
1[youngest child aged between 2 and 5]	0.14	0.35
1[youngest child aged 5 and 10]	0.15	0.35
Large urban area	0.31	0.46
Husband: unskilled worker	0.04	0.19
Husband: craftman	0.18	0.38
Observations	2795	

a: weighted averages
b: average for the sample of working females
Note: monetary variables are in CHF

Source: ERC 1998

Table A2a: Labour supply regression

	(1)	(2)	(3)	(4)
ln(ω_f)	80.917	65.556	71.621	64.950
	(2.82)**	(2.48)*	(2.50)*	(2.37)*
m_f	-0.007	-0.008	-0.008	-0.008
	(3.82)**	(5.15)**	(4.86)**	(5.20)**
Number of children younger than 5	-28.162	-25.606	-26.404	-25.634
	(7.31)**	(7.46)**	(7.35)**	(7.36)**
Number of children aged between 5 and 10	-22.898	-21.546	-22.052	-21.770
	(8.32)**	(8.38)**	(8.20)**	(8.21)**
Number of children aged between 10 and 15	-10.180	-9.889	-9.930	-10.038
	(5.29)**	(5.12)**	(5.14)**	(5.20)**
h_m		0.142		
		(2.27)*		
$1[40 \leq h_m \leq 42]$			10.364	9.352
			(1.81)	(1.68)
$1[h_m>42]$			13.160	-33.979
			(2.05)*	(1.83)
$h_m \cdot 1[h_m>42]$				0.244
				(2.33)*
Wife's age	-5.770	-4.826	-5.055	-4.635
	(3.34)**	(3.03)**	(3.05)**	(2.92)**
(Wife's age)^2	0.058	0.048	0.051	0.046
	(2.94)**	(2.61)**	(2.64)**	(2.49)*
Wife's education	-1.523	-1.364	-1.421	-1.414
	(2.13)*	(1.92)	(1.95)	(1.94)
Wife: unskilled worker	-31.487	-31.160	-31.443	-31.212
	(8.25)**	(8.13)**	(8.04)**	(8.03)**
Wife: skilled worker	39.255	35.696	36.427	35.846
	(4.23)**	(3.97)**	(4.02)**	(3.98)**
Wife: clerical	-5.569	-5.390	-5.729	-5.430
	(1.72)	(1.63)	(1.67)	(1.60)
Wife: intermediate position	-19.419	-16.568	-17.372	-16.463
	(2.71)**	(2.41)*	(2.41)*	(2.34)*
Wife: intellectual profession	-31.924	-26.213	-27.501	-26.148
	(2.86)**	(2.54)*	(2.55)*	(2.49)*
Wife: German speaking	-7.166	-7.436	-7.158	-7.295
	(2.90)**	(2.98)**	(2.88)**	(2.93)**
Wife: Swiss nationality	-13.919	-12.603	-13.211	-12.581
	(3.54)**	(3.30)**	(3.35)**	(3.25)**
Husband: Swiss nationality	-6.721	-6.004	-6.202	-5.927
	(2.06)*	(1.85)	(1.91)	(1.83)
Mittelland region	5.146	3.922	4.441	3.841
	(1.53)	(1.21)	(1.31)	(1.16)
Lemanic region	5.880	6.172	6.324	6.192
	(1.94)	(2.03)*	(2.07)*	(2.03)*
Central Switzerland	5.839	4.901	5.095	5.026
	(1.39)	(1.18)	(1.22)	(1.20)
u_w	-16.802	-14.392	-15.308	-14.278
	(3.94)**	(3.70)**	(3.63)**	(3.55)**
u_m	-0.005	-0.003	-0.003	-0.003
	(2.54)*	(1.90)	(2.09)*	(1.88)
Constant	62.523	61.308	62.727	74.749
	(1.23)	(1.10)	(1.11)	(1.38)
Observations	2795	2795	2795	2795
Uncensored observations	1633	1633	1633	1633
Log-likelihood	-9768.57	-9769.4	-9769.17	-9769.04
J-statistic p-value	0.927	0.768	0.774	0.766
Root MSE	52	48	49	48
Akaike criterion	6.991	6.991	6.991	6.991

Absolute value of z-statistics in parentheses
* significant at 5% level; ** significant at 1% level

Table A2b: Regression of h_f, participation decision $1[h_f>0]$

	(1)	(2)	(3)	(4)
ln(earings$_m$)	-0.614	-0.623	-0.625	-0.626
	(7.26)**	(7.36)**	(7.38)**	(7.39)**
(Husband's potential experience)^2	-0.002	-0.002	-0.002	-0.002
	(5.97)**	(6.00)**	(6.00)**	(6.01)**
$1[h_m<40]$	0.100	0.091	0.071	0.071
	(0.85)	(0.77)	(0.59)	(0.59)
$1[h_m>42]$	-0.045	-0.040	-0.048	-0.048
	(0.78)	(0.68)	(0.80)	(0.80)
Wife's potential experience	0.042	0.042	0.042	0.042
	(2.89)**	(2.93)**	(2.93)**	(2.94)**
(Wife's education)^2	0.003	0.003	0.003	0.003
	(4.32)**	(4.39)**	(4.40)**	(4.40)**
husband: Swiss nationality	-0.345	-0.345	-0.344	-0.344
	(4.41)**	(4.41)**	(4.40)**	(4.40)**
1[youngest child younger than 2]	-1.130	-1.135	-1.135	-1.137
	(7.17)**	(7.22)**	(7.22)**	(7.23)**
1[youngest child aged between 2 and 5]	-0.971	-0.976	-0.976	-0.976
	(6.84)**	(6.90)**	(6.89)**	(6.90)**
1[youngest child aged 5 and 10]	-0.495	-0.499	-0.498	-0.498
	(4.21)**	(4.26)**	(4.25)**	(4.25)**
Number of children younger than 5	-0.290	-0.286	-0.286	-0.285
	(3.42)**	(3.39)**	(3.38)**	(3.38)**
Number of children aged between 5 and 10	-0.136	-0.133	-0.134	-0.134
	(2.24)*	(2.20)*	(2.21)*	(2.21)*
Number of children aged between 10 and 15	-0.204	-0.203	-0.203	-0.203
	(4.08)**	(4.06)**	(4.07)**	(4.07)**
Large urban area	0.138	0.139	0.140	0.141
	(2.04)*	(2.07)*	(2.08)*	(2.09)*
Mittelland region	0.259	0.257	0.258	0.257
	(2.06)*	(2.05)*	(2.06)*	(2.05)*
Lemanic region	0.143	0.140	0.142	0.141
	(1.01)	(0.99)	(1.00)	(0.99)
Region of Zurich	0.401	0.400	0.400	0.399
	(2.89)**	(2.89)**	(2.89)**	(2.89)**
North-western Switzerland	0.202	0.201	0.202	0.201
	(1.51)	(1.51)	(1.51)	(1.50)
South-East Switzerland	0.229	0.226	0.227	0.226
	(1.71)	(1.69)	(1.70)	(1.69)
Central Switzerland	0.231	0.230	0.231	0.230
	(1.58)	(1.58)	(1.58)	(1.58)
Husband: unskilled worker	0.160	0.158	0.158	0.159
	(1.14)	(1.13)	(1.13)	(1.14)
Husband: craftman	-0.279	-0.281	-0.281	-0.281
	(3.95)**	(4.00)**	(4.00)**	(4.00)**
Wife: German speaking	0.189	0.190	0.189	0.189
	(2.05)*	(2.06)*	(2.05)*	(2.05)*
Wife: French speaking	0.347	0.348	0.347	0.347
	(3.15)**	(3.17)**	(3.16)**	(3.16)**
Constant	5.792	5.856	5.879	5.882
	(8.26)**	(8.35)**	(8.37)**	(8.38)**
$\tau=\ln(1-\rho)/(1+\rho)$	-0.478	-0.501	-0.497	-0.500
	(4.42)**	(4.81)**	(4.73)**	(4.79)**
$\ln(\sigma)$	3.648	3.654	3.653	3.654
	(132.01)**	(132.32)**	(132.27)**	(132.23)**
Observations	2795	2795	2795	2795

Absolute value of z-statistics in parentheses
* significant at 5% level; ** significant at 1% level

Table A3a: Regression of ln(ω_f)

	(1)	(2)	(3)	(4)
ln(earings$_m$)	-0.032	0.009	0.005	0.011
	(0.99)	(0.28)	(0.15)	(0.33)
(Wife's education)^2	0.002	0.002	0.002	0.002
	(2.70)**	(2.63)**	(2.38)*	(2.50)*
Number of children older than 15	-0.050	-0.052	-0.051	-0.051
	(2.94)**	(3.08)**	(3.03)**	(3.04)**
(Husband's education)^2	0.002	-0.000	-0.001	-0.001
	(0.41)	(0.03)	(0.16)	(0.14)
Number of children younger than 5	0.110	0.103	0.103	0.103
	(4.42)**	(4.13)**	(4.11)**	(4.12)**
Number of children aged between 5 and 10	0.066	0.066	0.066	0.068
	(3.67)**	(3.68)**	(3.65)**	(3.79)**
Number of children aged between 10 and 15	-0.009	-0.007	-0.009	-0.007
	(0.48)	(0.39)	(0.46)	(0.36)
h_m		-0.002		
		(4.13)**		
$1[40 \le h_m \le 42]$			-0.149	-0.148
			(3.49)**	(3.50)**
$1[h_m > 42]$			-0.173	0.235
			(3.85)**	(1.23)
$h_m \cdot 1[h_m > 42]$				-0.002
				(2.21)*
Wife's age	0.050	0.047	0.046	0.045
	(5.06)**	(4.82)**	(4.73)**	(4.62)**
(Wife's age)^2	-0.001	-0.001	-0.001	-0.001
	(4.62)**	(4.47)**	(4.37)**	(4.26)**
Wife's education	-0.044	-0.042	-0.037	-0.039
	(2.07)*	(1.99)*	(1.74)	(1.84)
Wife: unskilled worker	0.063	0.065	0.066	0.067
	(1.71)	(1.78)	(1.80)	(1.83)
Wife: skilled worker	-0.072	-0.069	-0.066	-0.070
	(0.84)	(0.81)	(0.77)	(0.82)
Wife: clerical	0.094	0.094	0.095	0.095
	(3.56)**	(3.58)**	(3.61)**	(3.62)**
Wife: intermediate position	0.267	0.265	0.259	0.262
	(10.17)**	(10.15)**	(9.87)**	(10.01)**
Wife: intellectual profession	0.380	0.366	0.358	0.363
	(9.55)**	(9.21)**	(8.94)**	(9.06)**
Wife: German speaking	0.008	0.010	0.006	0.008
	(0.30)	(0.40)	(0.24)	(0.30)
Wife: Swiss nationality	0.087	0.086	0.087	0.086
	(2.61)**	(2.58)**	(2.60)**	(2.60)**
Husband: Swiss nationality	0.015	0.012	0.012	0.011
	(0.47)	(0.36)	(0.37)	(0.34)
Mittelland region	-0.082	-0.084	-0.084	-0.084
	(3.46)**	(3.56)**	(3.56)**	(3.56)**
Lemanic region	-0.008	-0.013	-0.015	-0.015
	(0.27)	(0.44)	(0.48)	(0.47)
Central Switzerland	-0.060	-0.063	-0.061	-0.064
	(1.61)	(1.70)	(1.63)	(1.72)
Constant	2.238	2.288	2.146	2.119
	(7.26)**	(7.46)**	(6.97)**	(6.89)**
Observations	2795	2795	2795	2795

Absolute value of z-statistics in parentheses
* significant at 5% level; ** significant at 1% level

Table A3b: Participation decision equation, ln(ω_f)

	(1)	(2)	(3)	(4)
ln(earings$_m$)	-0.587	-0.593	-0.595	-0.595
	(6.82)**	(6.89)**	(6.92)**	(6.92)**
(Husband's potential experience)^2	-0.002	-0.002	-0.002	-0.002
	(5.91)**	(5.93)**	(5.92)**	(5.92)**
1[h_m<40]	0.131	0.103	0.091	0.090
	(1.08)	(0.85)	(0.75)	(0.75)
1[h_m>42]	-0.055	-0.043	-0.048	-0.048
	(0.92)	(0.73)	(0.80)	(0.80)
Wife's potential experience	0.041	0.041	0.041	0.041
	(2.80)**	(2.83)**	(2.83)**	(2.83)**
(Wife's education)^2	0.003	0.003	0.003	0.003
	(4.20)**	(4.24)**	(4.25)**	(4.25)**
husband: Swiss nationality	-0.327	-0.328	-0.328	-0.328
	(4.18)**	(4.19)**	(4.18)**	(4.19)**
1[youngest child younger than 2]	-1.055	-1.057	-1.059	-1.057
	(6.51)**	(6.52)**	(6.53)**	(6.52)**
1[youngest child aged between 2 and 5]	-0.920	-0.925	-0.925	-0.925
	(6.29)**	(6.32)**	(6.32)**	(6.32)**
1[youngest child aged 5 and 10]	-0.455	-0.458	-0.457	-0.458
	(3.76)**	(3.78)**	(3.77)**	(3.78)**
Number of children younger than 5	-0.331	-0.330	-0.329	-0.330
	(3.81)**	(3.80)**	(3.79)**	(3.80)**
Number of children aged between 5 and 10	-0.159	-0.157	-0.158	-0.157
	(2.55)*	(2.53)*	(2.54)*	(2.53)*
Number of children aged between 10 and 15	-0.216	-0.216	-0.216	-0.216
	(4.32)**	(4.33)**	(4.33)**	(4.32)**
Large urban area	0.123	0.122	0.123	0.122
	(1.76)	(1.76)	(1.77)	(1.76)
Mittelland region	0.356	0.355	0.354	0.355
	(2.79)**	(2.78)**	(2.77)**	(2.78)**
Lemanic region	0.234	0.234	0.233	0.234
	(1.61)	(1.61)	(1.61)	(1.61)
Region of Zurich	0.525	0.524	0.521	0.523
	(3.70)**	(3.68)**	(3.66)**	(3.67)**
North-western Switzerland	0.300	0.301	0.300	0.301
	(2.21)*	(2.21)*	(2.20)*	(2.21)*
South-East Switzerland	0.338	0.339	0.338	0.339
	(2.50)*	(2.51)*	(2.50)*	(2.51)*
Central Switzerland	0.321	0.320	0.320	0.320
	(2.18)*	(2.17)*	(2.16)*	(2.17)*
Husband: unskilled worker	0.219	0.217	0.216	0.216
	(1.52)	(1.50)	(1.50)	(1.49)
Husband: craftman	-0.251	-0.253	-0.253	-0.254
	(3.49)**	(3.51)**	(3.51)**	(3.52)**
Wife: German speaking	0.169	0.169	0.169	0.169
	(1.82)	(1.81)	(1.82)	(1.81)
Wife: French speaking	0.325	0.326	0.325	0.326
	(2.88)**	(2.88)**	(2.88)**	(2.88)**
Constant	5.492	5.536	5.558	5.556
	(7.66)**	(7.73)**	(7.76)**	(7.76)**
$\tau=\ln(1-\rho_w)/(1+\rho_w)$	-0.203	-0.186	-0.178	-0.181
	(2.07)*	(1.90)	(1.81)	(1.84)
ln(σ_w)	-0.944	-0.951	-0.951	-0.952
	(47.20)**	(48.39)**	(48.74)**	(48.69)**
Observations	2795	2795	2795	2795
Uncensored observations	1633	1633	1633	1633
Log-likelihood	-2337.55	-2329.07	-2330.14	-2327.72

Absolute value of z-statistics in parentheses
* significant at 5% level; ** significant at 1% level

Table A4: Virtual nonlabour income regressions

	(1)	(2)	(3)	(4)
ln(earings$_m$)	1,668.039	1,619.311	1,669.286	1,647.141
	(15.20)**	(14.48)**	(14.83)**	(14.52)**
(Wife's education)^2	-6.783	-6.699	-6.772	-6.994
	(2.39)*	(2.38)*	(2.40)*	(2.46)*
Number of children older than 15	738.586	741.402	738.804	740.333
	(12.43)**	(12.48)**	(12.43)**	(12.47)**
(Husband's education)^2	38.952	41.977	38.494	37.808
	(1.89)	(2.02)*	(1.85)	(1.81)
Number of children younger than 5	535.812	538.285	535.771	535.323
	(12.02)**	(12.07)**	(12.00)**	(12.01)**
Number of children aged between 5 and 10	453.897	453.542	453.278	450.277
	(10.37)**	(10.31)**	(10.35)**	(10.30)**
Number of children aged between 10 and 15	501.574	500.144	499.871	499.008
	(9.12)**	(9.11)**	(9.11)**	(9.15)**
h_m		2.549		
		(1.74)		
$1[40 \leq h_m \leq 42]$			-14.347	-11.718
			(0.09)	(0.07)
$1[h_m > 42]$			40.689	-997.247
			(0.24)	(1.91)
$h_m \cdot 1[h_m > 42]$				5.521
				(2.05)*
Wife's age	-73.446	-71.253	-73.040	-71.451
	(2.13)*	(2.01)*	(2.11)*	(2.07)*
(Wife's age)^2	1.247	1.230	1.243	1.224
	(2.96)**	(2.84)**	(2.94)**	(2.91)**
Wife's education	110.537	108.340	110.392	113.835
	(1.96)	(1.93)	(1.97)*	(2.01)*
Wife: unskilled worker	-294.235	-298.484	-289.514	-293.635
	(3.03)**	(3.07)**	(2.98)**	(3.01)**
Wife: skilled worker	-1,502.259	-1,508.578	-1,502.194	-1,492.675
	(6.72)**	(6.76)**	(6.71)**	(6.66)**
Wife: clerical	-772.967	-773.972	-772.593	-771.470
	(8.74)**	(8.74)**	(8.72)**	(8.70)**
Wife: intermediate position	-960.064	-958.720	-959.528	-968.052
	(9.58)**	(9.58)**	(9.59)**	(9.68)**
Wife: intellectual profession	-1,182.354	-1,163.094	-1,182.237	-1,191.061
	(7.44)**	(7.32)**	(7.30)**	(7.38)**
Wife: German speaking	-82.234	-86.745	-83.969	-84.248
	(1.05)	(1.10)	(1.07)	(1.07)
Wife: Swiss nationality	8.687	13.504	11.423	13.339
	(0.08)	(0.12)	(0.10)	(0.12)
Husband: Swiss nationality	215.539	215.504	213.367	213.997
	(2.18)*	(2.18)*	(2.15)*	(2.16)*
Mittelland region	-53.420	-53.291	-53.732	-53.892
	(0.77)	(0.77)	(0.78)	(0.78)
Lemanic region	-67.780	-64.263	-68.738	-67.962
	(0.75)	(0.71)	(0.76)	(0.75)
Central Switzerland	-84.420	-83.277	-86.259	-77.564
	(0.76)	(0.75)	(0.77)	(0.69)
Constant	-13,327.928	-13,416.549	-13,341.248	-13,178.693
	(11.82)**	(11.53)**	(11.83)**	(11.68)**
Observations	2795	2795	2795	2795
R-squared	0.35	0.35	0.35	0.35

Robust t-statistics in parentheses
* significant at 5% level; ** significant at 1% level