Labor Supply Responses of Italian Women to Minimum Income Policies

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Abstract

Minimum income policies are policies aimed at guarantee all citizens with a minimum level of income and at fighting social exclusion typically associated with extreme poverty. Theoretically, their main shortcoming is the disincentive effect on labour market participation they could generate in the bottom part of income distribution, due to the high effective marginal tax rate they impose around the threshold level. This paper employs a structural labor supply model under discrete choices to test the existence and the magnitude of this disincentive effect on Italian female labor supply. Our empirical results show that family structure is crucial in determining the existence of a disincentive effect: only married women experience it, while single women participation rates increase under all possible minimum income schemes. The magnitude of both the positive and the negative effect depend on the policy design.

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Introduction

The idea of guaranteeing every citizen with a minimum level of income goes back in the history of philosophical, political and economic thought (among others, Friedman, Tobin and Van Parijs) and, in the recent years, regained the center of attention of the European political agenda[1]. On one side, in favour of the minimum income idea there are motivations of redistribution, efficiency and cost-effectiveness. On the other side, its main theoretical shortcomings are the disincentive effect to labour market participation at the bottom end of the income distribution, due to the high effective marginal tax rate imposed near the threshold level, and the level of taxation it would require in order to finance it.

In this paper, we focus our attention on the first critical argument against minimum income policies: the labor disincentive effect. The problem arises from the fact that, for a low wage individual, it could be more convenient, in the short-run, to remain out of or even to leave the labour market in order to receive the social transfer. Looking at the long run, minimum income policies could, in principle, have the undesirable effect of creating welfare dependent families by preventing some individuals from participating in the labour market. Moreover, due to an income effect, individuals have no incentive to work if they can get for free the same amount of money by the State.

We contribute to the existing literature by testing empirically the existence and the magnitude of this labor disincentive effect. Therefore, we investigate how labor participation would react to the introduction, in the Italian welfare system, of a basic minimum income scheme. We focus our attention on female labor supply because it is likely that the labor disincentive effect would concern primarily women labor decisions, due to their higher flexibility (as shown, for Italy, by Colombino and Del Boca 1990 and, more in general, by Laroque and

Salanie 2002). We choose Italy because it does not have a minimum income policy and there is wide consensus among Italian economists and sociologists that it would strongly need one to replace its highly fragmentary and work-related actual welfare system (Sacchi 2005).

The rest of the paper is as follows. Section 1 briefly introduces minimum income scheme and reviews the existing literature. Section 2 describes the 2002 Italian tax and benefit system. Section 3 illustrates the data used and the main descriptive statistics of the selected sample. Section 4 lays out the labour supply model and section 5 presents the estimation results. Section 6 describes the policy design and reports policy simulation results. Section 7 concludes.

I Minimum Income Policies

State intervention is primarily aimed at guaranteeing all citizens with a minimum standard of living by means of both money transfers and in-kind services. It could be divided in two main categories according to the criterion used to distribute those benefits (Targetti Lenti 2000).

The first category uses a universal selection principle: the role of the State is mainly redistributive and each citizen derives benefits regardless of individual particulars. Thinking about money transfers, proposals like social dividend or citizenship transfer belong to this type (see, for example, Van Parijs and Vanderborght 2006). They are universal and unconditional transfers to all citizens not included in the tax base; as an example, with a constant tax rate t, the relation between disposable income Y_{post} , social transfer G and taxable income Y_{pre} is:

$$Y_{post} = G + (1 - t)Y_{pre} \tag{1}$$

The public health care system and the state education system can be seen as

examples of in-kind services belonging to this class of intervention.

The second category is based on a selective principle: the role of the State is mainly residual and the benefits are targeted to specific groups of citizens, like working people, or are means-tested. Typical examples belonging to this category are minimum pensions, minimum income transfers and, in general, all social policies aimed at fighting poverty. They are realized mainly through a negative income tax (NIT) scheme where individuals with a pretax income Y_{pre} higher than a certain threshold Y^* pay taxes on the exceeding part according to the country's tax rate structure. Instead, those who have an income Y_{pre} below Y^* pay no taxes and receive a money transfer G from the State to increase their disposable income up to Y^*. Considering again a tax system with a constant tax rate t, the negative income tax works as follows:

$$Y_{post} = \begin{cases} Y_{pre} + G \quad with \quad G = Y^* - Y_{pre} \quad \text{if } Y_{pre} < Y^* \\ Y^* + (1-t)(Y_{pre} - Y^*) \qquad \text{if } Y_{pre} > Y^* \end{cases} \tag{2}$$

NIT implicitly imposes a very high marginal tax rate on incomes around the threshold Y^*. A possible solution to avoid this problem is to weight pre-tax income Y_{pre} by a reduction rate t_1 (lower than 1[2]) and, consequently, to assign to individuals with $t_1(Y_{pre})$ lower than Y^* a transfer G, not included in the tax base, and make them pay taxes on income higher than $\frac{Y^*}{t_1}$ according to the country's tax structure (Fortin et al. 1993). The system works as follows:

$$Y_{post} = \begin{cases} Y_{pre} + G \quad with \quad G = Y^* - t_1(Y_{pre}) \quad \text{if } Y_{pre} < \frac{Y^*}{t_1} \\ (1-t_2)(Y_{pre} - Y^*) + \frac{Y^*}{t_1} \qquad \text{if } Y_{pre} > \frac{Y^*}{t_1} \end{cases} \tag{3}$$

Theoretically, all these transfer schemes induce a labor disincentive effect for those near the threshold Y^*.

Minimum income schemes, whose main goal is to guarantee all citizens with a

minimum level of income, can belong to both categories. Universal basic income and universal basic wealth schemes are examples of the first category, since they provide an unconditional transfer to all citizens. Workfare and participation basic income, instead, match the second category, since the transfer is conditioned to individual characteristics. Participation basic income is probably the more commonly used minimum income scheme. It is made up of two parts: a benefit scheme, to supply individuals whose income is below a certain threshold with a money transfer, and a participation program the individual has to carry out in order not to lose the monetary side. All activities included in the participation scheme are aimed at helping the individual back in to the labour market and into society on a long term perspective. In workfare schemes, instead, the money transfer is conditioned to a minimum amount of working hours. Workfare and participation systems could be designed using a NIT scheme.

Most European countries already have some sort of minimum income policy, mainly modelled as a participation scheme, while Italy does not have any. In 1998, a first experiment, the *reddito minimo d'inserimento*, was carried out on 39 municipalities over a period of two years to test the financial and organizational feasibility of a national minimum income scheme. In 2001, without waiting the evaluation results[3], the financial law extended the experimentation period by two more years and increased the number of cities involved up to 306. In 2003-2004 the minimum income experiment was declared over and in principle the *reddito di ultima istanza* was created in its place, but, in practice, it never actually happened. The *reddito minimo d'inserimento* was a participation basic income mainly modelled on those already up and running in other European countries. Every city had to manage the social side autonomously, while the economic side was mainly financed and established by the central government through the setting up of the eligibility rules and the income threshold, equal[4]

to 282 euros per month (equivalent individual income was computed using the ISE scale[5]).

The common solution to avoid the disincentive problem is to exclude part of the labour earnings from the income considered to establish program eligibility. For example, in France only

50%[6] of individual earnings enter into the income taken into consideration (Gurgand and Margolis 2005), while in Portugal the percentage increases up to 70% (Rodrigues 2003). In the *reddito minimo d'inserimento*, it was 75%.

Not many of the existing empirical studies on the relation between labor supply and different tax-benefit structures use a discrete choice approach.

Aaberge et al. 2004 examine the welfare and labor supply effects for Italian married couples of replacing the Italian tax system by three alternative schemes: a flat tax, a negative income tax and a work fare system. Whatever the reform, labor supply of women in the poorest decile of the population always increases. They explain this apparently counterintuitive result, opposite to the labor disincentive effect hypothesis, using the own- and cross-wage elasticities associated to the different income groups and the quantity constraints on the hours choice. Bargain and Orsini 2006 study the impact of two different in-work transfers in three different European countries, namely France, Germany and Finland, exploiting the differences in their existing tax-benefits systems and in the distributions of income and wages. When family transfers are considered, they find that married women labor supply decreases, mainly due to the fiscal existing systems that penalize second earners, while single women labor supply increases. When individual transfers are considered, instead, the labor supply of all women increases. Blundell et al. 2000 consider the impact of working families' tax credit on hours and participation in UK. They find that participation among single women increases, while married women labor supply decreases.

Very few empirical studies, to our knowledge, focus their attention on minimum income schemes. Gouveia and Rodrigues 2002, for example, study the effect of the Portuguese Minimum income program on income distribution and on government expenditures. Gurgand and Margolis 2005 analyze the monetary work incentive faced by the recipients of the minimum income program in France, i.e. the gap between the labor market income they can earn and the welfare provision they can get. They find that almost all welfare beneficiaries would gain from being employed rather than to stay on welfare but the size of these gains is small and it is sensitive to the way in which the authors construct the gains, in particular for single mothers.

Our contribution to the existing literature is to determine the existence and the magnitude of the labor disincentive effect associated specifically to public transfers, since it is one of the two main theoretical argument against minimum income policies. We concentrate on a single country, Italy, to be sure that our results will not depend on differences in the tax structure, and we use a structural family labor supply model among a set of discrete choice model to account for the fact that individuals face constraints on their possible working hours (Dickens and Lundberg 1993, Van Soest 1995). In particular, we investigate what would be the labor disincentive effect on Italian labour participation if a social transfer like the one tested between 1998 and 2003 took place. The focus on female employment is well documented in the literature, as shown by Laroque and Salanie 2002. For Italy in particular, Colombino and Del Boca 1990 and Aaberge et al. 1999 show that female labour supply flexibility and responsiveness are much higher with respect to male labour supply. Therefore, it is likely that the labor disincentive effect would concern primarily female labor participation. Italian female employment rate is among the lowest in Europe (in 2006 it was equal to 46,6% while male employment rate was 70,7%) and far

Table 2.1: 2002 Italian tax rates

Income bracket	Marginal rate
< 10.329,14	0,18
10.329,14 - 15.493,71	0,24
15.493,71 - 30.987,41	0,32
30.987,41 - 69.721,68	0,39
> 69.721,68	0,45

below the 60% established by Lisbon target. The potential detrimental effect on female labor supply should, then, be a major concern when considering the feasibility of an Italian minimum income scheme.

II The 2002 Italian Tax-Benefit System

The progressive income tax, IRPEF (Imposta sul reddito delle persone fisiche), represents the main source of revenue of the Italian tax system. The unit determining the taxable income is the individual, while family composition affects the tax liability by means of tax credits for dependent spouse and dependent children. The tax base is mainly given by earnings (from employment, self-employment or firms) and income from real estate. Income from financial assets is normally taxed separately. In 2002 the tax schedule was made by 5 brackets with marginal rates going from 18% to 45%, as shown in table 2.1.

Final tax liability depends on a system of tax credits, generally decreasing with family income, linked to the source of earned income and to dependent relatives (table 2.2). Tax credit for earned income depends on whether the individual is employed, self-employed or an entrepreneur and decreases with taxable income. In 2002, for employed individuals, it varied from a maximum of 1.146,53 euros, for gross earnings lower than 6.197 euros, to a minimum of 51,65 euros, for gross earnings higher than 51.646 euros. For the self-employed and entrepreneurs it was substantially lower and ranged from a maximum of 573,27 euros, for gross earnings lower than 4.700 euros, to a minimum of 51,65 euros,

Table 2.2: 2002 tax credits

	Max.	Min.
For employment	1146,53	51,65
For self-employment	573,27	51,65
For dependent spouse	546,18	422,23
For dependent children	546,18	285,08
For children < 3 years old	123,95	

for gross earnings higher than 30.987 euros. Also the tax credit for a dependent spouse decreases with liable income. To be eligible for this type of credit, the spouse must have a personal income lower than a very modest threshold[7] In 2002 it varied from a maximum of 546,18 euros for income lower than 15.493,71 euros to a minimum of 422,23 euros for income higher than 51.645,69 euros. Finally, the third main form of tax credit is the one for dependent children: it depends negatively on family income and positively on the number of children within the family. The amount of credit can be shared by both parents if both have taxable income. In 2002 it varied from a maximum of 546,18 to a minimum of 285,08 euros. An additional fixed tax credit of 123,95 euros was given for each baby younger than 3 years.

The Italian fiscal system also includes two major social transfers linked to the family income and structure (table 2.3). The "family allowance" is given to employed or retired individuals that have at least one child younger than 18. "The family allowance for young children", instead, is given to families that have at least three children younger than 18, irrespective of the claimant employment status. The transfer amount and the income level for eligibility increase according to the number of underage children and decrease with the family income. Both requirements are systematically higher for single parents than for couples.

Table 2.3: 2002 Family checks

	First bracket	Last bracket	Yearly max amount	Yearly min amount
Family check				
Couple with 1 underage child	< 11,422,98 €	35.825,69 € - 38.538,69 €	1567,92 €	154,92 €
Lone parent with 1 underage child	< 13,230,58 €	24.077,31 € - 26.788,71 €	1196,16 €	247,92 €
Couple with 3 underage children	< 11,422,98 €	43.962,05 € - 46.673,44 €	4307,28 €	942,00 €
Lone parent with 3 underage children	< 13,230,58 €	43.057,71 € - 45.770,18 €	4945,56 €	1227,12 €
Family check for young children				
Couple with 3 underage children*	< 19381,07 €		1437,54 €	
Lone parent with 3 underage children	< 20741,14 €			

*and one working spouse

III The Data

The present empirical analysis is carried out using the 2002 Bank of Italy Survey of Household Income and Wealth (SHIW). SHIW provides detailed information on a representative sample of the Italian population including micro data on socioeconomic characteristics, labour and non-labour income and wealth of 8011 Italian families (21148 individuals).

Since we focus on female labor supply, we selected a sub-sample of women between the age of 18 and 55, either employed or not. Individuals still in education, self-employed or retired were excluded. The final selected sample is made by 4227 women divided into two sub-groups: 2919 married women[8] and 1308 single women, 388 of which living on their own and 920 living within the parental household.

Descriptive statistics for the two sub-samples are shown in table 3.1.

TABLE 3.1 HERE

Married women are on average older (by 10 years) and less educated[9] than single women; 83,93 percent of them have at least one child, with an average of 1,8 each, against the 12,38 percent of single women[10], with an average of 1,5 each. 13,98 percent of married women have babies (children younger than 3), while very few singles, among those who have children, have babies (less than

Table 3.2: Part-time work

		Married women	Single women
Part-time		20,88%	12,87%
	North	*21,42%*	*11,54%*
	Center	*23,78%*	*13,13%*
	South	*16,78%*	*15,71%*
Observations		1365	878

5 percent). Both married and single women are more likely to live in a house they or their family own than to live in rented accommodation. More than 70 percent of single women still live with their original family.

Married women are less likely to participate in the labour market than single women: less than 50 percent of married women work while more that 65 percent of single women are employed. By dividing the participation rate for geographical areas, we observe that participation in the labour market for married women is higher than 50 per cent in both northern (61 percent) and central areas[11] (52 percent), but the overall participation rate is forced down by the very low rate in southern regions (only 26 percent). A similar path exists in the sub-sample of single women where participation rates are very high both in northern and central areas (respectively 85 percent and 76 percent) and under 50 percent only in southern regions (40 percent); participation rates are, in any case, always higher than the corresponding ones in the married sub-sample.

Married women on average earn more than single women (slightly less than 8 euro per hour against slightly more than 7 euro per hour) and work a couple of hours less per week. Everywhere apart from in southern regions, where the ratios are pretty similar, part-time work, as shown in table 3.2, is more common among married than among single women.

IV The Labour Supply Model

The standard assumption in neoclassical models of labor supply is that individuals can decide to work a number of hours equal to each positive real number. However, in reality, individuals, most of the time, can choose between part-time or full-time jobs with a predetermined number of working hours. To account for this hours constraint, we use the discrete choice structural labor supply model developed by Van Soest 1995.

In this model, each family can choose among L alternatives in the choice set made by income and working hours combinations $\{(y_l, h_{ml}, h_{fl}); l = 1, 2, ..., L\}$, where h_{ml} and h_{fl} are working hours per week of husband and wife. Possible working hours are multiple of some fixed interval length IL, creating a discrete number of possible alternatives instead of a continuum as in neoclassical labour supply models. Since the focus of this paper is female labour supply, we will treat husband labour supply as fixed at the observed values[12], reducing the family choice set to combinations of family income and wife's working hours. We denote by y_l family's after tax income associated to the l alternative, made up of husband's earnings, wife's earnings and family unearned income such as capital income and social transfers. In the model what matters is how the family budget set is determined by the wife's working decisions, not its shape. Therefore, nonlinear and large non-convex portions caused by the presence of mean-tested social transfers are easily handled in this type of approach.

We use a translog specification of the direct utility function:

$$V(v_q) = v'Av + b'v \tag{4}$$

where $v_q = (\log y_q, \log h_{qf})'$ is the vector of log commodities of the family q and A, a $2x2$ matrix with entries $a_{ij}(i, j = 1, 2)$, and b, a $1x2$ vector with

entries $b_i (i = 1, 2)$, are parameters to be estimated. Preferences variations across families due to observed characteristics can be incorporated through parameters in the following way:

$$\beta_i = \sum_k b_{ik} z_k, \ i = 1, 2 \text{ and } \alpha_{ij} = \sum_k a_{ijk} z_k \ i, j = 1, 2 \tag{5}$$

The $z_k' s$ reflect family characteristics such as family composition, wife's age, where the family lives, and include a constant term. In the empirical analysis, to reduce computational burden, A will be assumed to be constant across families and Z_q will be a $1x12$ vector. The final form of each family's direct utility function is:

$$\begin{aligned} V(\log y_q, \log h_{qf}) &= \beta_1 \log y_q + \beta_2 \log h_{qf} + \alpha_{11} (\log y_q)^2 + \\ &\quad + \alpha_{22} (\log h_{qf})^2 + (\alpha_{12} + \alpha_{21}) \log y_q \log h_{qf} \end{aligned} \tag{6}$$

Family q disposable income corresponding to the l choice, y_{ql}, could be expressed as a function T of family gross income and socio-demographic characteristics:

$$y_{ql} = T(w_q h_{fl}, t_{ql}, I_q, Z_q) \tag{7}$$

where $w_q h_{fl}$ are woman's earnings, computed using the hourly gross wage rate ${w_q}^{13}$, I_q is the exogenous income, made up of household unearned income and husband's earnings, in the case of married women, or parents' earnings, in the case of single women living within the parental household, and t_{ql} are the social transfers received by the family.

The empirical analysis consists of estimating preferences directly as revealed by individual choices, rather than through the specification of the labour supply function. Household q chooses one among L alternatives in the choice set. The utility the household can derive from each alternative l is given by:

$$U_{ql} = V(h_{fl}, y_{ql}, Z_q) + \epsilon_{ql} \tag{8}$$

where $V()$ is the utility function defined in equation 6 and ϵ_{ql} is an error term[14] assumed to be identically and independently distributed across alternatives and across families according to a *type I-extreme value* distribution. Under this assumption, McFadden 1974 proved that the probability that alternative n is chosen by household q is given by:

$$Pr_{qn} = \Pr(U_{qn} > U_{ql}, \forall l \in L) = \frac{\exp V(h_n, y_{qn}, Z_q)}{\sum_{l=1}^{L} \exp V(h_l, y_{ql}, Z_q)} \tag{9}$$

that leads to the estimation of a conditional logit model.

Italy, as many countries, shows a concentration of people around the part-time, full-time and non-working alternatives. The above outlined model is not able to replicate these peaks. Therefore, to improve the fit of the model, it is common practice to add either dummies (as in Van Soest 1995), that can reflects quantity constraints on the demand side, or a fixed costs variable (as in Bargain and Orsini 2006), that represents the direct and indirect costs an individual has to cover to work (like transport costs and child-caring costs). We use the fixed costs approach modelling them as a one-off weekly cost directly subtracted from net income for any choice that involves paid work. They enter in the utility comparison for each individual in their work - non work choice in the following form:

$$F = X_F \delta \tag{10}$$

Since we assume non stochastic fixed costs,they do not modify the likelihood function. The functional form of the utility function, instead, becomes:

$$U_{ql} = \begin{cases} V(h_l, y_{ql}, Z_q) + \epsilon_{ql} & if \quad h_l = 0 \\ V(h_l, y_{ql} - F, Z_q) + \epsilon_{ql} & if \quad h_l > 0 \end{cases} \tag{11}$$

In our sample, the working hours reported by individuals range practically all integers from 0 to 70. It is, then, necessary to use a grouping rule that maps the declared hours into a discrete number of possibilities.

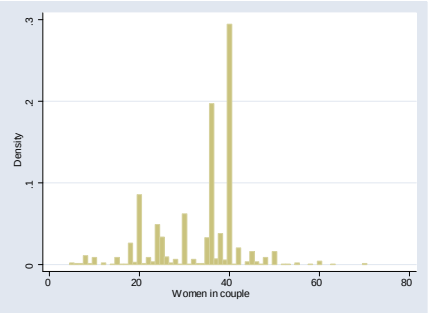

Figure 4.1: hours worked by married women

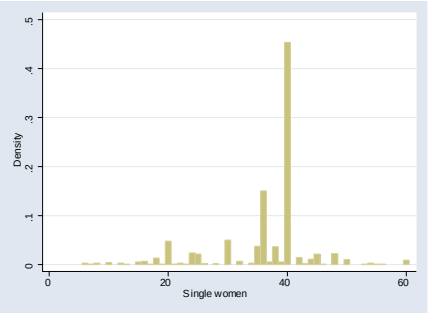

Figure 4.2: hours worked by single women

Gigure 4.1 and 4.2 show the distribution of working hours in the selected sample for single and married women, while figure 4.3 presents the number of hours worked by type of contract[15]. It is evident a strong concentration around the full-time (30, 35 and 40 hours) peaks and a minor concentration around the part-time peak (20 hours).

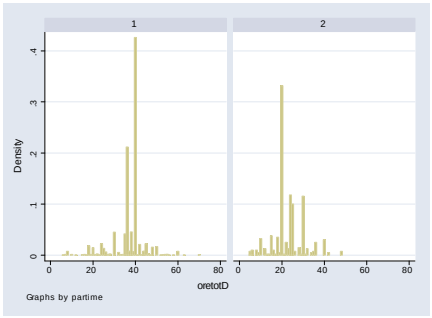

Figure 5.3: hours worked by type of contract

We use three different grouping rules constructed using two interval lengths ($IL = 20$ and $IL = 10$) and three set sizes ($L = 3$, $L = 5$, $L = 6$)[16] to test if our results are robust to different choice sets.

Finally, a well known problem in the labour supply literature is that wages are observed only for those actually working. Therefore, it is necessary to impute a wage to individuals who are currently out of work taking into account the bias linked to participation decisions.

A popular solution is to use the Heckman correction Heckman 1979. Strictly speaking, Heckman corrected wages might induce a correlation between the income and the utility stochastic component. Due to the selectivity problem, individuals with a large positive stochastic component in the wage equation are more likely to be observed in employment, given the observed variables; therefore, the wage stochastic component and the utility stochastic component become correlated. To fix this problem, different solutions have been adopted, all questionable to a certain degree: a) to use only the systematic component of the wage equation for everyone; b) to use the observed wages for employed individuals and the predicted wages for not employed; c) to use the predicted wages for all individuals. A more sophisticated procedure, that avoids this

correlation, simultaneously estimates the wage equation and the utility function or, alternatively, integrates the likelihood with respect to the distribution of the wage stochastic component.

We alternatively use all the four possible wages, the three above mentioned possibilities based on the Heckman correction and a fourth possibility constructed using a numerical procedure to approximate the integration of the likelihood with respect to the wage stochastic component[17], to test whether the Heckman procedure induce a bias in the labor supply coefficients. The results of the wage estimation are presented in the appendix.

V Empirical Results

Before looking at the empirical results, it is important to stress that they have to be interpreted with caution as preferences of individuals in a static environment, because this model does not explicitly take into account demand-side factors, as rationing in disposable working hours, and factors that might influence individuals' behaviors and preferences in a dynamic perspective (Bargain and Orsini 2006).

We estimate utility parameter, as revealed by actual working choices, using maximum likelihood. We allow fixed costs to vary according to the number of hours worked (part-time, full-time or over-time). Moreover, we tried to interact fixed costs with some observable factors that in principle should raise or lower their impact on individual choices (as the presence of young children within the household or the region of residence) but all coefficients different from the main one proved to be statistically not different from zero, therefore we do not include them in our simulation framework. The grouping rule based on the type of contract ($IL = 20, L = 3$) was able to fit the data, in terms of participation decisions, quite well without the introduction of the fixed costs

variables, therefore we use them only in the other two cases based on the declared number of working hours ($IL = 10, L = 5$ or $L = 6$).

For single women living with parents two possible types of family income have been considered, to investigate if parents' working situation affects cohabiting children's working decisions. The first possibility includes daughter's earnings, mother's earnings, father's earnings and family unearned income, while the second type is made up of only daughter's earnings and family unearned income. Results for the two types of income are much the same, suggesting that the parents' earnings do not have a direct effect on daughter's working decisions. In the following, we present the results obtained using the income of the whole family.

In our original sample, 51% of married women and 8% of single women declared to be housewives. In our estimates, we want to control for the fact that these women might have a strong preference towards the non working status that can determine their participation decisions in a way not related to economic reasons. We, then, include in the utility derived from working a dummy variable equal to 1 if in the original dataset the woman is a housewife.

Finally, we want to control for the fact that poor families might have some unobservable characteristics, like for example a poor social network, that might influence their working choices. We create a dummy equal to 1 if, in the observed data, the woman's family has an income below a certain threshold and we include it in the utility derived both from working and from income. In the following we show the estimates obtained using the experimented minimum income threshold[18] as benchmark for the construction of the dummy variable.

Table 5.1 and 5.2 show the results for married and single women using two out of three grouping rules[19] ($IL = 20$, $L = 3$ and $IL = 10$, $L = 5$) and three types of wages[20]. We omit the $IL = 10$, $L = 6$ because the coefficients and the

psedudo-R2 for $L = 5$ and $L = 6$ for both married and single women are the same under all possible types of wages, implying that explicitly modelling the overwork possibility does not improve the ability of the model to replicate real choices.

For both married and single women, taste parameters associated with working hours are more significant than those associated with income independently of the type of wage used. Significant coefficients have the same sign under all possible wages. Hours coefficients are larger with $IL = 10$ than with $IL = 20$, but this change in magnitude is mainly due to the presence of fixed costs. In fact, hour coefficients of the $IL = 10$ models without fixed costs are basically equal to the $IL = 20$ case[21].

Fixed costs are always strongly significant and vary according to the number of hours worked. In particular, they decrease as the number of hours increases, though the change is small with respect to the change in the number of hours. This result suggests that only a small fraction of the cost of working is related to the number of hours worked; the largest part is a sort of sunk cost related only to the participation-non participation dichotomy.

In the case of married women, the main hours coefficient is always negative, as expected since we use working hours and not leisure time[22], and strongly significant. The number of children within the household has a positive impact on the utility of working (it weakens the disutility derived from participation) and a negative impact on the utility derived from income (significant in most but not all of the tried specifications). The latter effect could be related to the fact that the higher the number of children within the household, the higher the number of individuals competing for the same economic resources. A negative, then reinforcing, effect on the utility linked to labor participation is associated both with living in central and in southern regions, the latter being stronger

than the former. Age shows the usual concave pattern but the coefficients are not statistically different from zero. Under random wages, home ownership reinforces the disutility derived from working. A possible explanation could derive from the need of a second source of labour income to support or simply to easier the refund of the loan most of the time associated with house purchases.

The housewife coefficient is always negative, increasing the disutility derived from working as expected, but it is not always significant[23]. Nevertheless, the inclusion of this variable increases significantly the pseudo-R2 under all possibilities, both for married and single women. To be below the threshold has always a negative impact on the utility derived from income, but it is significant only using corrected Heckman wages. It also has most of the time a negative, then reinforcing, effect on the utility derived from working, but it is significant only when no Heckman correction is considered. These two coefficients are the only ones not robust to the different specifications.

TABLE 5.1 HERE

The coefficients for single women are similar to those already commented for married women. Cohabiting with parents increases the disutility derived from working. A possible interpretation could be related to the fact that single cohabiting women face lower wages[24], implying that they face less attractive job offers. Another possibility is that single women that live with parents most of the time do unpaid housework and, therefore, are less likely to get a paid job. The effect of home ownership is insignificant on the utility derived from working but it has a negative effect on the utility derived from income. Also in the case of single women, the housewife coefficients is always negative but not always significant. Both coefficients related to the income threshold are negative and, differently from married women, they are significantly different from zero under all possible wages.

TABLE 5.2 HERE

An important characteristic of the model, to get reliable results on the simulation exercise, is its ability to replicate the actual data in terms of working hours frequencies. To verify the ability of our different specifications to fit the actual sample, we report in tables 5.3 the observed and the average predicted frequencies.

All possible combinations of wages and choice sets fit the observed frequencies of married women very well. Random wages tend to slightly overpredict full-time work and to underpredict the non working status. All specifications are also able to replicate real working decisions of single women cohabiting with their parents. The specifications that use $IL = 10$ tend to overestimate the intermediate solutions (10, 20 and 30 hours) and to underestimate the non working status. As in the case of married women, when random wages are used we get the worst scenario. Full-time work is strongly overpredicted while all the other hours possibilities are underpredicted.

Finally, our model seems to fail in representing working decisions of single women living alone. In fact, none of our specification is able to replicate exactly real frequencies. All combinations of wages and choice sets overestimate full-time (40 hours) and over-time work and underestimate all the other possibilities. Heckman corrected wages generate frequencies more similar to the observed ones.

TABLE 5.3 HERE

VI Policy Design and Simulation Results

In this section, we use our estimated labor supply coefficients to simulate the effect, on female labor decisions, of the introduction in the Italian welfare system

of a minimum income policy shaped on the scheme carried out from 1998 to 2003.

The *reddito minimo d'inserimento* was a participation basic income made up of a financial part, established by the central government and managed by the local governments involved in the project, and of a participation scheme designed and managed entirely by local governments. We are only able to simulate the effects of the financial part of the program. The benefit scheme was mainly characterized by three elements: the family reference income, the threshold level and the labor earnings inclusion mechanism. The reference family income for eligibility was made up of all family members' taxable income plus one fifth of household financial capital and one fifth of household real capital, calculated using ISE rules. The eligibility income threshold was equal to 282 euros per individual and it was adapted to family size and characteristics using, again, ISE scale. Finally, only 75% of labor earnings of each family member was included in the family reference income.

We test the existence and magnitude of the labor disincentive effect using different eligibility thresholds[25] and different levels of earnings inclusions On on side, the lower the income threshold the more stringent the income constraint should be and the higher the probability of loosing the transfer even if the individual has a very poorly paid job. Therefore, the disincentive effect should be weakened by an increase in the threshold level. On the other side, due to the income effect, the higher the eligibility threshold, the higher the transfer and, as a consequence, the higher the incentive individuals face not to work. Higher eligibility thresholds should, then, reinforce the disincentive effect. Which effect prevails is not a priori certain.

The earnings inclusion mechanism, instead, has a clear relation with the disincentive effect. The higher the level of labor earnings included in the family reference income, the stronger the effect should be.

Table 6.1: % of households below the threshold

	Threshold*	Women in couple	Single women living alone	Single cohabiting women
Experimented	€ 282,00	4,55%	11,60%	2,49%
Minimum pension	€ 350,57	6,47%	13,40%	4,98%
Absolute poverty	€ 367,94	8,32%	13,40%	5,52%
80% of relative poverty	€ 658,76	16,40%	23,45%	12,03%
Relative poverty	€ 823,45	21,98%	26,80%	15,92%

*Individual eligible monthly threshold

We try five different income thresholds, set respectively equal to the experimented one, the minimum pension level, the absolute poverty line and the relative (full and 80%) poverty line [26], and five different levels of earnings inclusion, using from 75% up to 100% of each individual's labour earnings.

Table 6.1 reports the ratio of individuals below the different income thresholds[27]. Single women living alone are the group that suffers the most in terms of income. In fact, it shows the highest percentage of individuals below the threshold under all five possibilities. They are also the group that benefits the less from the actual welfare system.

Since family allowances and allowances for young children, based on the 2002 Italian tax-benefit system described in section 2, were included in family unearned income used to estimate the model in the previous section, we also include them in the status quo simulation. In the other scenarios they are replaced by the different types of minimum income transfers. We also include a benchmark scenario where no social transfer is available. Tax credits for dependent spouses and children have been maintained in all the simulations.

Table 6.2[28] shows the simulation results based on $(IL = 20, L = 3)$ and type I wages estimates, a model with a small, then rigid, choice set but a high ability to replicate the observed working frequencies.

TABLE 6.2 HERE

For married women, the baseline case (the one without social transfers) is

the worst in terms of labour participation rates, having the highest ratio of individual in the non working status. This fact supports the idea that actual social transfers are able to weaken the economic constraints that in poor couples prevent women to participate in the labour market. When we look at the minimum income scenarios, a disincentive effect comes out but the size is very limited under all possible transfer schemes and it decreases as the threshold level increases. The disincentive effect concerns more full-time work than part-time work. Earnings inclusion does not have any effect on married women labor supply decisions.

Results for single women are quite different. For single women living with parents, social transfers are linked to the whole family situation, including the parents. What is, then, relevant is if by taking up a paid job, the daughter will cause her family to lose the transfer it was entitled to receive. In this case, we never observe a decrease in labor participation. Participation is positively correlated with the income threshold and its increase is less pronounced when higher ratio of labor earnings are included in the reference income. The same results hold for single women living alone.

Minimum income transfers seem, then, to allow single women to work or to work more. This result could be influenced by the fact that existing social transfers and simulated minimum income policies reach different targets. Existing social benefits are mainly for families, implying that single individuals have no access to them, while minimum income policies are designed for individuals and adapted to family composition through the ISE system.

We run simulations using all possible combinations of choice sets and types of wages. They all lead to the results we described above. A labor disincentive effect exists only in the case of married women, but its size is very limited. The income threshold has always a positive effect on female labor supply decisions,

while the earnings inclusion mechanism has basically no effect. Our results, in fact, hold under all possible earnings inclusion levels, even 100%. This suggests that individuals, for their participation decisions, consider mainly the level of the income threshold and do not take into account the fact that part of their earnings might be excluded from the reference income.

VII Conclusions

Minimum income policies are often seen as an effective instrument to fight poverty and social exclusion. Their main weakness relies on the theoretical disincentive effect on labour market participation they may cause at the bottom end of the income distribution. The problem is that individuals with low wages and not so attractive job perspectives could shortsightedly find it more convenient to remain on purpose out of the labour market or even to become unemployed in order to be included in the welfare programme. In the long run, of course, this is a highly undesirable effect.

In this work we try to test the existence and the magnitude of this labor disincentive effect by estimating a discrete choice structural labor supply model on Italian data and, then, by simulating the effect of different minimum income schemes. Differently from the existing literature, we focus our attention on the effect linked to the public transfer, isolating it from the effects due to changes in the tax structure.

Our results suggest that it is not at all obvious that minimum income policies have such a disincentive impact on employment, at least in the case of Italian women. We considered different groups of women (married women, singles living with parents and singles living alone) and different combinations of income eligibility criteria and levels of labour earnings exemption. Theoretically, the level of the income threshold has both a positive and a negative effect on labor

decisions, while the level of earnings inclusion should has a negative effect. Our results show that the mechanism of labour earnings inclusion, studied explicitly to avoid the disincentive effect, seems to play no role in female participation decisions. The level of the income threshold, instead, matters and has an overall positive effect on participation decisions: the higher the level, the weaker the disincentive effect. Moreover, this effect comes out only in the case of married women, but it tends to weaken the higher the threshold used. Single women, both living with parents and women living alone, always increase their labor market participation when they receive a minimum income transfer.

Our results are in line with those of other existing studies (Aaberge et al. 2005, Bargain and Orsini 2006, Blundell et al. 2000) and suggest that single and married women respond differently, in terms of labor decisions, to policy measures. They also suggest that in Italy the actual welfare system seems to benefit only married women, while a general transfer would reach single women too, in particular those living alone. Since they are also the group more likely to experience poverty, our results suggest that minimum income transfers would allow them to decide more freely about their working hours by relaxing the economic contraints they face. Further work is needed to verify if these results hold also with different tax structures and welfare systems.

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Notes

[1] A 1992 European recommendation suggest that European governments should have some sort of universal basic income mechanism.

[2] Off course, if $t_1 = 1$ we go back to the basic NIT structure with a 100% marginal tax rate around the threshold.

[3] The evaluation process was, for the first time in Italy, assigned to an independent institution, but the results never became public.

[4] In 2002 money value.

[5] The ISE (Indicatore della situazione economica) scale allows us to calculate equivalent income for families with different characteristics. Starting from a weight equal to 1 for a single member family, it increases by 0.35 for every additional member and by an additional 0.2 for particular situations such as single parents, couples where both parents work and disabled children.

[6] With an upper limit of 750 working hours in 1998, now extended, after which all earnings enter into the relevant income.

[7] In 2002 it was equal to 2.840,51 euros, meaning basically that he or she has not work on a regular base.

[8] The term married refers to both spouses and cohabiting couples.

[9] Low level of education = less or equal to compulsory education; mid level of education = high school or equivalent; high level of education = graduation or higher.

[10] In the SHIW survey, individuals reported as son/ daughter in the original family structure provide no information on their own family (spouse and children). Therefore, married daughters have been excluded from the sample while the number of children for single daughters has been set equal to zero by hypothesis.

[11] The northern area includes Valle d'Aosta, Piemonte, Liguria, Lombardia, Trentino-Alto Adige, Friuli-Venezia Giulia, Veneto and Emilia-Romagna; the central area includes Toscana, Umbria, Marche and Lazio; the southern area includes Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia and Sardegna.

[12] 84,24% of husbands in our sample work. If we exclude retired husbands, the ratio goes up to more than 94%.

[13] Which is assumed not to vary across alternatives.

[14] Error terms can be interpreted as unobserved alternative's specific utility components or errors in perception of the alternative's utility.

[15] 1= full-time, 2=part-time

[16] First rule: $L = 3$ and $IL = 20$. Individuals are assigned to each alternative looking at the type of contract they have. $h = 20$ if the individual works part-time and $h = 40$ if the individual works full-time.

Second rule: $L = 5$ and $IL = 10$. Individuals are assigned to each alternative using the declared working hours and the following classes: $h = 0$ if $h \leq 5$ or missing, $h = 10$ if $5 < h \leq 15$, $h = 20$ if $15 < h \leq 25$, $h = 30$ if $25 < h \leq 35$ and $h = 40$ if $h > 35$.

Third choice: $L = 6$ and $IL = 10$. Individuals are assigned to each alternative using the declared working hours and the following classes: $h = 0$ if $h \leq 5$ or missing, $h = 10$ if $5 < h \leq 15$, $h = 20$ if $15 < h \leq 25$, $h = 30$ if $25 < h \leq 35$, $h = 40$ if $35 < h \leq 45$ and $h = 50$ if $h > 45$. Using this rule, we explicitly model overwork decisions.

The after-tax income y_l is computed using the imputed working hours.

[17] See Van Soest 1995

[18] We create dummies for all five possible income thresholds showed in the next section and we always get the same estimation results.

[19] Tables showing all results are available upon request.

[20] Type I = only the systematic part for all individuals; type II = observed wage for workers and predicted wage for non-workers; type III = predicted wage for all individuals; type IV = random wage for all individuals. In the last case, standard errors have been bootstrapped.

[21] Results are not shown but available upon request.

[22] We do not have time use data. As a consequence, we cannot divide non-working time into leisure and time devoted to activities (like housekeeping) that could potentially produce disutility. Therefore, we prefer to use working hours.

[23] Only in the $IL = 20$, type I wage and under random wages.

[24] See wage estimation results shown in the appendix.

[25] Of course different thresholds imply different total costs for the national fiscal system, but an analysis of the fiscal sustainability of the different possibilities is beyond the scope of this paper. Our focus is simply to test the impact of different thresholds on participation rates.

[26] Absolute poverty and relative poverty as calculated for year 2002 by Istat (see www.istat.it for more information).

[27] As reference income, we consider the family income as computed using observed data.

[28] A=no social transfer; B=minimum income with experimented income threshold; C=minimum income with minimum pension as income threshold; D=minimum income with absolute poverty line as income threshold; E=minimum income with 80% of relative poverty line as income threshold; F=minimum income with relative poverty line as income threshold.

References

Aaberge, R., U. Colombino, and S. Strøm (1999). Labour supply in italy: An empirical analysis of joint household decisions, with taxes and quantity constraints. *Journal of Applied Econometrics 14*, 403–422.

Aaberge, R., U. Colombino, and S. Strøm (2004). Do more equal slices shrink the cake? an empirical investigation of tax-transfer reform proposals in italy. *Journal of Population Economics 17*, 767–785.

Aaberge, R., U. Colombino, and S. Strøm (2005). Taxes, transfers, labor supply and household welfare. In D. D. B. T. Boeri and C. Pissarides (Eds.), *Women at Work. An Economic Perspective*. Oxford University Press.

Bargain, O. and K. Orsini (2006). In-work policies in europe: Killing two birds with one stone? *Labor Economics 13*(6), 667–697.

Blundell, R., A. Duncan, J. McCrae, and C. Meghir (2000). The labor market impact of the working families' tax credit. *Fiscal Studies 21*(1), 75–104.

Colombino, U. and D. Del Boca (1990). The effect of taxes on labor supply in italy. *The Journal of Human Resources 25*, 390–414.

Dickens, W. and S. Lundberg (1993). Hours restrictions and labor supply. *International Economic Review 34*, 169–191.

Fortin, B., M. Truchon, and L. Beauséjour (1993). On reforming the welfare system. workfare meets the negative income tax. *Journal of Public Economics 51*(2), 119–151.

Gouveia, M. and C. Rodrigues (2002). The impact of a guaranteed minimum income program in portugal. *Public Finance and Management 2*(2).

Gurgand, M. and D. Margolis (2005). Does work pay in france? monetary incentives and the guaranteed minimum income. *IZA discussion paper 1467*.

Heckman, J. (1979). Sample selection bias as specification error. *Econometrica 47*, pp.153–161.

Laroque, G. and B. Salanie (2002). Labour market institutions and employment in france. *Journal of Applied Econometrics 17*, 25–48.

McFadden, D. (1974). Conditional logit analysis of qualitative choice behaviour. In P. Zarembka (Ed.), *Frontiers of Econometrics*. New York: Academic Press.

Rodrigues, C. (2003). The redistributive impact of guaranteed minimum income programme in portugal. *Working paper*.

Sacchi, S. (2005). Reddito minimo e politiche di contrasto alla povertà in italia. *URGE working paper n.1/2005*.

Targetti Lenti, R. (2000). Reddito di cittadinanza e minimo vitale. *Società Italiana di Economia Pubblica working paper*.

Van Parijs, P. and Y. Vanderborght (2006). *Il reddito minimo universale*. Egea.

Van Soest, A. (1995). Structural models of family labor supply: A discrete choice approach. *The Journal of Human Resources 30*(1), 63–88.

A Wage Estimates

Table A.1 and A.2 present the results of the Heckman procedure for gross and net wages, separately for married and single women..Since SHIW reports only information on net incomes it was necessary to recover gross wages using an ad hoc microsimulation program [29].

The included variables could be divided into the following main categories :

- individual characteristics: age (divided by 10), age squared (divided by

100) and educational level for both the selection and the main process;

- family characteristics: the number of children and the number of babies (children younger than 3) within the household, the ownership or the rent of the house, the area of residence (North, Centre or South), the presence of grandparents in the household and the family unearned income (divided by 100), and in the case of single women, a dummy equals to one when she lives with her parents and zero otherwise;

- in the case of married women, husband characteristics related to his labour income. We do not use directly the husband net labour income because it is likely to be correlated to the wife's wage, due to its dependence on tax credits for children and family arrangement shared by the spouses. To avoid this problem, the husband's earnings are represented by the husband's level of education, type of job and working sector[30].

Looking at the results for married women, all variables in the selection process are statistically significant with the exception of house rental, having a baby and family unearned income. Age seems not to have a direct effect on wages but it has a strong positive effect on participation, decreasing with woman's age. Living in central and especially in southern regions lowers the probability to work. Women that live in central Italy also have lower wages. The educational level has an impact on both processes: the higher the educational level, the higher the probability that a woman will work and the higher the wage she will get. The direct effect on wages is stronger than the one on participation, especially in the case of gross wages. The greater gain in term of earnings is generated by reaching graduation compared to all other educational attainments, while the difference between high school and low level of education is still statistically significant but much smaller. Having children lowers wife's participation rate independently from their age. Home ownership has a posi-

tive effect on participation; a possible explanation could derive from the need of a second source of labour income to support or simply to easier the refund of the loan most of the time associated with house purchases. The husband's education has a positive effect on the wife's participation; this effect could be related to the assortative mating phenomenon. Namely, men with higher education are likely to be married with women that also have a high education and that, consequently, are more likely to work and to get high wages. Finally, the husband's working position[31] has a negative impact on wife's participation.

TABLE A.1 HERE

The coefficients for single women are similar to those already commented for married women. An interesting point is that single women living with parents earn significantly less than the others. A possible explanation for this coefficient could be that, by living with their parents, these women face lower living costs and, therefore, are able to accept jobs with lower wages (at least initially). Single women that cohabit with parents also participate less in the labour market. A possible explanation is that, most of the time, they are engaged in unpaid work within the household and, therefore, are less likely to get an outside paid job, unless strongly motivated.

TABLE A.1 HERE

Table 3.1: Descriptive statistics

	Married women		**Single women**	
	Mean	*Std. Dev.*	*Mean*	*Std. Dev.*
Age	42,44	7,9	32,09	9,77
Hourly Wage	7,91	4,76	7,01	6,68
Hours worked	33,54	9,38	36,28	8,25
Number of childern*	1,81	0,77	1,58	0,75
	Perc.		*Perc.*	
Education				
Low education	60,33		41,13	
Mid education	30,83		43,43	
High education	8,84		15,44	
Employed	46,18		66,00	
North	*61,17*		*85,16*	
Center	*51,93*		*75,86*	
South	*26,39*		*40,28*	
Children**	83,93		12,38 (41,75)	
Children younger than 3*	13,98		4,59	
Home ownership	67,45		65,37	
Home rent	21,07		26,53	
Living with parents	-		70,33	
Husband's education				
Low education	62,68		-	
Mid education	28,11		-	
High education	9,21		-	
Husband's work				
Not working	15,75		-	
Blue collar	32,39		-	
White collar and teachers	23,69		-	
Manager	8,49		-	
Self-employed	19,69		-	
Husband's working sector				
No sector	15,75		-	
Agriculture	4,48		-	
Industry	34,51		-	
Public adiministration	20,34		-	
Other sectors	24,92			
North	43,20		41,65	
Center	18,66		19,90	
South	38,14		38,44	
Num. of tot.obs.	2919		1308	

* Among those who have children

** In parenthesis the ratio of single women living alone

Table 5.1: Estimation results for married women

	Type I						Type III						Type IV					
	IL=20			IL=10 and M=5			IL=20			IL=10 and M=5			IL=20			IL=10 and M=5		
	Coeff.	*se*		*Coeff.*	*se*		*Coeff.*	*se*		*Coeff.*	*se*		*Coeff.*	*se*		*Coeff.*	*se*	
Income^2	-0,278	0,176		-0,474	0,361		-2,592	0,611	***	-1,273	0,400	***	-0,556	0,263	**	-0,354	0,195	**
Hours^2	0,235	0,026	***	1,666	0,212	***	0,349	0,031	***	1,835	0,209	***	0,216	0,012	***	1,689	0,024	***
Hours x income	0,033	0,038		0,113	0,046	**	-0,036	0,042		0,020	0,040		0,089	0,024	***	0,086	0,022	***
Hours	-1,896	0,497	***	-20,395	2,925	***	-2,053	0,573	***	-21,544	2,906	***	-2,074	0,174	***	-20,408	0,242	***
x female age/10	0,035	0,231		0,011	0,264		-0,056	0,270		-0,003	0,263		-0,044	0,072		0,003	0,076	
x female age^2/100	0,006	0,029		0,007	0,033		0,018	0,034		0,009	0,033		0,015	0,009	*	0,007	0,009	
x number of children	0,054	0,023	**	0,084	0,028	***	0,071	0,029	**	0,076	0,028	***	0,077	0,008	***	0,076	0,007	***
x children younger than 3	-0,029	0,058		-0,101	0,058	*	-0,081	0,060		-0,099	0,057	*	-0,084	0,016	***	-0,095	0,013	***
x northern area		dropped			dropped			dropped			dropped			dropped			dropped	
x central area	-0,087	0,052	*	-0,104	0,059	*	-0,096	0,059		-0,100	0,057	*	-0,111	0,018	***	-0,114	0,015	***
x southern area	-0,124	0,049	**	-0,186	0,054	***	-0,106	0,057	*	-0,167	0,052	***	-0,151	0,016	***	-0,191	0,013	***
x owning the living house	0,013	0,079		-0,118	0,094		0,069	0,084		-0,004	0,084		-0,068	0,044		-0,088	0,041	**
x low educational level	0,016	0,084		-0,031	0,074		0,109	0,104		-0,072	0,072		0,159	0,035	***	-0,047	0,015	***
x medium educational level	0,044	0,081		0,031	0,072		0,175	0,100	*	0,010	0,071		0,192	0,030	***	0,013	0,011	
x high educational level		dropped			dropped			dropped			dropped			dropped			dropped	
x housewife	-1,172	0,0602	***	-4,252	114,406		-9,792	165,454		-6,473	147,440		-4,437	0,467	***	-3,825	0,515	***
x below income threshold	-0,483	0,1872	***	-0,449	0,223	**	0,081	0,228		-0,270	0,213		-0,430	0,085	***	-0,505	0,065	***
Income	15,020	7,2015	**	2,653	9,266		46,786	13,584	***	8,448	10,646		27,389	5,717	***	0,074	4,820	
x female age/10	-1,244	3,374		2,266	4,601		0,792	5,307		2,812	5,170		0,808	2,154		2,454	2,454	
x female age^2/100	0,159	0,4306		-0,285	0,569		0,057	0,667		-0,281	0,639		-0,087	0,260		-0,295	0,295	
x number of children	-0,629	0,3835		-1,377	0,517	***	-1,526	0,616	**	-1,606	0,563	***	-1,048	0,268	***	-1,170	0,245	***
x children younger than 3	-0,255	1,0771		0,756	1,128		0,280	1,514		0,846	1,273		0,394	0,573		0,596	0,486	
x northern area		dropped			dropped			dropped			dropped			dropped			dropped	
x central area	0,402	1,0576		0,208	1,278		-10,018	1,540		-0,274	1,375		0,062	0,667		0,249	0,580	
x southern area	0,087	0,8813		0,129	1,046		-1,591	1,375		-0,295	1,146		-0,227	0,523		0,283	0,443	
x owning the living house	-3,358	2,6564		1,601	2,731		-9,365	2,979	***	-3,918	2,723		-2,334	1,506		0,064	1,453	
x low educational level	-10,039	2,3092	***	-0,345	1,686		-25,342	5,695	***	-1,623	1,811		-22,637	2,718	***	-0,168	0,453	
x medium educational level	-9,222	2,2695	***	-0,312	1,669		-22,866	5,641	***	-1,004	1,755		-21,791	2,656	***	-0,061	0,436	
x high educational level		dropped			dropped			dropped			dropped			dropped			dropped	
x below income threshold	-0,602	1,1155		-1,790	1,817		-9,229	3,167	***	-4,314	2,165	**	-1,748	1,217		-1,116	0,783	
Fixed cost for part-time work				56,699	10,046	***				61,455	9,972	***				57,296	0,748	***
Fixed cost for full-time work				54,366	9,985	***				59,115	9,911	***				54,962	0,746	***
Observations	2919			2919			2919			2919			2919			2919		
Pseudo-R2	0,6978			0,6608			0,7234			0,6618								

* significant at 10%;**significant at 5%; *** significant at 1%

Table 5.2: Estimation results for single women

	Type I						Type III						Type IV					
	IL=20			IL=10 and M=5			IL=20			IL=10 and M=5			IL=20			IL=10 and M=5		
	Coeff.	*se*		*Coeff.*	*se*		*Coeff.*	*se*		*Coeff.*	*se*		*Coeff.*	*se*		*Coeff.*	*se*	
Income^2	-0,060	0,089		-0,089	0,080		-0,066	0,092		-0,085	0,082		-0,011	0,039		-0,026	0,034	
Hours^2	0,389	0,028	***	2,542	0,294	***	0,389	0,028	***	2,534	0,294	***	0,370	0,008	***	2,478	0,018	***
Hours x income	-0,008	0,025		-0,021	0,023		-0,008	0,025		-0,017	0,023		0,013	0,011		0,009	0,010	*
Hours	-3,208	0,260	***	-31,229	4,109	***	-3,168	0,263	***	-31,164	4,109	***	-3,126	0,060	***	-30,681	0,159	***
x female age/10	0,335	0,115	***	0,293	0,120	**	0,312	0,119	***	0,291	0,119	**	0,288	0,027	***	0,272	0,027	***
x female age^2/100	-0,032	0,018	*	-0,024	0,019		-0,028	0,019		-0,024	0,019		-0,026	0,004	***	-0,023	0,004	***
x number of children	0,003	0,055		-0,010	0,062		0,019	0,067		-0,010	0,062		0,031	0,017	*	0,006	0,015	
x northern area	dropped			dropped			dropped			dropped			dropped			dropped		
x central area	-0,102	0,034	***	-0,101	0,034	***	-0,101	0,034	***	-0,101	0,034	***	-0,098	0,006	***	-0,098	0,005	***
x southern area	-0,259	0,029	***	-0,260	0,029	***	-0,261	0,029	***	-0,264	0,029	***	-0,261	0,005	***	-0,264	0,005	***
x owning the living house	0,007	0,059		0,031	0,058		0,006	0,059		0,023	0,058		-0,026	0,024		-0,021	0,022	
x low educational level	0,018	0,039		0,009	0,039		0,015	0,039		0,008	0,038		0,020	0,006	***	0,018	0,006	***
x medium educational level	0,056	0,035		0,042	0,034		0,051	0,035		0,042	0,034		0,052	0,005	***	0,047	0,004	***
x high educational level	dropped			dropped			dropped			dropped			dropped			dropped		
x living with parents	-0,142	0,057	**	-0,157	0,057	***	-0,147	0,058	**	-0,159	0,057	***	-0,148	0,012	***	-0,153	0,011	***
x housewife	-0,878	0,145	***	-2,581	58,85		-2,685	98,82		-2,582	58,96		-2,621	0,223	***	-2,612	0,212	***
x below income threshold	-0,274	0,143	*	-0,285	0,147	*	-0,291	0,15	**	-0,289	0,145	**	-0,335	0,055	***	-0,334	0,060	***
Income	3,615	1,815	**	2,280	1,538		3,523	1,860	*	2,207	1,559		2,818	0,830	***	1,783	0,734	**
x female age/10	-1,719	0,851	**	-1,207	0,808		-1,654	0,885	*	-1,173	0,825		-1,426	0,406	***	-1,047	0,387	***
x female age^2/100	0,226	0,129	*	0,140	0,120		0,216	0,134		0,135	0,122		0,184	0,057	***	0,119	0,053	**
x number of children	0,336	0,331		0,498	0,369		0,292	0,411		0,504	0,372		0,209	0,136		0,409	0,122	***
x northern area	dropped			dropped			dropped			dropped			dropped			dropped		
x central area	0,004	0,332		-0,060	0,326		-0,005	0,337		-0,074	0,329		-0,018	0,126		-0,055	0,114	
x southern area	0,037	0,234		-0,052	0,240		0,032	0,240		-0,061	0,245		0,045	0,101		-0,022	0,096	
x owning the living house	-4,062	1,879	**	-5,640	1,881	***	-4,238	1,959	**	-5,559	1,936	***	-2,146	0,975	**	-2,733	0,919	***
x low educational level	0,031	0,671		0,561	0,548		0,033	0,688		0,562	0,544		0,082	0,155		0,510	0,114	***
x medium educational level	0,082	0,346		0,691	0,560		0,113	0,682		0,706	0,558		0,124	0,147		0,619	0,114	***
x high educational level	dropped			dropped			dropped			dropped			dropped			dropped		
x living with parents	-0,693	0,453		-0,455	0,395		-0,683	0,459		-0,448	0,396		-0,596	0,217	***	-0,385	0,157	**
x below income threshold	-1,669	0,873	*	-1,655	0,885	*	-1,636	0,899	*	-1,655	0,884	*	-1,388	0,385	***	-1,398	0,419	***
Fixed cost for part-time work				92,171	14,421	***				91,635	14,430	***				90,017	0,534	***
Fixed cost for full-time work				89,932	14,367	***				89,396	14,376	***				87,784	0,533	***
Observations	1308			1308			1308			1308			1308			1308		
Pseudo-R2	0,4109			0,4298			0,4143			0,4295								

* significant at 10%;**significant at 5%; *** significant at 1%

Tab. 6.2: Average simulated participation rates with IL=20 and type I wages

	Status quo	A	B	C	D	E	F
75% earnings							
Married women							
0	53,24%	53,307%	53,268%	53,271%	53,266%	53,270%	53,266%
20 hours	9,76%	9,747%	9,760%	9,756%	9,754%	9,754%	9,760%
40 hours	37,00%	36,946%	36,972%	36,973%	36,980%	36,976%	36,983%
Single women living alone							
0	17,20%	17,210%	16,810%	16,776%	16,783%	16,685%	16,663%
20 hours	9,98%	10,057%	10,120%	10,118%	10,122%	10,097%	10,093%
40 hours	72,81%	73,454%	73,070%	73,106%	73,095%	73,236%	73,298%
Single women living with parents							
0	39,48%	39,473%	39,429%	39,388%	39,316%	39,156%	39,067%
20 hours	8,07%	8,075%	8,082%	8,089%	8,102%	8,123%	8,132%
40 hours	52,44%	52,452%	52,489%	52,523%	52,582%	52,720%	52,801%
100% earnings							
Married women							
0	53,24%	53,307%	53,266%	53,270%	53,266%	53,258%	53,263%
20 hours	9,76%	9,747%	9,765%	9,760%	9,758%	9,754%	9,753%
40 hours	37,00%	36,946%	36,968%	36,970%	36,975%	36,988%	36,984%
Single women living alone							
0	17,20%	17,210%	16,810%	16,775%	16,783%	16,676%	16,648%
20 hours	9,98%	10,057%	10,120%	10,126%	10,124%	10,108%	10,081%
40 hours	72,81%	73,454%	73,070%	73,099%	73,093%	73,215%	73,270%
Single women living with parents							
0	39,48%	39,473%	39,420%	39,358%	39,350%	39,144%	39,044%
20 hours	8,07%	8,075%	8,084%	8,089%	8,096%	8,130%	8,141%
40 hours	52,44%	52,452%	52,497%	52,549%	52,554%	52,726%	52,816%

Table A.1: Net and gross wages of married women

	Net wage				**Gross wage**			
	Main		Selection		Main		Selection	
	Coeff	|z|	Coeff	|z|	Coeff	|z|	Coeff	|z|
Age	-0,653	(0.64)	1,462	(4.31)***	-0,626	(0.42)	1,503	(4.46)***
Age squared	0,173	(1.36)	-0,193	(4.71)***	0,237	(1.27)	-0,198	(4.87)***
Low education	-1,329	(7.19)***	dropped		-6,250	(12.63)***	-1,333	(10.18)***
Mid education	dropped		0,624	(9.89)***	-4,045	(8.41)***	-0,703	(5.55)***
High education	2,685	(8.63)***	1,354	(9.83)***	dropped		dropped	
House ownership			0,329	(3.99)***			0,318	(3.72)***
House rent			-0,045	(0.49)			-0,068	(0.73)
Number of children			-0,142	(5.06)***			-0,144	(5.05)***
Children younger than 3			-0,116	(1.37)			-0,139	(1.63)
Grandparents			0,045	(0.27)			0,030	(0.17)
Family wealth			0,000	(0.89)			0.000	(0.66)
North	dropped		dropped		dropped		dropped	
Center	-0,225	(1.20)	-0,219	(3.13)***	-0,603	(2.09)**	-0,218	(3.12)***
South	0,352	(1.46)	-0,904	(15.11)***	-0,202	(0.51)	-0,899	(15.05)***
Husband education			0,134	(2.63)**			0,113	(2.19)**
Husband type of job			-0,132	(5.23)***			-0,136	(5.25)***
Husband working sector			0,106	(4.37)***			0,102	(4.15)***
Constant	8,228	(4.07)***	-2,874	(4.25)***	13,827	(4.79)***	-1,546	(2.23)**
ρ	-0,440	(0,077 st.err.)			-0,283	(0,109 st.err.)		
σ_ε	2,954	(0,113 st. err.)			4,598	(0,177 st. err.)		
Observations	2893				2895			

Robust z statistics in parentheses

* significant at 10%;** significant at 5%; *** significant at 1%

Table A.2: Net and gross wages of single women

	Net wage				Gross wage			
	Main		Selection		Main		Selection	
	Coeff	|z|	Coeff	|z|	Coeff	|z|	Coeff	|z|
Age	1,309	(1.78)*	1,076	(3.35)***	1,655	(1.43)	1,018	(3.18)***
Age squared	-0,074	(0.74)	-0,124	(2.74)***	-0,058	(0.36)	-0,117	(2.58)**
Low education	-3,066	(8.39)***	dropped		-4,862	(8.63)***	-0,280	(2.13)**
Mid education	-2,337	(6.56)***	0,460	(5.09)***	-3,650	(6.54)***	0,163	(1.29)
High education	dropped		0,289	(2.20)**	dropped		dropped	
House ownership			0,177	(1.06)			0,200	(1.21)
House rent			0,254	(1.48)			0,285	(1.68)
Number of children			-0,323	(3.61)***			-0,355	(3.84)***
Grandparents			-0,345	(1.74)*			-0,361	(1.81)*
Family wealth			0,000	(0.49)			0.000	(0.55)
North	dropped		dropped		dropped		dropped	
Center	-0,344	(1.58)	-0,368	(3.18)***	-0,503	(1.40)	-0,378	(3.27)***
South	-0,151	(0.55)	-1,261	(13.46)***	-0,404	(1.01)	-1,252	(13.35)***
Living with parents	-0,742	(2.78)***	-0,656	(4.19)***	-0,802	(1.86)*	-0,671	(4.27)***
Constant	5,992	(4.10)***	-0,781	(1.35)	8,498	(3.74)***	-0,448	(0.74)
ρ	-0,097	(0,063 st.err.)			-0,182	(0,056 st.err.)		
σ_ε	2,551	(0,162 st. err.)			3,996	(0,240 st. err.)		
Observations	1288				1286			

Robust z statistics in parentheses

* significant at 10%;** significant at 5%; *** significant at 1%