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Working Papers

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ChilD n. 14/2007

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July 20, 2007

Abstract

Minimum income policies are means-tested policies aimed at guarantee all citizens with a minimum level of income and at fighting social exclusion typically associated with extreme poverty. Their main shortcoming relies on the theoretical 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 examine labor supply responses of Italian women to the introduction of a minimum income policy. Different thresholds levels and earnings exemption ratios (exemption of part of labour earnings from relevant family income) have been tested to assess the existence and the magnitude of the disincentive effect. The results show that the level of the eligibility threshold is crucial in determing the existence of a poverty trap mechanism while the earnings exemption mecanism seems not to play any role. Moreover, family structure is crucial: only married women experience a disincetive effect, that tends to vanishes the hgher the income thresholds, while single women participation rates increase under all possibilities.

JEL classification: J22, C25, H31, C25

Key words: Labor supply, welfare transfers, tax-benefit system, microsimulation.

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Acknowledgement 1 *I would like to thank Daniela Del Boca for patiently supervising me. Special thanks to Massimo Baldini (Univeristy of Modena) who provide me with gross incomes generated by his program for the simulation of direct and inverse tax-transfer rules, Mapp98. I would like also to thank Ugo Colombino, Maristella Botticini, Alessandro Sembenelli,Lia Pacelli, Flavia Coda and Fabio Berton for their helpful comments. I am gratefull to Fondazione CRT and Collegio Carlo Alberto for providing financial and logistic support.*

1 Introduction

State intervention is primary aimed at guaranteeing all citizens with a minimum level of living conditions 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.

The first category uses a universal selection principle: the role of the State is mainly redistributive and the benefits are distributed to all citizens regardless to particular individual characteristics. Thinking about money transfers, proposals like the social dividend or the citizenship transfer belong to this type. 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:

$$Y_{post} = G + (1 - t)Y_{pre} \tag{1.1}$$

Public health care system and public educational system could be seen as examples of in-kind services belonging to this class of intervention.

The second category is based on a selective selection 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 of this kind of mechanism 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 scheme where individuals with a pretax income higher Y_{pre} than a certain threshold Y^* pay taxes according to the

country 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 constant tax rate t, negative income tax works as follows:

$$Y_{post} = \begin{cases} Y_{pre} + G \quad with \quad G = Y^* - Y_{pre} & \text{if } Y_{pre} < Y^* \\ Y^* + (1-t)(Y_{pre} - Y^*) & \text{if } Y_{pre} > Y^* \end{cases} \tag{1.2}$$

This version of negative income tax implicitly imposes very high marginal tax rate on incomes lower than 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) and, consequently, to assign to individuals with $t_1(Y_{pre})$ lower than Y^* a transfer G, not included in the tax base, and makes them pay taxes on income higher than $\frac{Y_{pre}}{t_1}$ according to the country tax structure. The system works as follow

$$Y_{post} = \begin{cases} Y_{pre} + G \quad with \quad G = Y^* - t_1(Y_{pre}) & \text{if } Y_{pre} < \frac{Y^*}{t_1} \\ (1-t_2)(Y_{pre} - Y^*) + \frac{Y^*}{t_1} & \text{if } Y_{pre} > \frac{Y^*}{t_1} \end{cases} \tag{1.3}$$

Off course, if $t_1 = 1$ we go back to the basic NIT structure with a 100% marginal tax rate around the threshold. The NIT system could be translate into a workfare system by adding a minimum working hour constraint.

As already said, minimum guaranteed income policies belong to the second category. They are means-tested policies with two different goals. First of all, they guarantee all citizens with a minimum level of income regardless of particular personal characteristics, like working history, and consequently, they fight social exclusion typically associated with poverty. Typically, they are made by two pieces. The first one sets up a benefits' scheme to supply individuals whose income is below a certain threshold with money transfers to reach that minimum level; the second one establishes a bounch of activities the individual has to do in order not to loose the monetary side. These activities includes a wide range of possibilities, such as job searching activities, training courses, to update or to acquire new skills, socializing and volunteering activities and so on and so forth. All these activities are targeted at fostering the individual reinsertion within the labour market and the society

on a long run perspective.

The main theoretical shortcoming typically associated with minimum income policies is their disincentive effect on labour market participation at the bottom of income distribution, due to the high effective marginal tax rate they impose near the threshold level. For low wage individuals could be more convenient, on a short run perspective, to remain out of or to exit from 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 retaining some individuals from participating in the labour market and, therefore, of creating welfare dependent families.

Most European countries have already minimum income schemes of different types. The more applied solution to face the disincentive problem consists in discharging part of labour earnings from the total income considered to establish program eligibility. For example, in France only 50%[1] of individual earnings enters in the considered income while in Portugal the percentage increases up to 70%.

Italy does not have a welfare policy based on the minimum income idea. In 1998, a first experimentation was made to test the financial and organizational feasibility of a national minimum income scheme. The experiment was carried out by 39 local cities for two years and the evaluation process, for the first time in italian social policies, was assigned to an independent institution. In 2001, without waiting evaluation results[2], the financial law stretched the experimentation period of two more years and enlarged the number of cities involved in it. 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 became real. The experimented minimum income scheme was mainly modelled on those already up and running in other European countries and, consequently, was made by an economic and a social part. Every city had to managed autonomously the social side while the economic side was mainly financed and established, through the setting

[1] With an upper bound at 750 worked hours in 1998, now extended, after which all earnings enter in the relevant income.

[2] By the way, evaluation results never became public.

up of eligibility rules and of income threshold, by the central government. The individual income threshold was set equal[3] to 282 euros per month and equivalent individual income was computed using the ISE scale[4].

There is wide consensus among Italian economists and sociologists that Italy needs a minimum income welfare policy. The fragmentary and work-related structure of actual welfare system, the strong territorial differences and the concentration of poverty in some areas of the country call for it. This paper is aimed at investigating what would be the labour participation disincentive effect if a social transfer like the one experimented from 1998 to 2003 would be realized. We will focus our attention particularly on female labour supply, considering its higher flexibility and responsiveness with respect to male labour supply, as shown for example by Colombino and Del Boca (1990). We will test how female participation decisions change after the introduction of a minimum income policy using a structural model of family labor supply among a set of discrete choices, to account for the fact that individuals face constraints on their possible working hours (Dickens and Lundberg, 1993, Van Soest, 1995).

The rest of the paper is as follow. Section 2 describes briefly 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. Section 5 displays the econometric techniques used to infer individual wages from observable characteristics and the related estimation results. Section 6 presents estimation results of the structural labour supply model. Section 7 reports the results of the policy simulations and section 8 concludes.

[3] In 2002 money value.

[4] The ISE (Indicatore della situazione economica) scale allows 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 peculiar family's characteristics as single parents, couple where both parents work and disabled children.

2 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 to determine 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.

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

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 entrepreneur and is decreasing with taxable income. In 2002, for employed individuals, it varied from a maximum of 1.146,53 euro, for gross earnings lower than 6.197 euro, to a minimum of 51,65 euro, for gross earnings higher than 51.646 euro. For self-employed and entrepreneur it was substantially lower and ranged from a maximum of 573,27 euro, for gross earnings lower than 4.700 euro, to a minimum of 51,65 euro, for gross earnings higher than 30.987 euro. Also the tax relief for 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 (in 2002 it was equal to 2.840,51 euro), meaning basically that he or she has not to work on a regular base. This type of tax credit, then,

could in principle represents a disincentive for the labour supply of one of the two spouses, normally the wife, especially in low income families where gains derived from spouse's earnings are not high enough to compensate the tax credit's loss. The tax credit for dependent spouse in 2002 varied from a maximum of 546,18 euro for income lower than 15.493,71 euro to a minimum of 422,23 euro for income higher than 51.645,69 euro. 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 the credit could be shared by parents if both have taxable income. In 2002 it varied from a maximum of 546,18 to a minimum of 285,08 euro. An additional fixed tax credit of 123,95 euro was given for each baby younger than 3 years.

Table 2.2: 2002 tax credits

	Max.	Min.
For employment	€ 1.146,53	€ 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

Italian fiscal system includes also two major social transfers linked to the family income and structure (table 2.3). The "family check" is given to employed or retired individual that have at least one child younger than 18. The transfer amount and the income level for eligibility increase in the number of underage children and decrease in family income. In addition both of them are systematically higher for single parents than for couples. "The family check for young children", instead, is given to families that have at least three children younger than 18, irrespective to the claimant employment status. Again, the transfer amount is increasing in the number of underage children and decreasing in family income. To be compared with the fixed income threshold, equivalent family income is computed using a coefficient based on the ISE scale.

3 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).

Considering the aim of the paper, we selected a sub-sample of women between the age of 18 and 55, either employed or non employed. Individuals still in education, self-employed or retired were excluded because their decisions on participating or not in the labour market are likely to follow different paths from those of wage earners. The final selected sample is made by 4232 women divided in two sub-groups: 2921 married women[5] and 1311 single women, 388 living on their own and 923 living within the parental household.

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

Married women are on average older (by 10 years) and less educated[6] than single women; 83,94 percent of them have at least one child with an average of 1,8 against the 12,36 percent of single women[7] with an average

[5]The term married women refers to both spouses and cohabiting couples

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

[7]In the SHIW survey when an individual is reported as son/ daughter information concerning his/her eventual personal family are not reported except his/her marital status .

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

Table 3.1: Descriptive statistics

	Married women		**Single women**	
	Mean	*Std. Dev.*	*Mean*	*Std. Dev.*
Age	42,45	7,9	31,09	9,75
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	60,32		41,11	
Mid education	30,85		43,48	
High education	8,83		15,41	
Employed	46,18		66,00	
North	*61,17*		*85,16*	
Center	*51,93*		*75,86*	
South	*26,39*		*40,28*	
Children**	83,94		12,36 (41,75)	
Children younger than 3*	16,64		3,70	
Home ownership	67,48		65,29	
Home rent	21,05		26,62	
Living with parents	-		70,40	
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.	2921		1311	

* Among those who have children

** In parenthesis the ratio of single women living alone

of 1,5 each. 13,97 percent of married women have babies (children younger than 3), while very few singles, among those who have children, have babies (less than 4 percent). Both married and single women are more likely to live in a house they or their family own than to live in a rented one. More than 70 percent of single women still share the living arrangement with the original family.

Married women are less likely to participate in the labour market than singles: less than 50 percent of married women works while more that 65 percent of single women is 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[8] (52 percent), but the overall participation rate is driven down by the very low one 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); however participation rates are 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 weak. Everywhere but in southern regions, part-time work, as shown in table 3.2, is more common among married women (20,88 percent) than among single ones (12,90 percent).

4 The model

Each family can choose among m alternatives in the choice set made by income and working hours combinations $\{(y_j, h_{mj}, h_{fj})\,; j = 1, 2, ..., m\}$, where

Therefore, married daughter have been excluded from the sample while for single daughter the number of children has been set equal to zero by hypothesis.

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

Table 3.2: Part-time work

		Married women	Single women
Part-time		20,88%	12,90%
	North	*21,42%*	*11,54%*
	Center	*23,78%*	*13,13%*
	South	*16,78%*	*15,72%*
Observations		1365	876

h_{mj} and h_{fj} are working hours per week of husband and wife. 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. Individuals choices are determined according to some grouping rule that map real choices into the discrete number of available possibilities. Since female labour supply is the focus of this paper, we will treat husband labour supply as fixed at the observed values, reducing then the family choice set to combinations of family income and wife's working hours.

SHIW include a variable that reports directly the number of hours worked per week by each individual. Hours range practically all integers from 0 to 70, therefore suggesting for an interval length equal to 1. However, as shown in figure 4.1 and 4.2, the distribution of actual hours in the selected sample for both single and married women shows strong concentration around the full-time (30, 35 and 40 hours) peak and a minor concentration around the part-time peak (20 hours).

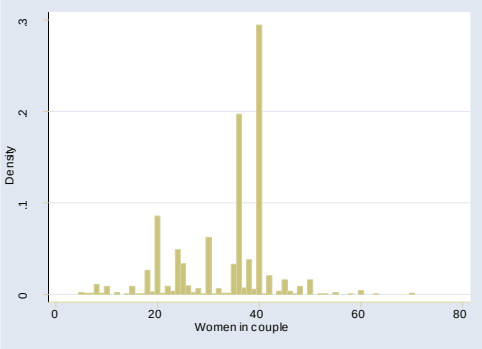

Figure 4.1: Hours worked by married women

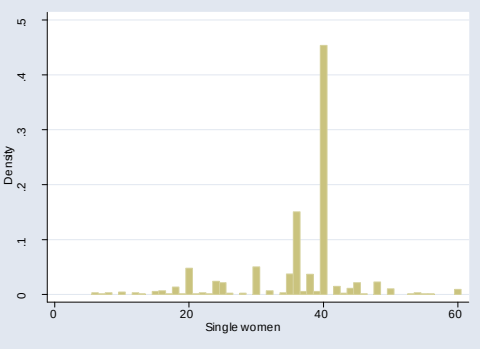

Figure 4.2: Hours worked by single women

A second variable, called part-time (figure 4.3), reports instead the type of job contract individuals have (1=part-time and 2=full-time).

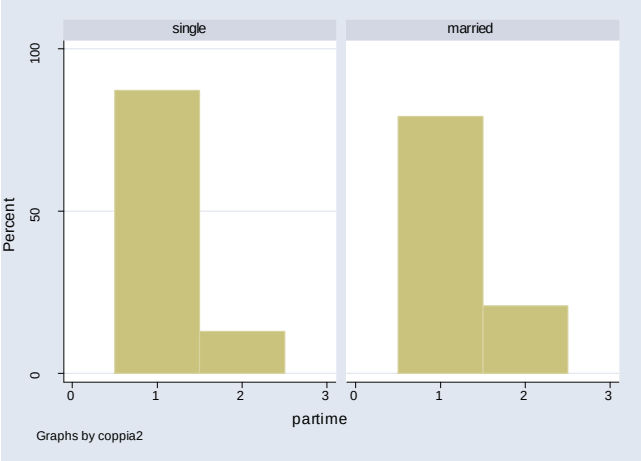

Figure 4.3: Partime variable for single and married women

Based on the hours variable, we choose to consider two possible interval lengths: $IL = 20$ and $IL = 10$. In the first case, the choice set of each family is made by three alternatives ($M = 3$): non participation ($h_1 = 0$), part-time ($h_2 = 20$) and full-time ($h_3 = 40$). In the second case, it is made by 5 or 6 alternatives ($M = 5$ or $M = 6$): non participation ($h_1 = 0$), small part-time

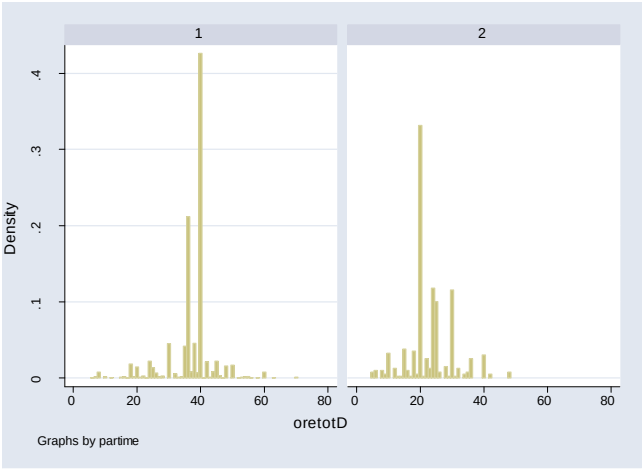

Figure 4.1: Figure 4.4 : Hours worked by partime variable

($h_2 = 10$), part-time ($h_3 = 20$), small full time ($h_4 = 30$), full-time ($h_5 = 40$) and overwork ($h = 50$). For $IL = 20$ we use a grouping rules based on the partime variable: $h = 0$ if the variable is missing, $h = 20$ if the individual works part-time and $h = 40$ if he works full-time. Figure 4.4 reports the distribution of hours worked based on the partime variable; it exists a clear peak at 40 hours for those that declare full-time activities and a peak at 20 hours for those claiming part-time activities.

For $IL = 10$ we use instead a grouping rule based on the hours variable. For $M = 5$ we make 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 $h > 35$; for $M = 6$ the groups are: $h = 0$ 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 $h > 45$.

We denote by y_j family's after tax income, including, husband's earnings, wife's earnings and family unearned income, such as capital income and social transfers[9]. In the model what matters is how the family budget set is determined by wife's working decisions and not his shape. Therefore, non-linear and large non-convex portions caused by the presence of mean-tested social transfers are easily handled in this type of approach.

[9] y_j is calculated for each alternatives using the imputed working hours.

The model uses a translog specification of the direct utility function:

$$V(v_q) = v'Av + b'v \tag{4.1}$$

where $v = (\log y_q, \log h_{qf})'$ is the vector of log commodities 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:

$$\beta_i = \sum_k b_{ik} z_k, \;\; i = 1, 2 \text{ and } \alpha_{ij} = \sum_k a_{ijk} z_k \;\; i, j = 1, 2 \tag{4.2}$$

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 $1x10$ vector. The final form of each family's direct utility function is:

$$\begin{aligned} V(\log y_q, \log h_{qf}) \;\; = \;\; & \beta_1 \log y_q + \beta_2 \log h_{qf} + a_{11}(\log y_q)^2 + \\ & + a_{22}(\log h_{qf})^2 + (a_{12} + a_{21}) \log y_q \log h_{qf} \end{aligned} \tag{4.3}$$

Family q disposable income y_{qk} could be expressed as a function T of family gross income and family sociodemographic characteristics:

$$y_{qk} = T(w_q h_{fk}, t_{qk}, I_q, Z_q) \tag{4.4}$$

where T is function of: a) female earnings $w_q h_k$, computed using the hourly gross wage rate w_q, which is assumed to not vary across alternatives; b) exogenous income I_q, made by husband earnings, in the case of married women, or parents' earnings, in the case of single women living within parental household, and household unearned income; c) t_{qk}, social transfers received by the family and d) family characteristics Z_q.

The analysis consists in estimating preferences directly as revealed by individual choices, rather than through the specification of the labor supply function. Empirically, this leads to use a conditional logit model. Household q chooses one among K alternatives in the choice set. The utility the household can derive from each alternative k is given by:

$$U_{qk} = V(h_k, y_{qk}, Z_q) + \epsilon_{qk} \tag{4.5}$$

where U is the utility function defined in equation 4.3 and ϵ_{qk} is an error term assumed to be identically and independently distributed across alternatives and across families according to a *type I-extreme value* distribution. Under this assumption, McFadden (1973) proved that the probability that alternative n is chosen by household q is given by:

$$Pr_{qn} = \Pr(U_{qn} > U_{qk}, \nabla k = 1, 2, 3) = \frac{\exp V(h_n, y_{qn}, Z_q)}{\sum_{k=1}^{K} \exp V(h_k, y_{qk}, Z_q)} \tag{4.6}$$

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

To improve the fit of the models, it is common practice to add either part-time dummies (as in van Soest, 1995) or fixed costs variable. Fixed costs are the direct or indirect costs an individual has to pay to get to work. We introduce them as a one-off weekly cost directly subtracted from net income for any choice that involve work. They are modelled in terms of a set of observable factors and consequently they will enter in the utility comparisons for each individual in their work - non work choice. Fixed cost are written as:

$$F = X_F \delta \tag{4.7}$$

Since we assume non stochastic fixed costs,they do not modify the likeli-

hood function. The functional form of the utility function, instead, becomes:

$$U_{qk} = \begin{cases} V(h_k, y_{qk}, Z_i) + \epsilon_{qk} & if \quad h_k = 0 \\ V(h_k, y_{qk} - F, Z_i) + \epsilon_{qk} & if \quad h_k > 0 \end{cases} \tag{4.8}$$

5 Wages

A well known problem in labour supply research is that, to perform the analysis, every individual needs to have his own wage, but wages are observed only for those actually working. It is, then, necessary to impute a wage to individuals who are currently out of work.

A popular solution in the literature to this problem is to use the Heckman correction (1979) to take into account the bias arising from participation decisions. The Heckman estimation procedure involves two different equations: the first represents the selection process using a probit model, while the second determines wages conditional on the employment status. The presence of a correction term in the wage equation accounts for the fact that wages of employed people may not represent properly wages of non-working ones. Put it in another way, the correlation between the two equations accounts for the possible selection into work of those who also gain higher wages.

Each individual observed employment status e_i is assumed to be the result of an underlying unobserved process that determines his tendency to participate e_i^* according to his personal characteristics z_i

$$e_i^* = z_i'\gamma + u_i \text{ with } u_i \sim N(0,1)^{10} \tag{5.1}$$

The resulting individual employment status is

$$e_i = \begin{cases} 1 & if \ e_i^* > 0 \text{ with probability } \Phi(z_i'\gamma) \\ 0 & if \ e_i^* \leq 0 \text{ with probability } 1 - \Phi(z_i'\gamma) \end{cases} \tag{5.2}$$

where $\Phi()$ is the standard normal cumulative distribution function and

[10] The variance of u_i is normalized to 1 because it is not possible to measure the scale of the selection process.

$\varphi()$ is the standard normal density function. The $\gamma's$ are consistently estimated by means of a probit model, and the inverse Mill's ratio for a working individual can be computed as

$$\hat{\lambda}_i = \frac{\varphi(z_i'\hat{\gamma})}{\Phi(z_i'\hat{\gamma})} \tag{5.3}$$

The original wage equation, giving that an individual works, is

$$w_{i|e_i=1} = x_i'\beta + \varepsilon_i \text{ with } \varepsilon \sim N(0, \sigma_\varepsilon) \tag{5.4}$$

u_i and ε_i are assumed to be jointly normally distributed as $N(0, 0, 1, \sigma_\varepsilon, \rho)$. To take account of the selectivity bias, the estimated wage equation that entails the correction term is

$$w_{i|e_i=1} = x_i'\beta + \rho\sigma_\varepsilon\hat{\lambda}_i + v_i \tag{5.5}$$

Predicted wages for employed individuals are given by

$$E(w_{i|e_i=1}) = x_i'\hat{\beta} + \hat{\rho}\hat{\sigma}_\varepsilon\hat{\lambda}_i \tag{5.6}$$

while imputed wages for non-employed individuals are given by

$$E(w_{i|e_i=0}) = x_i'\hat{\beta} - \hat{\rho}\hat{\sigma}_\varepsilon\frac{\varphi(z_i'\hat{\gamma})}{1 - \Phi(z_i'\hat{\gamma})} \tag{5.7}$$

Strictly speaking, using the predicted wages in the utility model introduces a correlation between 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 becomes correlated. To correct this problem, different solutions have been adopted: a) use of the systematic component only of the wage equation for everyone; b) use of the observed wages for employed individuals and of predicted wages for not-employed; c) use of predicted wages for all individuals.

A more sophisticated procedure that avoid this kind of problem relies on simultaneously estimate the wage equation and the utility function or, alternatively, integrate the likelihood with respect to the distribution of the wage stochastic component. A relatively simple approximation of this latter possibility can be obtained by means of the following procedure: to extract a value ε' from the distribution of the wage stochastic component for each individual, to add it to the systematic component and to use the so constructed wage to estimate the model. By repeating T times (with $T > 5$) this procedure and averaging the T estimates, we obtain a good numerical approximation of the integration with respect to distribution of the wage stochastic component.

We confront results obtained with both solutions, the Heckman correction and the approximation of the integration of the likelihood with respect to the distribution of the wage stochastic component.

Because SHIW reports only information on net incomes it was necessary to recover gross wages using an ad hoc microsimulation program, Mapp98, that reconstructs the taxable income of individuals starting from information entailed in the Bank of Italy dataset.

5.1 Wage Estimation results

Table 5.1 reports the results of the Heckman procedure for married women. The variables relate mainly to three aspects :

- 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) in the household, the ownership or the rent of the house, the residence area (North, Center or South), the presence of grandparents in the household and the family unearned income (divided by 100);
- husband characteristics related to his labour income. We do not use directly the husband net labour income because it is likely to be corre-

lated with wife's wage due to its dependence on tax credits for children and family arrangement shared by the spouses. To avoid this problem, husband's earnings are represented by husband's level of education, type of job and working sector[11].

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 age. Living in central and especially in southern regions lowers the probability to work. Women that live in central Italy have also lower wages. The educational level has an impact on both processes: the higher is the educational level, the higher is the probability that a woman will work and the higher is 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 big jump in term of earnings is generated by reaching graduation compared to all other educational attainments while the difference between high school and low education is still statistically significant but much smaller. Having children lowers wife's participation rate independently from her age. To own the house has a positive 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. Husband's education has a positive effect on wife's participation; that effect could be related to the assortative mating problem. By this we mean that men with high education are likely to be married with women that also have a high education and, consequently, are more likely to work and to get high wages. Finally, husband's working position (constructed to be positively related to his earnings) has a negative impact on wife's participation.

[11] Husband's level of education: 1=less or equal to compulsory education; 2=high school or equvalent; 3=university degree or more.

Husband's type of work: 0=not employed or retired; 1=blue collar; 2=white collar or equivalent; 3=manager; 4=self-employed.

Husband's working sector: 0=no sector; 1= agricolture; 2=industry; 3=public administration; 4=other sectors.

Table 5.1: Net and gross wages of married women

	Net wage				Gross wage			
	Main		Selection		Main		Selection	
	Coeff	|z|	Coeff	|z|	Coeff	|z|	Coeff	|z|
Age	-0,650	(0.64)	1,452	(4.28)***	-0,624	(0.42)	1,494	(4.43)***
Age squared	0,173	(1.36)	-0,191	(4.69)***	0,237	(1.27)	-0,197	(4.84)***
Low education	-1,330	(7.19)***	-1,355	(9.84)***	-6,248	(12.63)***	-1,334	(10.19)***
Mid education	dropped		-0,732	(5.40)***	4,042	(8.40)***	-0,706	(5.58)***
High education	2,683	(8.63)***	dropped		dropped		dropped	
House ownership			0,327	(3.97)***			0,316	(3.70)***
House rent			-0,045	(0.49)			-0,069	(0.73)
Number of children			-0,142	(5.04)***			-0,143	(5.02)***
Children younger than 3			-0,116	(1.37)			-0,139	(1.63)
Grandparents			0,04702	(0.28)			0,032	(0.18)
Family wealth			0,000	(0.89)			0.000	(0.63)
North	dropped		dropped		dropped		dropped	
Center	-0,221	(1.47)	-0,223	(3.19)***	-0,599	(2.07)**	-0,222	(3.18)***
South	0,354	(1.47)	-0,904	(15.13)***	-0,204	(0.52)	-0,900	(15.07)***
Husband education			0,133	(2.62)**			0,112	(2.18)**
Husband type of job			-0,132	(5.23)***			-0,136	(5.26)***
Husband working sector			0,107	(4.40)***			0,103	(4.17)***
Constant	8,224	(4.07)***	-1,500	(2.15)**	13,821	(4.79)***	-1,526	(2.20)**
ρ	-0,440	(0,077 st.err.)			-0,286	(0,109 st.err.)		
σ_ε	2,954	(0,113 st. err.)			4,598	(0,177 st. err.)		
Observations	2895				2897			

Robust z statistics in parentheses

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

Table 5.2 reports results for single women. Variables included in the wage equation and in the selection process relate to two main categories:

- individual characteristics: age (rescaled by 10), age squared (rescaled by 100) and dummies representing woman's educational level;
- family characteristics: dummies for the macro region of residence, dummies to identify if the living arrangement is rented or owned by her or by her family, a dummy that is equal to one when she lives with her parents and zero otherwise, a dummy equal to one if grandparents live within the household and household unearned income (rescaled by 100).

Age has positive and significant impact on the selection process but it has a direct effect on wages only in the case of net wages. The strongest direct effect is associated with educational levels. To have a *laurea,* as in the case of married women, strongly increases wages compared to all other educational attainments, while the difference between high school and low education is statistically significant but much smaller. Another interesting point is that single women that live 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 labor market. A possible explanation is that single women that live with parents most of the time do different type of unpaid work within the household and therefore are less likely to get an outside paid job. The other coefficients are similar to those already commented for married women.

Table 5.2: Net and gross wages of single women

	Net wage				**Gross wage**			
	Main		Selection		Main		Selection	
	Coeff	|z|	Coeff	|z|	Coeff	|z|	Coeff	|z|
Age	1,311	(1.78)*	1,040	(3.25)***	1,661	(1.43)	0,992	(3.11)***
Age squared	-0,075	(0.74)	-0,121	(2.68)***	-0,059	(0.36)	-0,113	(2.51)**
Low education	-3,066	(8.39)***	dropped		-4,860	(8.63)***	-0,282	(2.15)**
Mid education	-2,337	(6.56)***	0,451	(5.05)***	-3,648	(6.54)***	0,155	(1.23)
High education	dropped		0,289	(2.20)**	dropped		dropped	
House ownership			0,185	(1.12)			0,200	(1.21)
House rent			0,251	(1.49)			0,276	(1.63)
Number of children			-0,327	(3.65)***			-0,354	(3.83)***
Grandparents			-0,353	(1.78)*			-0,361	(1.81)*
Family wealth			0,000	(0.51)			0.000	(0.55)
North	dropped		dropped		dropped		dropped	
Center	-0,344	(1.58)	-0,367	(3.18)***	-0,508	(1.40)	-0,377	(3.27)***
South	-0,151	(0.55)	-1,263	(13.49)***	-0,372	(1.01)	-1,259	(13.47)***
Living with parents	-0,741	(2.78)***	-0,697	(4.31)***	-0,800	(1.86)*	-0,677	(4.31)***
Constant	5,989	(4.10)***	-0,781	(1.35)	8,486	(3.74)***	-0,448	(0.74)
ρ	-0,098	(0,062 st.err.)			-0,183	(0,056 st.err.)		
σ_ε	2,551	(0,162 st. err.)			3,997	(0,240 st. err.)		
Observations	1291				1289			

Robust z statistics in parentheses

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

6 Empirical results

Before looking at the results, it is important to remember that they have to be cautionally interpreted as preferences of individuals in a static environment, because this model does not take explicitly into account demand-side factors, as rationing in disposable working hours, and factors that might influences individuals' behavior and preferences in a dynamic perspective.

Table 6.1 and 6.2 shows the results for married and single women for all combinations of interval length and number of choices ($IL = 10$ and $IL = 20$; $M = 5$ and $M = 6$) and all four types of wages[12].

We use fixed costs only with $IL = 10$ specifications, because the $IL = 20$ was able to reproduce well the data in terms of participation rates without their introduction. We allow fixed costs to vary based on the number of hours worked by the individual. Moreover, we try to interact fixed costs with some observable factors that in principle should higher 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 significant.

The results for $M = 5$ and $M = 6$ for both married and single women are very similar under all possible types of wages.

Looking at tables 6.1a and 6.1b, taste parameters associated with working hours are more significant than those associated with income independently from the type of wage used. With few exceptions, coefficients have the same sign under all possible wages. Hours coefficients are larger whit $IL = 10$ than with $IL = 20$, but this change in magnitude is mainly due to fixed costs. In fact, hours coefficients of the $IL = 10$ models without fixed costs are much lower than the corresponding ones of models with fixed costs and are basically equal to the $IL = 20$ case. In all scenarios, having no more than the compulsory level of education has a negative effect on the utility derived from working; also high school level with respect to having a college degree

[12]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 are bootstrapped.

has a negative impact on utility but weaker than the former, as expected. The fact that less educated women participate less could be interpreted in different ways. One possible explanation is that rationing on the demand side of labour market concerns primarily less educated people, implying for them higher costs associated with the participation status and therefore an higher probability for the non working status. Another possible interpretation is that better educated women are more willing to work both because they receive more attractive job offers or because their preferences might be more work-oriented. In the $IL = 20$ scenario, lower educational levels have also a negative effect on the utility derived from income, probably due to the strong relation between earnings and educational level. This effect vanishes (and reverse the sign) in both $IL = 10$ cases, probably due to the higher flexibility of the specification in terms of working hours and consequently of earnings.

As expected, the number of children within the household has a negative impact on both the disutility of working and the utility derived from income. A negative effect is also associated both with living in central and in southern regions, the latter being stronger than the former. The regional effect holds also for the utility derived from income, but only for $IL = 20$. Again, this could be related to relatively high rigidity of this formulation with respect to the other two. Age does not show the usual concave pattern, suggesting that women in couple are relatively attached to their job, but the magnitude of this effect is very limited. Owning the living arrangement has a positive effect on the utility derived from working and a negative one on the utility derived from income. As already seen in wage estimation, a possible explanation comes from the loan normally linked to house purchase, that requires an additional source of income preventing, at the same time, the higher family income to be translated in higher family consumption. This negative effect is much weaker and also less statistically significant under the random wages hypothesis than under the other possibilities, suggesting that wages obtained through the Heckman correction overestimate this effect.

Fixed costs vary according to the number of hours worked. In particular, they decrease as the number of hours worked increases, but 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.

Table 6.1a: Estimation results for married women

	Type I						Type II					
	IL=20		**IL=10 and M=5**		**IL=10 and M=6**		**IL=20**		**IL=10 and M=5**		**IL=10 and M=6**	
	Coeff.	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*
Income^2	-0,142	(1.71)*	-0,055	(0.67)	-0,053	(0.65)	-0,827	(8.89)***	-0,813	(9.45)***	-0,812	(9.43)***
Hours^2	0,311	(16.60)***	1,734	(8.40)***	1,604	(7.74)***	0,425	(24.28)***	1,921	(9.34)***	1,791	(8.67)***
Hours x income	-0,023	(1.45)	-0,005	(0.35)	-0,005	(0.34)	-0,139	(10.07)***	-0,151	(11.02)***	-0,151	(11.02)***
Hours	-2,288	(10.15)***	-20,254	(7.08)***	-18,536	(6.46)***	-2,216	(9.61)***	-20,765	(7.25)***	-19,045	(6.62)***
x female age/10	0,223	(2.38)**	0,224	(2.38)**	0,222	(2.37)**	0,241	(2.50)**	0,234	(2.39)**	0,233	(2.38)**
x female age^2/100	-0,031	(2.79)***	-0,032	(2.85)***	-0,031	(2.84)***	-0,029	(2.59)**	-0,029	(2.47)**	-0,028	(2.47)**
x number of children	-0,029	(3.77)***	-0,028	(3.60)***	-0,028	(3.60)***	-0,038	(4.61)***	-0,041	(4.89)***	-0,040	(4.88)***
x children younger than 3	-0,027	(1.09)	-0,032	(1.33)	-0,033	(1.33)	-0,033	(1.29)	-0,041	(1.59)	-0,041	(1.59)
x northern area	dropped		dropped		dropped		dropped		dropped		dropped	
x central area	-0,054	(3.16)***	-0,054	(3.12)***	-0,054	(3.12)***	-0,061	(3.31)***	-0,066	(3.55)***	-0,066	(3.55)***
x southern area	-0,177	(11.10)***	-0,184	(11.50)***	-0,184	(11.51)***	-0,171	(9.81)***	-0,179	(10.22)***	-0,178	(10.22)***
x owning the living house	0,108	(3.38)***	0,085	(2.74)***	0,085	(2.74)***	0,199	(6.25)***	0,241	(7.51)***	0,241	(7.52)***
x low educational level	-0,290	(8.29)***	-0,312	(9.52)***	-0,312	(9.53)***	-0,353	(9.59)***	-0,416	(11.57)***	-0,416	(11.57)***
x medium educational level	-0,151	(4.34)***	-0,173	(5.26)***	-0,173	(5.27)***	-0,188	(5.16)***	-0,240	(6.74)***	-0,240	(6.76)***
x high educational level	dropped		dropped		dropped		dropped		dropped		dropped	
Income	-1,252	(0.34)	-5,435	(1.50)	-5,484	(1.51)	3,791	(0.86)	-2,677	(0.59)	-2,718	(0.60)
x female age/10	2,101	(1.32)	2,491	(1.53)	2,502	(1.54)	2,091	(1.08)	2,962	(1.45)	2,966	(1.45)
x female age^2/100	-0,220	(1.19)	-0,267	(1.41)	-0,268	(1.42)	-0,245	(1.07)	-0,344	(1.43)	-0,314	(1.43)
x number of children	-0,647	(2.32)**	-0,390	(2.55)**	-0,390	(2.55)**	-0,481	(2.18)**	-0,544	(2.40)**	-0,542	(2.39)**
x children younger than 3	-0,345	(0.55)	-0,170	(0.28)	-0,169	(0.28)	-0,201	(0.28)	0,128	(0.18)	0,129	(0.18)
x northern area	dropped		dropped		dropped		dropped		dropped		dropped	
x central area	0,373	(1.07)	0,368	(1.05)	0,368	(1.05)	0,141	(0.27)	0,273	(0.52)	0,274	(0.52)
x southern area	0,283	(1.01)	0,308	(1.08)	0,309	(1.09)	0,188	(0.43)	0,325	(0.73)	0,327	(0.74)
x owning the living house	-4,595	(3.10)***	-3,055	(2.13)**	-3,038	(2.12)**	-12,788	(8.58)***	-15,878	(9.99)***	-15,872	(9.98)***
x low educational level	-2,972	(2.12)**	0,022	(0.02)	0,034	(0.03)	-4,382	(2.84)***	-0,072	(0.06)	-0,056	(0.05)
x medium educational level	-2,617	(1.86)*	0,276	(0.27)	0,291	(0.28)	-3,529	(2.30)**	0,542	(0.45)	0,563	(0.46)
x high educational level	dropped		dropped		dropped		dropped		dropped		dropped	
Fixed cost for part-time work			55,467	(5.58)***	49,820	(5.00)***			57,703	(5.80)***	52,048	(5.22)***
Fixed cost for full-time work			53,131	(5.38)***	47,543	(4.80)***			55,364	(5.60)***	49,766	(5.02)***
Fixed cost for over-time work					43,434	(4.42)***					45,342	(4.61)***
Observations	2921		2921		2921		2921		2921		2921	
Pseudo-R2	0,2768		0,3630		0,2859		0,3085		0,3960		0,4185	

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

Table 6.1b: Estimation results for married women

	Type III						Type IV								
	IL=20		IL=10 and M=5		IL=10 and M=6		IL=20			IL=10 and M=5			IL=10 and M=6		
	Coeff.	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|sd|*		*Coeff.*	*|sd|*		*Coeff.*	*|sd|*	
Income^2	-1,258	(11.37)***	-0,914	(10.29)***	-0,913	(10.27)***	-0,016	0,035		0,006	0,034		0,008	0,034	
Hours^2	0,562	(24.63)***	1,977	(9.58)***	1,846	(8.92)***	0,279	0,004	***	1,696	0,010	***	1,564	0,120	***
Hours x income	-0,275	(14.14)***	-0,208	(12.13)***	-0,208	(12.12)***	0,013	0,005	***	0,015	0,005	***	0,017	0,006	**
Hours	-2,190	(9.10)***	-20,772	(7.22)***	-19,046	(6.60)***	-2,390	0,060	***	-20,046	0,097	***	-18,332	0,119	***
x female age/10	0,235	(2.31)**	0,226	(2.27)**	0,225	(2.25)**	0,254	0,027	***	0,257	0,025	***	0,259	0,025	***
x female age^2/100	-0,256	(2.14)**	-0,026	(2.24)**	-0,026	(2.24)**	-0,035	0,003	***	-0,036	0,003	***	-0,036	0,003	***
x number of children	-0,045	(5.47)***	-0,040	(4.97)***	-0,040	(4.96)***	-0,029	0,001	***	-0,029	0,001	***	-0,029	0,002	***
x children younger than 3	-0,024	(0.88)	-0,031	(1.18)	-0,031	(1.18)	-0,027	0,065		-0,031	0,006	***	-0,032	0,008	***
x northern area	dropped		dropped		dropped		dropped			dropped			dropped		
x central area	-0,078	(4.17)***	-0,073	(3.94)***	-0,073	(3.95)***	-0,050	0,004	***	-0,051	0,004	***	-0,051	0,003	***
x southern area	-0,164	(9.33)***	-0,172	(10.10)***	-0,172	(10.10)***	-0,180	0,003	***	-0,186	0,003	***	-0,185	0,002	***
x owning the living house	0,402	(10.49)***	0,343	(9.59)***	0,343	(9.59)***	0,061	0,013	***	0,056	0,013	***	0,056	0,011	***
x low educational level	-0,431	(11.59)***	-0,422	(12.16)***	-0,421	(12.16)***	-0,278	0,009	***	-0,305	0,007	***	-0,304	0,006	***
x medium educational level	-0,242	(6.66)***	-0,240	(7.06)***	-0,240	(7.08)***	-0,143	0,009	***	-0,167	0,007	***	-0,166	0,006	***
x high educational level	dropped		dropped		dropped		dropped			dropped			dropped		
Income	4,814	(0.93)	-1,480	(0.31)	-1,523	(0.32)	-0,775	1,740		-4,194	1,730	**	-3,934	1,669	**
x female age/10	2,146	(0.94)	2,726	(1.24)	2,734	(1.24)	1,531	0,750	**	1,788	0,740	**	1,681	0,706	**
x female age^2/100	-0,202	(0.75)	-0,274	(1.07)	-0,274	(1.07)	-0,163	0,084	*	-0,193	0,083	**	-0,181	0,078	**
x number of children	-0,403	(1.98)**	-0,493	(2.40)**	-0,492	(2.40)**	-0,303	0,048	***	-0,336	0,050	***	-0,337	0,061	***
x children younger than 3	-0,957	(1.16)	-0,509	(0.65)	-0,508	(0.65)	-0,243	0,259		-0,142	0,248		-0,129	0,317	
x northern area	dropped		dropped		dropped		dropped			dropped			dropped		
x central area	0,434	(0.83)	0,441	(0.89)	0,441	(0.89)	0,312	0,152	**	0,312	0,158	*	0,317	0,124	**
x southern area	0,290	(0.66)	0,395	(0.98)	0,397	(0.98)	0,246	0,106	**	0,270	0,107	**	0,256	0,088	**
x owning the living house	-26,161	(12.92)***	-22,146	(11.53)***	-22,136	(11.52)***	-1,608	0,706	**	-1,238	0,716	*	-1,211	0,623	*
x low educational level	-4,973	(3.49)***	-1,379	(1.23)	-1,366	(1.22)	-2,594	0,553	***	0,195	0,341		0,180	0,311	
x medium educational level	-3,489	(2.48)**	-0,368	(0.33)	-0,350	(0.31)	-2,394	0,560	***	0,334	0,364		0,321	0,319	
x high educational level	dropped		dropped		dropped		dropped			dropped			dropped		
Fixed cost for part-time work			57,681	(5.77)***	52,00757	(5.19)***				54,389	0,305	***	48,715	0,364	***
Fixed cost for full-time work			55,338	(5.57)***	49,72302	(4.99)***				52,055	0,305	***	46,439	0,364	***
Fixed cost for over-time work					45,18627	(4.57)***							42,375	0,351	***
Observations	2921		2921		2921		2921			2921			2921		
Pseudo-R2	0,3167		0,3924		0,4152										

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

Tables 6.2a and 6.2b show the results for single women. For singles living with parents two possible types of family income have been considered, to investigate if parents' working situation is relevant for cohabiting children working decisions. The first type includes daughter's earnings, mother's earnings, father's earnings and family unearned income, while the second type is made only by daughter's earnings and family unearned income. Results for the two types of income are pretty much the same, suggesting that the parent's earnings have not a direct effect on daughter's working decisions. In the following, we present the results related to income of the whole family.

Type I, type III and type IV scenarios are very similar and show coefficients smaller than those related to type II wages. Coefficients signs hold across the different possibilities. In all cases, as for married women, taste parameters associated with working hours are more significant than those associated with income. Differently from married women, only the coefficient related to the compulsory level of education is significant and only at 10% level of significance. A possible explanation for the non-effect on participation decisions, at least in the case of single women living alone, could be related to the fact that they have to work no matter what. Educational levels influence the type of job and the level of earnings they can get but not the fact they must have some kind of job.

As for married women, living in central or in southern regions with respect to northern regions has a negative effect on the utility derived from working, the second being much stronger than the first. Cohabiting with parents decreases the utility derived from working. A first possible interpretation could be related to the fact that single cohabiting women, as seen in wage estimation, face lower wages, implying that they face less attractive job offers. Another possible interpretation is that single women that live with parents most of the time do unpaid work within the household and therefore are less likely to get a paid job outside of it.

The effect of owning the living arrangement is insignificant on the utility derived from working and is negative, and again smaller in the case of random wages, on the utility derived from income.

Table 6.2a: Estimation results for single women

	Type I						Type II					
	IL=20		**IL=10 and M=5**		**IL=10 and M=6**		**IL=20**		**IL=10 and M=5**		**IL=10 and M=6**	
	Coeff.	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*
Income^2	-0,039	(0.76)	-0,063	(1.20)	-0,061	(1.17)	-0,110	(2.34)**	-0,166	(3.47)***	-0,169	(3.53)***
Hours^2	0,402	(15.47)***	2,542	(8.67)***	2,406	(8.18)***	0,420	(17.94)***	2,595	(8.88)***	2,460	(8.40)***
Hours x income	-0,007	(0.31)	-0,006	(0.79)	-0,015	(0.71)	-0,031978	(1.84)*	-0,062	(3.58)***	0,062	(3.57)***
Hours	-3,246	(14.13)***	-31,233	(7.61)***	-29,435	(7.16)***	-3,181	(13.90)***	-31,405	(7.66)***	-29,629	(7.21)***
x female age/10	0,352	(4.12)***	0,356	(4.14)***	0,351	(4.10)***	0,363	(4.21)***	0,377	(4.29)***	0,380	(4.32)***
x female age^2/100	-0,043	(3.48)***	-0,043	(3.45)***	-0,042	(3.42)***	-0,042	(3.56)***	-0,045	(3.52)***	-0,045	(3.57)***
x number of children	-0,051	(1.84)*	-0,058	(2.09)**	-0,057	(2.08)**	-0,047	(1.64)	-0,060	(2.05)**	-0,059	(2.04)**
x northern area	dropped		dropped		dropped		dropped		dropped		dropped	
x central area	-0,096	(3.24)***	-0,098	(3.27)***	-0,097	(3.26)***	-0,096	(3.20)***	-0,098	(3.21)***	-0,097	(3.21)***
x southern area	-0,261	(10.28)***	-0,265	(10.36)***	-0,263	(10.35)***	-0,265	(10.33)***	-0,268	(10.32)***	-0,267	(10.29)***
x owning the living house	-0,017	(0.32)	0,004	(0.08)	0,000	(0.00)	-0,021	(0.40)	0,052	(1.01)	0,048	(0.95)
x low educational level	-0,058	(1.75)*	-0,058	(1.74)*	-0,058	(1.75)*	-0,067	(2,03)**	-0,073	(2.20)**	-0,072	(2.18)**
x medium educational level	0,031	(1.02)	0,032	(1.03)	0,031	(1.00)	0,027	(0.88)	0,022	(0.71)	0,023	(0.74)
x high educational level	dropped		dropped		dropped		dropped		dropped		dropped	
x living with parents	-0,146	(3.55)***	-0,149	(3.61)***	-0,149	(3.60)***	-0,154	(3.65)***	-0,173	(3.99)***	-0,172	(3.99)***
Income	1,512	(1.44)	1,389	(1.33)	1,366	(1.30)	1,890	(1.67)*	1,888	(1.63)	1,956	(1.69)*
x female age/10	-0,944	(1.81)*	-0,877	(1.67)*	-0,866	(1.65)*	-0,936	(1.70)*	-0,837	(1.48)	-0,865	(1.53)
x female age^2/100	0,134	(1.90)*	0,122	(1.72)*	0,120	(1.71)*	0,135	(1.80)*	0,118	(1.55)	0,122	(1.60)*
x number of children	-0,114	(0.86)	-0,046	(0.36)	-0,047	(0.37)	-0,207	(1.43)	-0,140	(0.95)	-0,141	(0.96)
x northern area	dropped		dropped		dropped		dropped		dropped		dropped	
x central area	0,138	(0.64)	0,113	(0.52)	0,111	(0.51)	0,065	(0.28)	-0,042	(0.17)	-0,045	(0.19)
x southern area	-0,074	(0.44)	-0,110	(0.64)	-0,113	(0.66)	-0,095	(0.53)	-0,183	(0.96)	-0,192	(1.01)
x owning the living house	-3,678	(2.24)**	-4,949	(2.91)***	-4,735	(2.80)***	-3,905	(2.83)***	-7,769	(4.96)***	-7,630	(4.89)***
x low educational level	0,031	(0.12)	0,133	(0.50)	0,131	(0.50)	-0,108	(0.40)	-0,061	(0.22)	-0,059	(0.21)
x medium educational level	-0,106	(0.37)	0,029	(0.10)	0,024	(0.08)	-0,265	(0.89)	-0,173	(0.56)	-0,171	(0.55)
x high educational level	dropped		dropped		dropped		dropped		dropped		dropped	
x living with parents	-0,092	(0.44)	-0,037	(0.18)	-0,035	(0.17)	-0,192	(0.89)	-0,128	(0.58)	-0,132	(0.60)
Fixed cost for part-time work			91,483	(6.34)***	85,584	(5.92)***			92,276	(6.41)***	86,418	(5.99)
Fixed cost for full-time work			89,245	(6.21)***	83,406	(5.80)***			90,033	(6.27)***	84,236	(5.86)
Fixed cost for overl-time work					78,934	(5.52)***					79,676	(5.58)
Observations	1311		1311		1311		1311		1311		1311	
Pseudo-R2	0,3189		0,3651		0,3606		0,3184		0,3761		0,3706	

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

Table 6.2b: Estimation results for single women

	Type III						Type IV								
	IL=20		IL=10 and M=5		IL=10 and M=6		IL=20			IL=10 and M=5			IL=10 and M=6		
	Coeff.	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|z|*	*Coeff.*	*|sd|*		*Coeff.*	*|sd|*		*Coeff.*	*|sd|*	
Income^2	-0,042	(0.81)	-0,063	(1.18)	-0,063	(1.19)	-0,003	0,020		-0,013	0,018		-0,020	0,021	
Hours^2	0,403	(15.59)***	2,538	(8.66)***	2,404	(8.18)***	0,381	0,006	***	2,481	0,014	***	2,349	0,013	***
Hours x income	-0,007	(0.32)	-0,015	(0.69)	-0,015	(0.70)	0,021	0,008	**	0,020	0,008	**	0,018	0,008	**
Hours	-3,246	(14.18)***	-31,192	(7.60)***	-29,415	(7.15)***	-3,260	0,041	***	-30,770	0,119	***	-29,007	0,120	***
x female age/10	0,353	(4.14)***	0,356	(4.15)***	0,353	(4.12)***	0,335	0,016	***	0,334	0,016	***	0,332	0,017	***
x female age^2/100	-0,043	(3.49)***	-0,043	(3.46)***	-0,042	(3.43)***	-0,041	0,002	***	-0,040	0,002	***	-0,040	0,002	***
x number of children	-0,052	(1.88)*	-0,058	(2.13)**	-0,058	(2.13)**	-0,050	0,004	***	-0,056	0,003	***	-0,056	0,005	***
x northern area	dropped		dropped		dropped		dropped			dropped			dropped		
x central area	-0,097	(3.27)***	-0,098	(3.29)***	-0,098	(3.30)***	-0,093	0,004	***	-0,094	0,004	***	-0,094	0,004	***
x southern area	-0,265	(10.39)***	-0,268	(10.51)***	-0,268	(10.50)***	-0,262	0,004	***	-0,265	0,004	***	-0,265	0,004	***
x owning the living house	-0,018	(0.34)	-0,001	(0.01)	-0,001	(0.02)	-0,067	0,020	***	-0,062	0,020	***	-0,065	0,021	***
x low educational level	-0,060	(1.81)*	-0,059	(1.78)*	-0,060	(1.81)*	-0,048	0,004	***	-0,045	0,005	***	-0,047	0,004	***
x medium educational level	0,031	(1.02)	0,032	(1.03)	0,030	(0.98)	0,035	0,004	***	0,037	0,004	***	0,036	0,003	***
x high educational level	dropped		dropped		dropped		dropped			dropped			dropped		
x living with parents	-0,148	(3.58)***	-0,151	(3.64)***	-0,151	(3.65)***	-0,139	0,008	***	-0,138	0,008	***	-0,137	0,007	***
Income	1,502	(1.40)	1,361	(1.27)	1,330	(1.25)	1,297	0,415	***	1,176	0,402	***	1,178	0,419	**
x female age/10	-0,935	(1.75)*	-0,859	(1.60)	-0,848	(1.58)	-0,879	0,192	***	-0,833	0,189	***	-0,817	0,204	***
x female age^2/100	0,133	(1.84)*	0,119	(1.66)*	0,118	(1.64)	0,125	0,024	***	0,115	0,024	***	0,112	0,026	***
x number of children	-0,113	(0.84)	-0,046	(0.36)	-0,045	(0.35)	-0,127	0,027	***	-0,062	0,024	**	-0,055	0,034	*
x northern area	dropped		dropped		dropped		dropped			dropped			dropped		
x central area	0,139	(0.64)	0,108	(0.49)	0,111	(0.50)	0,129	0,064	*	0,108	0,067		0,104	0,072	*
x southern area	-0,078	(0.46)	-0,115	(0.66)	-0,114	(0.66)	-0,063	0,056		-0,090	0,059		-0,089	0,057	*
x owning the living house	-3,819	(2.25)**	-4,922	(2.83)***	-4,919	(2.82)***	-1,670	0,802	**	-2,072	0,809	**	-2,000	0,840	**
x low educational level	0,031	(0.12)	0,125	(0.47)	0,134	(0.50)	0,048	0,055		0,148	0,056	**	0,147	0,042	***
x medium educational level	-0,107	(0.37)	0,020	(0.07)	0,033	(0.11)	-0,059	0,080		0,072	0,075		0,066	0,058	
x high educational level	dropped		dropped		dropped		dropped			dropped			dropped		
x living with parents	-0,094	(0.45)	-0,037	(0.18)	-0,038	(0.18)	-0,094	0,072		-0,038	0,072		-0,048	0,065	
Fixed cost for part-time work			91,329	(6.33)***	85,505	(5.92)***				89,787	0,397	***	84,028	0,379	***
Fixed cost for full-time work			89,091	(6.20)***	83,326	(5.79)***				87,554	0,396	***	81,854	0,378	***
Fixed cost for overl-time work					78,854	(5.58)***							77,445	0,363	***
Observations	1311		1311		1311		1311			1311			1311		
Pseudo-R2	0,3189		0,3650		0,3606										

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

To verify the ability of the different models to replicate the sample, table 6.3 presents the observed and the average predicted frequencies for the three possible choice sets and the four type of wages.

For married women with type I, type II and type III wages all the three models replicate precisely the data frequencies. By using random wages, instead, data are better, but not perfectly, replicated by the case that uses an interval length equal to 10 and that does not model explicitly overwork. For single women, instead, none of the wages and none of the possible choice set are able to replicate precisely the data. The case that better reflects the actual frequencies, for both single living alone and living with parents, is $IL = 10$ with $M = 5$ under random wages. In the case of women living alone, this scenario overpredicts full time work and non participation, slightly underestimates part-time (20 hours) and underpredicts the intermediate solutions (10 and 30 hours). In the case of women living with parents, at the opposite, it overpredict all intermediate solutions (10, 20 and 30 hours) and underestimates the non working status.

Table 6.3: Observed and predicted frequencies

Married women						**Single women**										
						Living outside						**Living at home**				
Choice	*Observed frequency*	*Average predicted frequencies*				*Choice*	*Observed frequency*	*Average predicted frequencies*				*Choice*	*Observed frequency*	*Average predicted frequencies*		
		Type I	*Type II*	*Type III*	*Type IV*			*Type I*	*Type II*	*Type III*	*Type IV*			*Type I*	*Type II*	*Type III*	*Type IV*
IL=20																	
0	53,27%	53,27%	53,27%	53,27%	43,33%	0	17,27%	17,18%	17,16%	17,18%	16,50%	0	39,65%	39,69%	39,70%	39,69%	37,66%
part-time	9,76%	9,76%	9,76%	9,76%	11,04%	part-time	9,28%	10,22%	10,50%	10,24%	9,94%	part-time	8,34%	7,95%	7,83%	7,94%	8,15%
full-time	36,97%	36,97%	36,97%	36,97%	45,63%	full-time	73,45%	72,60%	72,34%	72,57%	73,56%	full-time	52,00%	52,36%	52,47%	52,37%	54,19%
IL=10 and M=5																	
0	53,37%	53,37%	53,37%	53,37%	49,65%	0	17,27%	17,57%	17,51%	17,57%	18,08%	0	39,65%	39,53%	39,55%	39,53%	37,98%
10 hours	1,68%	1,68%	1,68%	1,68%	1,74%	10 hours	2,58%	1,75%	1,89%	1,75%	1,71%	10 hours	1,08%	1,43%	1,37%	1,43%	1,49%
20 hours	9,96%	9,96%	9,96%	9,96%	10,56%	20 hours	10,57%	9,80%	10,20%	9,82%	9,65%	20 hours	7,15%	7,47%	7,30%	7,47%	7,76%
30 hours	5,82%	5,82%	5,82%	5,82%	6,26%	30 hours	10,82%	8,57%	8,69%	8,57%	8,52%	30 hours	5,42%	6,37%	6,31%	6,36%	6,55%
40 hours	29,17%	29,17%	29,17%	29,17%	31,79%	40 hours	58,76%	62,31%	61,71%	62,29%	62,04%	40 hours	46,70%	45,20%	45,46%	45,21%	46,23%
IL=10 and M=6																	
0	53,37%	53,37%	53,37%	53,37%	42,57%	0	17,27%	17,59%	17,53%	17,59%	14,65%	0	39,65%	39,52%	39,54%	39,52%	33,86%
10 hours	1,68%	1,68%	1,68%	1,68%	1,80%	10 hours	2,58%	1,74%	1,87%	1,75%	1,59%	10 hours	1,08%	1,43%	1,38%	1,43%	1,48%
20 hours	9,96%	9,96%	9,96%	9,96%	11,49%	20 hours	10,57%	9,78%	10,13%	9,80%	9,45%	20 hours	7,15%	7,48%	7,33%	7,47%	7,96%
30 hours	5,82%	5,82%	5,82%	5,82%	7,07%	30 hours	10,82%	8,55%	8,66%	8,56%	8,87%	30 hours	5,42%	6,37%	6,33%	6,37%	6,90%
40 hours	27,29%	27,29%	27,29%	27,29%	34,65%	40 hours	54,90%	58,07%	57,55%	58,04%	61,10%	40 hours	43,55%	42,22%	42,44%	42,23%	46,49%
50 hours	1,88%	1,88%	1,88%	1,88%	2,42%	50 hours	3,87%	4,27%	4,26%	4,27%	4,52%	50 hours	3,14%	2,97%	2,98%	2,97%	3,31%

7 Policy simulations

We simulate the effect on female participation rates of the introduction of a minimum income policy shaped on the rules tested from 1998 to 2003. The reference family income for eligibility is made by all family members taxable income plus one fifth of household financial capital and one fifth of household real capital, calculated using ISE rules. We test the effect of five possible thresholds[13], set respectively equal to the experimented one, to the minimum pension level, to the absolute poverty line and to the relative (full and 80%) poverty line [14], and of different levels of earnings exemption, including in family income from 75% up to 100% of each individual labour earnings. Different combinations of these two elements should catch the relation between the possible labour disincentive effect and thresholds' level. 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 get a very bad paid job. In principle the disincentive effect should be weakened by an increase in the income threshold level. An higher exemption for labor earnings should also weaken the disincentive effect. We repeated simulations for all possible choice sets and all possible type of wages and they all lead to the same results. In the following, as examples, we will present two sets of simulations : the first is based on Heckman type I wages and $IL = 20$, configuration able to replicate precisely the observed frequency, while the second is based on random wages, $IL = 10$ and $M = 5$, a more complex model that includes a wider choice set and fixed cost of working.

As an example table 7.1 presents a summary of the simulated social transfers for the IL=20 case. Statistics on family check, family check for young children and different types of minimum income policies are presented . For each category (married women, single women living alone and single women

[13] Off 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.

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

living with parents[15]) recipients[16] number, mean distributed transfer and related monthly income threshold are displayed.

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

[15]For single cohabiting women transfers are based on the whole family income and on family composition, meaning that they are only partially influenced by daughter's decisions.

[16]It is assumed that individuals entitled to receive a transfer automatically apply for it.

Table 7.1: Simulated social transfers for IL=20 and type A wages

	Married women						Single women												Individual monthly benchmark
							Living alone						Living with parents						
	75% of labor earnings			*100% of labor earnings*			*75% of labor earnings*			*100% of labor earnings*			*75% of labor earnings*			*100% of labor earnings*			
	Num.	%	Mean	Num.	%	Mean	Num.	%	Mean	Num.	%	Mean	Num.	%	Mean	Num.	%	Mean	
Family check																			
Not working	1092	37,38%	€ 1.297,26	-	-	-	0	-	-	-	-	-	67	7,26%	€ 1.447,00	-	-	-	
Working part-time	107	3,66%	€ 345,76	-	-	-	86	6,56%	€ 1.575,41	-	-	-	59	6,39%	€ 1.133,92	-	-	-	
Working full-time	0	-	-	-	-	-	80	6,10%	€ 728,60	-	-	-	52	5,63%	€ 749,76	-	-	-	
Family check for young children																			
Not working	55	1,88%	€ 1.415,36	-	-	-	4	0,31%	€ 1.437,54	-	-	-	4	0,43%	€ 1.337,38	-	-	-	
Working part-time	29	0,99%	€ 1.554,28	-	-	-	4	0,31%	€ 1.437,54	-	-	-	2	0,22%	€ 1.437,54	-	-	-	
Working full-time	11	0,38%	€ 1.253,64	-	-	-	4	0,31%	€ 1.437,54	-	-	-	0	-	-	-	-	-	
Minimum income with italian experimented threshold																			
Not working	49	1,68%	€ 4.667,82	40	1,37%	€ 4.897,79	21	5,41%	€ 4.336,68	20	5,15%	€ 4.521,12	16	1,73%	€ 5.366,51	15	1,63%	€ 4.930,64	€ 282,00
Working part-time	15	0,51%	€ 1.471,82	4	0,14%	€ 497,69	2	0,52%	€ 2.054,82	1	0,26%	€ 1.506,39	7	0,76%	€ 4.357,59	7	0,76%	€ 2.608,02	
Working full-time	0	-	-	0	-	-	0	-	-	0	-	-	7	0,76%	€ 4.357,59	7	0,76%	€ 2.608,02	
Minimum income with threshold equal to the minimum pension																			
Not working	60	2,05%	€ 5.608,92	47	1,61%	€ 5.984,61	22	1,68%	€ 5.295,81	21	1,60%	€ 5.412,66	24	2,60%	€ 5.403,74	20	2,17%	€ 5.600,31	€ 350,57
Working part-time	21	0,72%	€ 3.482,84	21	0,72%	€ 3.482,84	6	0,46%	€ 4.818,00	6	0,46%	€ 4.818,00	12	1,30%	€ 4.531,85	7	0,76%	€ 5.036,57	
Working full-time	0	-	-	0	-	-	0	-	-	0	-	-	12	1,30%	€ 4.531,85	7	0,76%	€ 5.036,57	
Minimum income with threshold equal to the absolute poverty line																			
Not working	71	2,43%	€ 6.418,80	57	1,95%	€ 6.591,66	22	1,68%	€ 5.440,39	21	1,60%	€ 5.525,11	29	3,14%	€ 6.628,60	23	2,49%	€ 5.339,52	€ 367,94
Working part-time	28	0,96%	€ 4.279,31	28	0,96%	€ 4.279,31	7	0,53%	€ 4.090,72	7	0,53%	€ 4.090,72	16	1,73%	€ 6.254,02	16	1,73%	€ 6.254,02	
Working full-time	4	0,14%	€ 1.037,83	0	-	-	1	0,08%	€ 2.295,27	0	-	-	14	1,52%	€ 6.425,61	11	1,19%	€ 5.406,30	
Minimum income with threshold equal to the 80% of relative poverty line																			
Not working	104	3,56%	€ 10.614,79	89	3,05%	€ 10.360,98	22	1,68%	€ 10.602,84	22	1,68%	€ 10.412,67	39	4,23%	€ 11.470,26	37	4,01%	€ 10.779,79	€ 658,76
Working part-time	70	2,40%	€ 7.523,81	70	2,40%	€ 7.523,81	19	1,45%	€ 5.491,52	19	1,45%	€ 5.491,52	31	3,36%	€ 9.433,13	31	3,36%	€ 9.433,13	
Working full-time	27	0,92%	€ 4.708,89	11	0,38%	€ 2.807,10	5	0,38%	€ 3.256,64	1	0,08%	€ 6.878,99	31	3,36%	€ 8.803,35	23	2,49%	€ 8.525,07	
Minimum income with threshold equal to the relative poverty line																			
Not working	114	3,90%	€ 14.036,00	101	3,46%	€ 13.502,83	22	1,68%	€ 13.438,81	22	1,68%	€ 13.248,64	44	4,77%	€ 14.950,27	40	4,33%	€ 14.854,16	€ 823,45
Working part-time	94	3,22%	€ 9.997,57	94	3,22%	€ 9.997,57	20	1,53%	€ 8.113,16	20	1,53%	€ 8.113,16	36	3,90%	€ 13.078,38	36	3,90%	€ 13.078,38	
Working full-time	50	1,71%	€ 6.786,45	26	0,89%	€ 4.802,18	6	0,46%	€ 6.298,15	3	0,23%	€ 5.267,47	34	3,68%	€ 13.190,39	31	3,36%	€ 11.114,06	

Table 7.2 shows the results on average participation rates for the different possibilities for the IL=20 case while table 7.3 shows results for the IL=10 case.

It is worth noting that following results are true under all possible mechanisms of earnings exemption, including when 100% of labor earnings are included in family income, meaning that what matters in terms of participation decisions is only the absolute level of the income threshold.

In the case of married women, the baseline case (the one without social transfer) is the worst in term of labor participation. This fact supports the idea that social transfers are able to weaken the economic constraints that in poor couples prevent women labor participation. It exists a disincentive effect but the income threshold level is crucial in determining its magnitude, quite limited under all possible transfer schemes. Moreover, at the higher possible threshold (poverty line) it vanish almost completely[17].

For single women living with parents, the threshold level is crucial in determining the existence of a disincentive effect. This could be related to the fact that social transfers refer to the family as a whole, meaning that they are linked primary to parents characteristics in terms of employment and eligibility criteria. What is relevant, in this case, is if by taking up a paid job daughter will cause the family to loose the transfer it was entitled to receive. Labor disincentive effect takes place only with low thresholds (experimented, minimum pension and absolute poverty) and the magnitude is very limited. When 80% of relative poverty line is taken as benchmark it vanishes and when the full relative poverty line is considered a reverse, therefore positive, effect appears.

Even more striking are the results for single women living alone, where there is never a disincentive effect. Participation increases in all cases and the increase is larger the higher the threshold level. Minimum income transfers seem then to allow lone women to work or to work more by, for example, giving them the possibility to cover fixed costs implied by labour market participation. This result could be also related to the fact that actual social

[17]It could be the case that this changes in participation rate are driven mainly by unobservable factors we cannot control for.

transfers and 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.

Table 7.2: Average simulated participation rates with IL=20 and type I wages

	Status quo	A	B	C	D	E	F
75% earnings							
Married women							
0	53,269%	53,829%	53,761%	53,724%	53,675%	53,499%	53,409%
20 hours	9,757%	9,610%	9,636%	9,642%	9,648%	9,667%	9,671%
40 hours	36,974%	36,561%	36,603%	36,635%	36,677%	36,834%	36,920%
Single women living alone							
0	17,183%	17,124%	16,529%	16,472%	16,473%	16,332%	16,296%
20 hours	10,219%	10,317%	10,409%	10,410%	10,413%	10,381%	10,348%
40 hours	72,598%	72,558%	73,062%	73,118%	73,114%	73,286%	73,356%
Single women living with parents							
0	39,689%	39,755%	39,619%	39,548%	39,460%	39,280%	39,175%
20 hours	7,947%	7,934%	7,955%	7,966%	7,980%	8,003%	8,014%
40 hours	52,364%	52,311%	52,427%	52,486%	52,560%	52,717%	52,811%
80% earnings							
Married women							
0	53,269%	53,829%	53,764%	53,728%	53,681%	53,496%	53,403%
20 hours	9,757%	9,610%	9,636%	9,642%	9,648%	9,669%	9,674%
40 hours	36,974%	36,561%	36,600%	36,630%	36,671%	36,835%	36,923%
Single women living alone							
0	17,183%	17,124%	16,529%	16,472%	16,470%	16,327%	16,290%
20 hours	10,219%	10,317%	10,410%	10,412%	10,414%	10,388%	10,357%
40 hours	72,598%	72,558%	73,061%	73,115%	73,115%	73,285%	73,353%
Single women living with parents							
0	39,689%	39,755%	39,620%	39,567%	39,473%	39,272%	39,169%
20 hours	7,947%	7,934%	7,955%	7,963%	7,978%	8,006%	8,016%
40 hours	52,364%	52,311%	52,425%	52,470%	52,549%	52,723%	52,815%
85% earnings							
Married women							
0	53,269%	53,829%	53,766%	53,732%	53,686%	53,498%	53,397%
20 hours	9,757%	9,610%	9,636%	9,643%	9,649%	9,671%	9,676%
40 hours	36,974%	36,561%	36,598%	36,625%	36,665%	36,832%	36,927%
Single women living alone							
0	17,183%	17,124%	16,529%	16,473%	16,468%	16,322%	16,284%
20 hours	10,219%	10,317%	10,410%	10,415%	10,415%	10,395%	10,365%
40 hours	72,598%	72,558%	73,061%	73,112%	73,117%	73,282%	73,350%
Single women living with parents							
0	39,689%	39,755%	39,622%	39,580%	39,485%	39,264%	39,164%
20 hours	7,947%	7,934%	7,955%	7,961%	7,976%	8,008%	8,018%
40 hours	52,364%	52,311%	52,423%	52,459%	52,539%	52,727%	52,818%

	Status quo	A	B	C	D	E	F
90% earnings							
Married women							
0	53,269%	53,829%	53,768%	53,735%	53,690%	53,499%	53,392%
20 hours	9,757%	9,610%	9,636%	9,643%	9,650%	9,672%	9,678%
40 hours	36,974%	36,561%	36,595%	36,622%	36,660%	36,829%	36,930%
Single women living alone							
0	17,183%	17,124%	16,529%	16,473%	16,468%	16,318%	16,279%
20 hours	10,219%	10,317%	10,411%	10,416%	10,415%	10,400%	10,373%
40 hours	72,598%	72,558%	73,061%	73,111%	73,117%	73,282%	73,348%
Single women living with parents							
0	39,689%	39,755%	39,624%	39,582%	39,497%	39,260%	39,160%
20 hours	7,947%	7,934%	7,954%	7,961%	7,975%	8,010%	8,019%
40 hours	52,364%	52,311%	52,422%	52,457%	52,528%	52,730%	52,821%
95% earnings							
Married women							
0	53,269%	53,829%	53,770%	53,738%	53,694%	53,500%	53,388%
20 hours	9,757%	9,610%	9,636%	9,644%	9,650%	9,674%	9,681%
40 hours	36,974%	36,561%	36,593%	36,618%	36,655%	36,826%	36,931%
Single women living alone							
0	17,183%	17,124%	16,528%	16,472%	16,469%	16,315%	16,274%
20 hours	10,219%	10,317%	10,411%	10,417%	10,415%	10,405%	10,380%
40 hours	72,598%	72,558%	73,060%	73,110%	73,116%	73,279%	73,346%
Single women living with parents							
0	39,689%	39,755%	39,626%	39,585%	39,510%	39,259%	39,151%
20 hours	7,947%	7,934%	7,954%	7,961%	7,973%	8,011%	8,022%
40 hours	52,364%	52,311%	52,420%	52,455%	52,517%	52,730%	52,827%
100% earnings							
Married women							
0	53,269%	53,829%	53,772%	53,740%	53,698%	53,501%	53,385%
20 hours	9,757%	9,610%	9,636%	9,645%	9,651%	9,676%	9,683%
40 hours	36,974%	36,561%	36,591%	36,615%	36,651%	36,823%	36,932%
Single women living alone							
0	17,183%	17,124%	16,528%	16,472%	16,469%	16,313%	16,268%
20 hours	10,219%	10,317%	10,412%	10,418%	10,416%	10,408%	10,386%
40 hours	72,598%	72,558%	73,060%	73,110%	73,115%	73,279%	73,345%
Single women living with parents							
0	39,689%	39,755%	39,628%	39,577%	39,520%	39,263%	39,142%
20 hours	7,947%	7,934%	7,954%	7,962%	7,971%	8,011%	8,025%
40 hours	52,364%	52,311%	52,418%	52,461%	52,509%	52,726%	52,833%

A= No social transfer
B= experimented threshold
C= Minimum pension threshold
D= Absolute poverty threshold
E= 80% relative poverty threshold
F= Relative poverty threshold

Table 7.3: Average simulated participation rates with IL=10, M=5 and random wages

	Status quo	A	B	C	D	E	F
75% earnings							
Married women							
0	49,653%	49,798%	49,763%	49,757%	49,746%	49,720%	49,703%
10 hours	1,738%	1,733%	1,735%	1,735%	1,736%	1,736%	1,736%
20 hours	10,557%	10,524%	10,534%	10,535%	10,538%	10,542%	10,544%
30 hours	6,265%	6,246%	6,251%	6,251%	6,253%	6,256%	6,258%
40 hours	31,789%	31,699%	31,717%	31,720%	31,728%	31,747%	31,759%
Single women living alone							
0	18,082%	18,048%	17,589%	17,545%	17,544%	17,417%	17,376%
10 hours	1,711%	1,723%	1,724%	1,723%	1,723%	1,718%	1,717%
20 hours	9,650%	9,687%	9,744%	9,748%	9,748%	9,747%	9,741%
30 hours	8,519%	8,529%	8,577%	8,584%	8,584%	8,596%	8,598%
40 hours	62,037%	62,017%	62,363%	62,400%	62,400%	62,522%	62,568%
Single women living with parents							
0	37,975%	37,995%	37,959%	37,929%	37,880%	37,724%	37,628%
10 hours	1,493%	1,492%	1,493%	1,494%	1,495%	1,496%	1,497%
20 hours	7,760%	7,757%	7,762%	7,766%	7,773%	7,787%	7,794%
30 hours	6,547%	6,545%	6,549%	6,552%	6,557%	6,573%	6,582%
40 hours	46,225%	46,210%	46,237%	46,259%	46,295%	46,419%	46,498%
80% earnings							
Married women							
0	49,653%	49,798%	49,764%	49,758%	49,747%	49,720%	49,704%
10 hours	1,738%	1,733%	1,735%	1,735%	1,736%	1,736%	1,736%
20 hours	10,557%	10,524%	10,534%	10,535%	10,538%	10,542%	10,544%
30 hours	6,265%	6,246%	6,250%	6,251%	6,253%	6,256%	6,258%
40 hours	31,789%	31,699%	31,716%	31,712%	31,727%	31,746%	31,758%
Single women living alone							
0	18,082%	18,048%	17,588%	17,545%	17,544%	17,415%	17,373%
10 hours	1,711%	1,723%	1,724%	1,723%	1,723%	1,718%	1,716%
20 hours	9,650%	9,687%	9,745%	9,749%	9,749%	9,749%	9,743%
30 hours	8,519%	8,529%	8,580%	8,584%	8,584%	8,597%	8,599%
40 hours	62,037%	62,017%	62,363%	62,400%	62,400%	62,521%	62,569%
Single women living with parents							
0	37,975%	37,995%	37,954%	37,938%	37,887%	37,726%	37,627%
10 hours	1,493%	1,492%	1,493%	1,494%	1,495%	1,497%	1,498%
20 hours	7,760%	7,757%	7,763%	7,765%	7,772%	7,788%	7,795%
30 hours	6,547%	6,545%	6,549%	6,551%	6,557%	6,573%	6,583%
40 hours	46,225%	46,210%	46,240%	46,253%	46,289%	46,416%	46,498%
85% earnings							
Married women							
0	49,653%	49,798%	49,764%	49,759%	49,748%	49,721%	49,704%
10 hours	1,738%	1,733%	1,735%	1,735%	1,736%	1,736%	1,736%
20 hours	10,557%	10,524%	10,534%	10,535%	10,537%	10,542%	10,544%
30 hours	6,265%	6,246%	6,250%	6,251%	6,252%	6,256%	6,258%
40 hours	31,789%	31,699%	31,716%	31,719%	31,726%	31,745%	31,758%
Single women living alone							
0	18,082%	18,048%	17,588%	17,545%	17,544%	17,414%	17,371%
10 hours	1,711%	1,723%	1,724%	1,723%	1,723%	1,718%	1,716%
20 hours	9,650%	9,687%	9,745%	9,749%	9,749%	9,750%	9,745%
30 hours	8,519%	8,529%	8,580%	8,584%	8,584%	8,597%	8,600%
40 hours	62,037%	62,017%	62,363%	62,399%	62,399%	62,521%	62,568%
Single women living with parents							
0	37,975%	37,995%	37,958%	37,940%	37,892%	37,729%	37,627%
10 hours	1,493%	1,492%	1,493%	1,494%	1,495%	1,497%	1,498%
20 hours	7,760%	7,757%	7,762%	7,765%	7,771%	7,788%	7,795%
30 hours	6,547%	6,545%	6,549%	6,551%	6,556%	6,573%	6,583%
40 hours	46,225%	46,210%	46,238%	46,251%	46,286%	46,413%	16,497%

	Status quo	A	B	C	D	E	F
90% earnings							
Married women							
0	49,653%	49,798%	49,765%	49,760%	49,749%	49,722%	49,704%
10 hours	1,738%	1,733%	1,735%	1,735%	1,736%	1,736%	1,736%
20 hours	10,557%	10,524%	10,534%	10,535%	10,537%	10,542%	10,544%
30 hours	6,265%	6,246%	6,250%	6,251%	6,252%	6,256%	6,258%
40 hours	31,789%	31,699%	31,716%	31,718%	31,725%	31,745%	31,757%
Single women living alone							
0	18,082%	18,048%	17,588%	17,545%	17,544%	17,412%	17,369%
10 hours	1,711%	1,723%	1,724%	1,723%	1,723%	1,718%	1,712%
20 hours	9,650%	9,687%	9,745%	9,750%	9,750%	9,752%	9,747%
30 hours	8,519%	8,529%	8,580%	8,585%	8,585%	8,598%	8,600%
40 hours	62,037%	62,017%	62,363%	62,398%	62,399%	62,520%	62,568%
Single women living with parents							
0	37,975%	37,995%	37,958%	37,941%	37,897%	37,733%	37,630%
10 hours	1,493%	1,492%	1,493%	1,494%	1,495%	1,497%	1,497%
20 hours	7,760%	7,757%	7,762%	7,765%	7,770%	7,788%	7,796%
30 hours	6,547%	6,545%	6,549%	6,551%	6,555%	6,573%	6,583%
40 hours	46,225%	46,210%	46,237%	46,250%	46,282%	46,409%	46,494%
95% earnings							
Married women							
0	49,653%	49,798%	49,766%	49,761%	49,750%	49,723%	49,704%
10 hours	1,738%	1,733%	1,735%	1,735%	1,736%	1,736%	1,736%
20 hours	10,557%	10,524%	10,534%	10,535%	10,537%	10,542%	10,544%
30 hours	6,265%	6,246%	6,250%	6,251%	6,252%	6,256%	6,258%
40 hours	31,789%	31,699%	31,715%	31,718%	31,725%	31,744%	31,757%
Single women living alone							
0	18,082%	18,048%	17,588%	17,544%	17,545%	17,411%	17,367%
10 hours	1,711%	1,723%	1,724%	1,723%	1,723%	1,718%	1,716%
20 hours	9,650%	9,687%	9,746%	9,750%	9,750%	9,754%	9,749%
30 hours	8,519%	8,529%	8,580%	8,585%	8,585%	8,598%	8,601%
40 hours	62,037%	62,017%	62,363%	62,398%	62,398%	62,519%	62,567%
Single women living with parents							
0	37,975%	37,995%	37,958%	37,942%	37,902%	37,736%	37,631%
10 hours	1,493%	1,492%	1,493%	1,494%	1,495%	1,497%	1,497%
20 hours	7,760%	7,757%	7,762%	7,765%	7,770%	7,788%	7,796%
30 hours	6,547%	6,545%	6,549%	6,551%	6,555%	6,573%	6,583%
40 hours	46,225%	46,210%	46,237%	46,249%	46,279%	46,406%	46,493%
100% earnings							
Married women							
0	49,653%	49,798%	49,766%	49,762%	49,751%	49,724%	49,704%
10 hours	1,738%	1,733%	1,735%	1,735%	1,736%	1,736%	1,737%
20 hours	10,557%	10,524%	10,534%	10,535%	10,537%	10,542%	10,545%
30 hours	6,265%	6,246%	6,250%	6,251%	6,252%	6,256%	6,258%
40 hours	31,789%	31,699%	31,715%	31,717%	31,724%	31,743%	31,757%
Single women living alone							
0	18,082%	18,048%	17,587%	17,544%	17,544%	17,410%	17,365%
10 hours	1,711%	1,723%	1,724%	1,723%	1,723%	1,718%	1,716%
20 hours	9,650%	9,687%	9,746%	9,751%	9,750%	9,755%	9,751%
30 hours	8,519%	8,529%	8,580%	8,585%	8,585%	8,598%	8,602%
40 hours	62,037%	62,017%	62,363%	62,398%	62,398%	62,519%	62,567%
Single women living with parents							
0	37,975%	37,995%	37,957%	37,919%	37,910%	37,742%	37,632%
10 hours	1,493%	1,492%	1,493%	1,494%	1,494%	1,497%	1,497%
20 hours	7,760%	7,757%	7,763%	7,768%	7,769%	7,788%	7,797%
30 hours	6,547%	6,545%	6,549%	6,553%	6,554%	6,572%	6,583%
40 hours	46,225%	46,210%	46,238%	46,266%	46,273%	46,401%	46,491%

8 Conclusions

Minimum income policies are often seen as an effective instrument to fight poverty and social exclusion. Their main weakness relies on the possible disincentive effect on labor market participation they might cause in the bottom part of income distribution. The problem is that individuals with low wage and not so attractive job perspectives could find, myopically, more convenient to remain by purpose out of the labor market or to become unemployed in order to be included in the welfare programme. On a long run perspective, off course, this is a highly undesirable result. The results we presented suggest that it is not obvious at all that minimum income policies generate a disincentive effect.

Using a structural model of labour supply based on a discrete choices, we have simulated the effects that a minimum income policies would have on female labor supply in Italy. We have considered different groups of women (married, single living with parents and single living alone) and different combination of income eligibility criteria (five different thresholds equal to the experimented one, minimum pension, absolute poverty, 80% and total relative poverty line) and level of labor earnings exemption.

Our results show that the mechanism of labor earnings exemption, studied for avoiding the poverty trap mechanism, seems not be relevant in female participation decisions. What really matters is the level of the income eligibility criteria: the higher that level the weaker the disincentive effect. Moreover, this effect exists only for some type of women categories. A disincentive effect shows up only in the case of married women and it tends to vanish the higher the threshold used. Single living with parents face a disincentive effect only under lower thresholds. Moreover, social transfers always generate a positive effect on labour participation of single women living alone.

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