From housewives to independent earners:
behavioural reactions of Italian women to changes in the tax system

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Preliminary version

ABSTRACT

In the last decade, interest in in-work benefits has grown in most European countries. In-work benefits are means-tested cash transfers given to individuals, through the tax system, conditional on their employment status. They are intended to enhance the incentives to accept work and redistribute resources to low income groups. In-work benefits might be one of the pillars of a redesigned welfare system in Italy aiming at increasing the female labour market participation, among the lowest in Europe, and redistributing resources to the working poor.
This paper explores the potential scope to enhance both the incentive and the redistributive effects of the Italian tax system. The potential introduction of a family based and an individual in-work benefit in Italy is simulated by using EUROMOD, the EU-wide tax-benefit microsimulation model. The proposed new benefits are financed through the contextual abolition of the existing tax credit targeted to inactive people. Taking into account any detail of the tax-benefit I apply a static structural discrete model of labour supply to analyse behavioural reactions of women in couples and lone mothers separately.
The research confirms that the abolition of the existing tax credit for dependent person and the introduction of new family in-work benefits might lead to an increase of labour supply of women in couples of 3 percentage points and lone mothers of 4 percentage points. As expected, individual in-work benefits seem to be more efficient for women in couples which enhance their labour market participation by 6 percentage points. Most of the behavioural changes take places in the bottom part of the income distribution with clear redistributive effects that lead in a reduction in poverty rates of 2 percentage points for women in couples and of 5 percentage points for lone mothers.

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This paper uses EUROMOD version D25. EUROMOD is continually being improved and updated. Any remaining errors, results produced, interpretations or views presented are the author's responsibility. I am indebted to all past and current members of the EUROMOD consortium for the construction and development of EUROMOD. This paper uses data from the *IT-SILC XUDB 2006 – version April 2008*, made available by ISTAT who does not bear any responsibility for the analysis or interpretation of the data reported here.

1. Introduction

In the last decade, interest in in-work benefits (IWBs) has grown in most European countries. In-work benefits provide cash transfers through the tax system to individuals with low earnings. They belong to the family of "make work pay" (OECD, 2003) policies since they are conditional on employment status of the recipient. In-work benefits aim at enhancing the incentives to accept work by increasing the financial value of the work and redistributing resources to low income groups through transfers to the working poor (Pearson and Scarpetta, 2000; Blundell, 2006). Saez (2002) shows that in-work benefits may configure as optimal income transfers when the individual choice is whether or not to enter the labour force rather than varying the number of hours worked. In this case, Saez shows that in-work benefits are more efficient than guaranteed income support schemes. Employment effects, as well as distributional effects, also make in-work benefits particularly favoured in the political agenda of countries traditionally not characterised by generous social assistance programmes.

In-work benefits can be family based or individually-based. Family based in-work benefits are well established in Anglo-Saxon countries. The Family Income Supplement was introduced in the UK in 1971 and it has been modified several times since then, with the introduction of the Working Family Tax Credit (1999) and most recently the Working Tax Credit (Brewer, 2003). The US, Ireland and New Zealand have also introduced family based in-work benefit schemes. Other countries, such as Australia, Canada, Belgium and France, have implemented individual in-work benefits, targeting individual family members rather than the family as a whole (OECD, 2003).

The two different types of in-work benefits share common objectives in terms of enhancing labour market participation and financial resources of low income groups. However, individual in-work benefits tend to shift the aim from redistribution towards work-incentive aspects. From a purely employment based point of view OECD recommends the implementation of individual in-work benefits (OECD, 2003). Family based policies may discourage the labour market participation of the second earner mainly due to income effect: in a couple the additional employment income would lead the family to lose the eligibility of receiving the benefit with only marginal financial advantage. This scenario has been confirmed by ex ante and ex post analyses of the labour market implication of the British in-work benefits (Blundell et al., 2000; Brewer et al., 2006; Francesconi and Van der Klaauw,

2007) and may be crucial in those countries where non-employment is concentrated among wives. On the other hand, individually-based policies may be less well targeted on poor households, because individuals with low earnings would receive the benefit irrespective of partner's income and other non labour income. This type of support to relatively poor individuals belonging to well-off families might be particularly common in countries characterized by the presence of multigenerational families.

The increasing role played by the in-work benefits in the Anglo-Saxon welfare system and their extension to continental European countries, with positive evidence of redistributive effects and social inclusion of low skilled workers, should encourage other countries to study the feasibility of implementing such policies. In particular, these policies might be one of the pillars of redesigned welfare systems in Italy aimed at achieving specific targets in terms of social protection (Baldini et al., 2002; Boeri and Perotti, 2001; Owens, 2006). A reduction in the poverty rates (among the highest in Europe) and an increase in the women labour participation rate (much lower than in other countries) are two important policy issues currently under debate in Italy (OECD, 2006). However, the potential role of in-work benefits as part of a redesigned welfare system has not been analysed.

This paper aims at filling this gap, analysing the effects of implementing two different types of in-work benefits in Italy, taking into account the behavioural responses of women in couples and lone mothers separately. The proposed new benefits are financed through the contextual abolition of the existing tax credit targeted to inactive people. The first in-work benefit is a family based policy using the British Working Tax Credit as an exemplar (Brewer, 2003). The second IWB is an individual scheme implemented as a low wage subsidy conditional on working at least 16 hours per week (Phelps, 1994). Previous studies show that the effects of new in-work benefits in countries where they do not already exist depend heavily on the structure of the benefit and its interaction with the national framework (Bargain and Orsini, 2006; Bertola, 2000; Haan and Myck, 2007).

This paper uses the Italian component of EUROMOD, the multi-country European-wide tax-benefit model (Sutherland, 2007), in order to explore the potential scope to enhance both the incentive and the redistributive effects of the Italian tax system. The behavioural reactions of women are taken into account by applying a static structural discrete model of labour supply.

The research confirms that the abolition of the existing tax credit and the introduction of new family in-work benefits might lead to an increase of labour supply of women in couples of 3 percentage points and lone mothers of 4 percentage points. As expected, individual in-work benefits seem to be more efficient for women in couples which enhance their labour market participation by 6 percentage points. Most of the behavioural changes take places in the bottom part of the income distribution with clear redistributive effects that lead in a reduction in poverty rates of 2 percentage points for women in couples and of 5 percentage points for lone mothers.

The rest of the paper is organised as follows: section 2 contains a short overview of the Italian economic and institutional framework and explains the proposed reform. Section 3 provides a description of the labour supply model, followed by data and methods in Section 4. Section 5 illustrates the model estimates. Section 6 provides the evidence of behavioural responses under new scenarios. Section 7 concludes.

2. Economic outlook and the proposed reform

The Italian economic outlook shows a number of features that can make in-work benefits particularly well tailored as part of a reformed welfare system. Poverty and inequality rates are among the highest in the EU-15 (Eurostat, 2007): in 2003, the share of people at risk of poverty was around 19% against an EU-15 average of 17% and the inequality of income distribution measured by the Gini index was equal to 0.33 against an EU-15 average of 0.30.
The level of public support through the tax-benefit system for low income people is very limited because of the absence of any generalised income support and individuals must rely almost exclusively on their own earnings that are not taxed up to the threshold corresponding to the personal allowance. Existing benefits conditional on employment status, in the form of Family Allowances, are limited and only targeted on specific categories of people. Generalised low earnings and the absence of generous income support schemes mean that more than half people at risk of poverty have a job. In other words, the working poor are at the very bottom of the income distribution.
The low level of general social protection nets is reflected by the share of GDP spent on social protection: 26.4% compared with an EU-15 average of 28.3% and with a large part of it spent on public pensions and support to elderly people.

In 2003 Italy was far from the European average in terms of female education attainment and far from the Lisbon targets (Council of the European Union, 2000) in terms of female labour market participation (i.e. 57% by 2005). The percentage of low-educated women was around 57% ranged, against an average level in the EU-15 fewer than 40%. Moreover, the employment rate of women was much lower than elsewhere: fewer than 40% of women with lower than secondary education level is in paid employment.

Such employment rates refer to both women in couples and lone mothers. However, in Italy, lone mothers, whose number has increased over the last decade, are more likely to work than women in couples due to the absence of relevant social protection schemes (Bradshaw et al., 1996).

The aim of this paper is to evaluate the potential role of in-work benefits, both family based and individually-based, in order to promote social inclusion and to support income of those at the bottom of the income distribution. In particular, the analyses will focus on the women labour market participation (in couples and lone mother separately), traditionally more vulnerable than men due to their role in caring family responsibilities.

Given the British experience in in-work benefits and the recent developments of these policies I simulate the family based in-work benefit using the UK Working Tax Credit (WTC) as an exemplar (i.e. structure and relative magnitude of the parameters). The existing Working Families Tax Credit was subsumed within a new Child Tax Credit (CTC) and the Working Tax Credit (WTC) in 2003 in order to simplify support for families with children and to raise income of those on low incomes but without children (Brewer, 2003). The Working Tax Credit is the first in-work benefit available also for childless people in the UK. Employees receive the Working Tax Credit directly by employers.

The main eligibility condition for the Working Tax Credit is that at least one person in the family works 16 or more hours a week (30 or more if there are no children). The amount of the tax credit depends on family gross income (all main sources of income with the exception of children's earnings and a disregarded amount for pensions, capital and property income) and it varies according to the composition of the family. Above the given thresholds the tax credit is tapered out at the rate of 37%.

Figure 1 shows the structure of the family based in-work benefit with the relevant parameters for each country. Families with annual income below a minimum threshold (i.e. T1 in the figure) are entitled to the full amount if at least one member works 16 or more hours a week. The full amount of the tax credit varies if the beneficiary is a single person without children

(i.e. A1 in the figure), a couple or a lone parents working part-time (i.e. A2) or full-time (i.e. A3). Incomes above the minimum threshold reduce the tax credit at the rate of 37%, and the entitlement is exhausted at different levels (i.e. T2, T3 and T4 in the figure) according to the family composition.

<FIGURE 1 around here>

I simulate the individual in-work benefit as a wage subsidy (Phelps, 1994) for all individuals working 16 or more hours a week. Such a work requirement implies that beneficiaries of this policy are individuals characterized by low hourly wages and not simply low earnings and this provides an incentive for working poor people to work at least part-time. Its structure is depicted in the Figure 2. Eligible individuals with gross earnings below the fifteenth percentile (α) of the earnings distribution are entitled to the full amount of the benefit, which is equal to an additional percentage β of their earnings. Earnings above α reduce the entitlement at the rate of 37%.

<FIGURE 2 around here>

Taking into account labour supply effects and the interaction with the existing tax-benefit instruments, the introduction of the in-work benefits is simulated being revenue neutral due to the contemporary abolition of the tax credit for dependent person. Such a tax credit has disincentive effects on labour supply of the second earner in a couple, might be a cause of horizontal inequity and is not a well targeted way of support through the tax system given that rich earner can benefit from that tax credit related to dependent persons in the family. The abolition of this tax credit does not affect the existing tax relief targeted to families with children.

Two assumptions underlie the simulations. First, all the administrative burden and procedures involved by such schemes are ignored, although the British experience reveals the relevance of both the timing and the structure of the payment system (Brewer, 2006). Second, the employee receives the full amount of the in-work benefits without any reduction in his gross wage. On the one hand, this requires procedures to prevent firms decreasing the gross wage to a level lower than before the introduction of the in-work benefits. On the other hand, the introduction of a binding minimum wage and in-work benefits could be a joint step. This occurred in the UK where the minimum wage came into force in April 1999 before the introduction of the Working Families' Tax Credit.

3. Behavioural responses: empirical methodology

In order to simulate the behavioural responses of women to the changes in the tax system, I follow the well established literature of static structural discrete models of labour supply (Aaberge et al. 1995, Van Soest 1995, Blundell et al. 2000).[2] Such models provide direct estimations of preferences over income and hours of work, specifying the possible alternatives an individual faces through a discrete choice set. The assumption behind this kind of labour supply models is that utility-maximising individuals and couples choose from a relatively small number of hour's levels. Indeed the choice of numbers of hours worked is also restricted in practice due to demand side constraints and the level of labour market flexibility, in particular in Italy. To each combination of worked hours corresponds a given budget on the basis of the potential earnings of each individual and the tax benefit system rules.

In my model I only allow women (in couples and lone mother separately) to modify their labour supply and I consider the hours worked by the men as observed in the data. I assume that the male labour supply is inelastic while women are more flexible in their choice given their traditional involvement in care responsibilities and housework. Nevertheless, the utility maximization takes place at couple level considering the net income of both the partners.

I group the working hours in five intervals (0-7, 8-19, 20-30, 31-40, 41+) and the choice set of each woman is made up of five $j = 0, \ldots, J$ alternatives: the actual choice (i.e. observed number of worked hours) plus other four alternatives sampled from the empirical density function of the hours observed within the relevant interval, respecting the proportion of women working each specific hour within that interval. This approach (Dagsvik 1994; Aaberge et al. 1995, 1999, 2006) allows me to define the different alternatives considering the relative (within each interval) demand side constraints and to have more variability in the budget set (not only due to different wage rates and tax-benefit rules but also due to different hours of work).

Given the utility function over hours of work H and disposable income Y,

$$U = U(H,Y) \tag{1}$$

[2] See Creedy and Kalb (2005) for an extensive review of discrete choice modelling in the analysis of labour supply. Train (2003) provides an analytical description of the different model specifications.

a woman *f* chooses the number of hours of work in order to maximise the utility of the couple under the budget constraint

$$Y(H_f) = E_f(w_f, H_f) + E_m + N + B(E_f, E_m \mid X) - t(E_f, E_m, B \mid X) \quad (2)$$

where the disposable income Y depends on partners' earnings (E_f and E_m), other incomes (N), benefits (B) and taxes (t), which both depend on family characteristics (X).

At each alternative j, the utility function can be decomposed in the deterministic and the stochastic part:

$$U_j = V_j + \varepsilon_j \qquad \forall j \in J \quad (3)$$

where V_j is the portion of utility given by the observable characteristics while the error term ε_j captures the portion from unobservable characteristics.

I adopt for the deterministic a quadratic functional form (Stern, 1986) linear in the parameters with the following form:

$$V_j = \alpha Y_j + \beta Y_j^2 + \gamma H_j + \delta H_j^2 + \lambda Y_j H_j \quad (4)$$

where income and hours of work enter in both level and square. Observed heterogeneity, captured by observable characteristics, cannot enter the model directly because these characteristics do not vary across alternative. It enters through the linear utility parameters:

$$\alpha = \alpha_0 + \alpha_1' X \quad (5)$$

$$\gamma = \gamma_0 + \gamma_1' X \quad (6)$$

allowing marginal utilities of income (Y) and hours of work (H) depending on a vector of family characteristics (X) including age, education level and number of children.

When a woman decides to work full time she faces additional actual and psychological costs related to the full time work which are unobservable (i.e. related to childcare costs for women with children, other care expenditures, transportation costs, additional expenditures related to the housework). I model these costs as a fixed component, when she works more than thirty hours per week, subtracted from the disposable income corresponding to each full time choice. Including fixed costs of working (FC), the deterministic part of the utility function takes the following form:

$$V_j = \alpha(Y\text{-}FC)_j + \beta(Y\text{-}FC)_j^2 + \gamma H_j + \delta H_j^2 + \lambda(Y\text{-}FC)_j H_j \quad (7)$$

allowing the fixed costs of working entering the model and being interacted with the presence of children.[3]

The choice a woman faces follows this probability rule

$$\begin{aligned} Pr_k(H_k) &= Pr[U(H_k) > U(H_j)] \qquad \forall k \neq j,\ j = 1 \ldots J \\ &= Pr[(V_k + \varepsilon_k) > (V_j + \varepsilon_j)] \qquad \forall k \neq j,\ j = 1 \ldots J \\ &= Pr[(\varepsilon_j - \varepsilon_k) < (V_k - V_j)] \qquad \forall k \neq j,\ j = 1 \ldots J \end{aligned} \quad (8)$$

according to which the probability that a woman chooses the alternative *k* if equal to the probability that the utility associated with the choice *k* is bigger than the utility associated with any other choices *j*.

If the stochastic component ε_j of the utility function is assumed to be independently and identically distributed across alternatives and households according to the Extreme Value distribution, McFadden (1974) proves that probability of choosing the alternative *k* becomes

$$\Pr_k = \frac{\exp(U_k)}{\sum_J \exp(U_k)} \qquad \forall k \in J \quad (9)$$

which is a conditional logit specification. The parameters can be estimated using Simulated Maximum Likelihood.

Conditional logit estimation assumes that IIA property holds and there is no correlation between the error terms of the different hours alternatives. Despite this restrictive assumption Haan (2006) shows that the conditional logit model provides an adequate model choice for the analysis of labour supply.

However a possibility to obviate the limitations of the conditional logit specification is to allow unobserved heterogeneity to enter the utility function through the linear utility parameters. Expressions 5) and 6) become:

$$\alpha = \alpha_0 + \alpha_1' X + \nu_\alpha \quad (10)$$

[3] An alternative way to take into account unobserved characteristics of the job correlated with the number of worked hours (relative demand side constraints, flexibility, costs of working) is to introduce alternative specific constants in the utility function (Train 2003, van Soest 1995). I also tried this specification, see Appendix X.

$$\gamma = \gamma_0 + \gamma_1' X + \nu_\gamma \quad (11)$$

where ν_α and ν_γ are assumed to be normally distributed with variances σ_α and σ_γ and are allowed to be correlated. Such a model is a mixed logit specification.

In order to simulate the behavioural responses of women to policy changes and to respect the probabilistic form of the discrete choice model, I employ the so-called maximum probability rule (Bargain et al 2006, Creedy and Duncan 2002, Haan and Myck 2007). This ensures that the optimal choice of each individual, given the estimated labour supply function, corresponds to the choice actually made. However, the characteristics included in the deterministic part of the utility function do not guarantee that the maximum utility is associated with the actual choice. Any discrepancy can be interpreted as individual random preference heterogeneity and this term can be factored back into the underlying preference structure as an individual-specific parameter.[4]

The observed distribution of working hours is replicated by drawing conditionally from the stochastic error structure, such that the predicted choice probability is maximized at the observed state. In my analysis I select 100 draws for each couple and allow each draw up to 200 re-draws for alignment of the observed and predicted choice (after 200 unsuccessful trials, the observed choice is considered as fixed). Using the same draws I then apply the maximum probability rule to derive the preferred choice after the simulated policy change. Individual transitions probabilities can be approximated by taking the mean of the predicted transitions between states over the repetitions.

4. Simulation: model, data and approach

This paper uses the Italian component of EUROMOD, the multi-country European-wide tax-benefit model covering nineteen European Union member states. EUROMOD is a static microsimulation model: it combines information on relevant policy rules with detailed and representative data on individual and household circumstances drawn from national household income surveys. EUROMOD simulates most direct taxes and cash benefits except those based on contributory history which are taken from the data as the information necessary to simulate them is not available from input datasets (Sutherland, 2007). EUROMOD outputs have been checked through validation exercises at micro and macro

[4] This assumes that individual random preference heterogeneity as well as the observable preferences do not change with a policy reform.

level (Lietz and Sutherland 2005) and they have been used in a number of applications (see Bargain 2007).

The data comes from the 2004 Survey of Income and living Conditions (IT-SILC) made available by ISTAT as the Italian component of the EU-SILC project. The data contains information on 24,270 households and 60,847 individuals. Monetary values refer to the 2003 and the main demographic variables have been adjusted to match the income reference period.

The sample used in this analysis is composed of women in couples and lone mothers, restricted to those aged between 18 and 65 years, without any pension and self employment incomes and not in education. The same restrictions apply to the partner of women in couples. The final sample includes 4,820 women in couples and 682 lone mothers.

As explained above at each choice a woman faces corresponds a level of earning given by the predicted gross hourly wage times the number of hours. Predicted hourly wages are obtained using a Heckman regression including all women in the sample. The dependent variable is the logarithm of the hourly gross wage. In the outcome equation I include three dummies for education (lower secondary, higher secondary and tertiary), a variable for potential working experience (age minus years of schooling minus 6) and its square and the female regional unemployment rate. In the selection equation I also consider whether a woman is in couple, the number of children she has (including three different dummies), other household income and other earnings (except her own). See Table 1 for the results which are in line with the expectations. The likelihood ratio test of independent equations (i.e. rho = 0) indicates that the selection bias is statistically significant, justifying the Heckman procedure.

< TABLE 1 AROUND HERE>

Considering the earnings of a woman at each alternative in the choice set and any other source of income of the family and its characteristics, EUROMOD computes the disposable income of each family applying the tax-benefit system rules. This budget set is then used to estimate the labour supply model described in the Section 3. The preference estimates and the error terms are assumed to be fixed for each woman and used to predict the labour supply

effects of the simulated reforms. See Figure 3 for a schematisation of the behavioural tax-benefit model.

< FIGURE 3 AROUND HERE>

5. Model estimates

Table 2 and 3 report the coefficients of the two different specifications of the labour supply model outlined in the Section 3, a conditional logit model and a mixed logit model respectively. I estimate the effects of income and hours of work and their interactions with other demographic characteristics on the probability of choosing one of the alternatives.

As expected from economic theory, the coefficients of linear income and its square (significant only for women in couples) indicate increasing and diminishing marginal utility of income. The coefficients of number of hours worked and its square show decreasing and diminishing marginal utility of time spent in work.

For women in couples utility of income increases with education level and with children while it decreases with age. The disutility of number of hours increases with education level and with children while it decreases with age.

For lone mothers the interactions with most of the socio-demographic characteristics are not significant but the presence of children increases the utility of income and the disutility of number of hours worked (only in the conditional logit specification).

The parameter capturing the fixed costs of working has always a positive and statistical significant coefficient while the effect of presence of children on fixed costs is not statistically significant.

In the mixed logit specification the standard deviation of the random coefficients related to income and hours of work are always significantly different from zero, revealing an important role of unobserved heterogeneity. Moreover the correlation term between the random coefficients is significant for women in couples.

According to the economic theory, the utility function should respect monotonicity and quasi-concavity with respect to income. Such conditions are checked ex-post rather than being imposed in the model specification.

The monotonicity condition is checked through the following derivative:

$$\frac{\delta U_j}{\delta Y_j} = \alpha + 2\beta Y_j + \lambda Y_j H_j > 0 \qquad (12)$$

And it is respected in the 98% of alternative-choices after the conditional logit specification by both women in couples and lone mothers. After the mixed logit specification it is respected in the 90% of choices by women in couples and in the 99% of choices by lone mothers.

The quasi-concavity check is given by the second derivative

$$\frac{\delta^2 U_j}{\delta Y_j^2} = 2\beta \leq 0 \Leftrightarrow \beta < 0 \qquad (13)$$

which is as expected when the coefficients of the income square term are significant.

6. Evidence of behavioural responses under new scenarios

The results presented in this section refer to the policy simulation which takes into account the behavioural reactions of women in couples and lone mothers using the conditional logit specification (see Annex for robustness checks using mixed logit specification).

The parameters of the new in-work benefits have been calibrated (see Figure 4) to achieve revenue neutrality once the changes in labour supply have been considered allowing for all the interactions with the existing tax-benefit instruments. Indeed the additional cost of in-work benefits is in part compensated by the abolition of the existing tax credit for dependent person and a reduction of the family allowances due to the higher means of families receiving the new in-work benefits.

<FIGURE 4 around here>

As expected, given the higher level of income at which the benefit is exhausted and less stringent working hour's requirements of the individual in-work benefit than the family based in-work benefit, the number of household beneficiaries of the individual in-work benefit (19%) is much higher than those recipients of the family based in-work benefit (11%). In some cases, more than one recipient of the individual in-work benefit belongs to the same household and this increases the number of the individuals potentially entitled to receive the individual in-work benefit. However looking at the value of the in-work benefits, it emerges

that the family based in-work benefits are double than the individual in-work benefits both in terms of average and maximum value. Average month family based (individual) in-work benefits are €100 (€22) for women in couples and € 60 (€ 20) for lone mothers. Maximum month family based (individual) in-work benefits are €523 (€207) for women in couples and € 424 (€ 142) for lone mothers.

Table 4 reports the labour supply and redistributive effects for women in couples. Family based in-work benefit would increase the labour supply of women currently not working by 3%, with additional smaller percentage increases also among women currently working. Individual based in-work benefit would have a larger effect (+5.6%) on women currently not working and on those working between 8 and 19 hours (+3.65%) and those working between 20 and 30 hours (+2.3%). Taking into account such behavioural reactions, the poverty rates would decrease by 2 points, with a substantial decrease in percentage terms of poverty rates when the poverty line is set at 40% of the median of equivalised income.

<TABLE 4 around here>

It contrasts with the situation experienced in other countries where individuals at the bottom of the income distribution relies on social assistance and income support schemes more than on their earnings (Bargain and Orsini, 2006). This implies that in Italy a policy oriented at the working poor, as the in-work benefits, is also a means to support the poorest individuals.

The effects for lone mothers are reported in Table 5. The labour supply of those currently not working increases significantly more after the family based in-work benefit (+4%) than after individualised benefits (+1.2%). This is because lone mothers have generally access to both the in-work benefits and the family based in-work benefit for them is much more generous.

In both scenarios the labour supply decreases for women currently working more than 31 hours per week and this because such women have fewer incentives to work more because they lose the entitlement to receive the benefits. As expected the redistributive effects would be higher after family based in-work benefits with a reduction of 4 (6) points in the poverty rates, from 16% to 12% (27% to 22%) when the poverty line is set at 40% (60%) of the median of equivalised income.

<TABLE 5 around here>

This kind of reform would not be Pareto improving to the extent that there are people losing the existing tax credit for dependent person and not receiving the new in-work benefit (losers)

and vice versa people who would have a net benefit from the reform (gainers). Figure 5 and 6 show the distribution of gainers and losers (by quintiles of equivalised disposable income) after the two in-work benefits, among women in couples and lone mothers respectively.
Gainers are always more than losers and they are concentrated at the bottom of the income distribution. Interestingly, individual in-work benefits lead to larger share of gainers at the bottom of the income distribution than family based in-work benefits: this enhance their redistributive role irrespective of being targeted at individual level.

<FIGURE 5 and 6 around here>

In order to evaluate the impact of such a reform, it is also relevant to analyse the changes in the pre and post reform distribution of number of hours worked and where the behavioural reactions take place along the income distribution. This is what emerges from the transition matrices presented in Table 6 and 7 for women in couples and lone mothers respectively.

<TABLE 6 around here>

<TABLE 7 around here>

The positive effects in labour supply of women in couples after family based in-work benefit are focused among those who are in did not work before the reform; after the individual in-work benefit these effects are even larger but there are women who would work less after the reform. Most of the changes in labour supply are faced by those in the first quintile group where 86% of women did not work before the reform; after individual in-work benefit some of the women in the fifth quintile group would experience a reduction in their labour supply.
Among lone mothers some women face fewer incentives to work after both the reforms, in particular among those who worked more than 30 hours per week before the reform. This is because women's participation into the labour market implies a reduction in the benefit received by their working partners or the lost of their own benefit when they earn more than the maximum threshold.
On the one hand, the results contrast with the disincentive effect for secondary earners in a couple that has been assessed in the UK after the introduction of the Working Family Tax Credit (Blundell et al., 2000), showing that there is scope to enhance women labour supply also using family targeted benefits. On the other hand, the results suggest higher incentives to work for lone mothers after the family based in-work benefit given the larger generosity of such a benefit compared to the individual in-work benefit.

7. Conclusions

The increasing role played by the in-work benefits in the Anglo-Saxon welfare systems, with positive evidence of redistributive effects and social inclusion of low skilled workers, should encourage other countries to evaluate the feasibility of implementing such policies.

Taking into account the institutional framework conditions and making use of micro-simulation techniques, in this paper I consider the behavioural reaction of Italian women to the implementation of two forms of in-work benefits. The first is a family based in-work benefit, which borrows the structure of the British Working Tax Credit. The second is an individually-based in-work benefit in the form of a low wage subsidy. Italian socio-economic conditions and labour market characteristics make the comparison between the two types of in-work benefits particularly relevant. Labour supply effects are modelled through a discrete choice model that allows the women to choose among five different alternatives to maximize the utility of the couple or their own utility if lone mothers. Taking into account labour supply effects and the interaction with the existing tax-benefit instruments, the introduction of the in-work benefits is simulated being revenue neutral due to the contemporary abolition of the tax credit for dependent person. Such a tax credit has disincentive effects on labour supply of the second earner in a couple, might be a cause of horizontal inequity and is not a well targeted way of support through the tax system given that rich earner can benefit from that tax credit related to dependent persons in the family.

The analysis confirms the possibility of enhancing both the redistributive and the incentive effects of the Italian tax-benefit system through the introduction of the two different in-work benefits. The abolition of the existing tax credit and the introduction of new family in-work benefits might lead to an increase of labour supply of women in couples of 3 percentage points and lone mothers of 4 percentage points. As expected, individual in-work benefits seem to be more efficient for women in couples which enhance their labour market participation by 6 percentage points. Most of the behavioural changes take places in the bottom part of the income distribution with clear redistributive effects that lead in a reduction in poverty rates of 2 percentage points for women in couples and of 5 percentage points for lone mothers.

In Italy, given the absence of relevant income support schemes, the working poor are at the bottom of the income distribution. Although the in-work benefits cannot be considered as a primary tool in the poverty reduction, they are a means to support the poorest. This contrasts with the situation experienced in other countries where individuals at the bottom of the

income distribution relies on social assistance and income support schemes more than on their earnings.

The analyses confirm that in-work benefits might be one of the pillars of a redefined welfare system in Italy in order to enhance the economic position of working poor and to increase female occupation. However, cash transfers must be complemented by an extension of childcare provisions in order to allow women to find jobs not only more financially attractive but also reconcilable with other caring responsibilities. The inclusion of childcare expenses and availability in the structural model of labour supply is a further development of this analysis currently investigated.

References

Aaberge R., Colombino U., and Strom S. (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., Colombino U., and Wennemo T. (2006), Evaluating Alternative Representations of the Choice Sets in Models of Labour Supply, CHILD Working Paper, no 14.

Aaberge R., Dagsvik J. K., and Strom S. (1995), Labor supply responses and welfare effects of tax reforms, Scandinavian Journal of Economics 97(4): 635-659.

Baldini M, P Bosi and S Toso (2002) `Targeting Welfare in Italy: Old Problems and Perspectives on Reform`, Fiscal Studies, 23(1), 51-75.

Bargain O, and K Orsini (2006) `In-Work Policies in Europe: Killing Two Birds with One Stone`, Labour Economics, 13, 667-697.

Bargain O. (2007), Micro-simulation in action: Policy analysis in Europe using EUROMOD (ed.), Research in Labor Economics, 25, Elsevier Ltd.

Bertola G (2000) `Policy Choices and Interactions with Existing Instruments`, OECD Economic studies, 31, 185-196.

Blundell R (2006) `Earned income tax credit policies: Impact and optimality. The Adam Smith Lecture, 2005`, Labour Economics, 13, 423-443.

Blundell R, A Duncan, J McCrae, and C Meghir (2000) `The Labour Market Impact of the Working Families Tax Credit`, Fiscal Studies, 21(1), 75-104.

Boeri T and R Perotti (2001) `Less Pensions, More Welfare`. Bologna: Il Mulino.

Boeri T., Layard R., and S. Nickell (2000), `Welfare-to-Work and the fight against long-term unemployment`.

Bradshaw J, S Kennedy, M Kilkey, S Hutton, A Corden, T Eardley, H Holmes and J Neale (1996) `Policy and the Employment of Lone Parents: A comparison of Policy in 20 Countries, London, SPRC.

Brewer M (2003) `The New Tax Credits`, IFS Briefing Note No. 35.

Brewer M (2006) `Tax credits: fixed or beyond repair?` in Chote R et al. (Eds), The IFS Green Budget: January 2006. London: IFS.

Brewer M, A Duncan, A Shephard, and M J Suarez (2006) `Did Working Family Tax Credit work? The impact of in-work support on labour supply in Great Britain`, Labour Economics, 13, 699-720.

Council of the European Union (2000) Presidency Conclusion. Lisbon European Council, 23 24 March 2000.

Creedy J. and Duncan A., (2002), Behavioural microsimulation with labour supply responses, Journal of Economic Survey 16(1): 1-39.

Creedy J. and Kalb G., (2005), Discrete Hours Labour Supply Modelling: Specification, Estimation and Simulation, Journal of Economic Surveys, 19: 697-738.

Dagsvik J.K. (1994), Discrete and Continuous Choice, Max-stable Processes and Independence from Irrelevant Attributes, Econometrica, 62, 1179-1205.

Esping-Andersen G. (1990), The Three Worlds of Welfare Capitalism. Oxford: Polity Press.

Eurostat (2007), Europe in figures. Eurostat yearbook 2006-07. Eurostat Statistical books.

Ferrera M (1996), `The "Southern" Model of Welfare in Social Europe`, Journal of European Social Policy 6(1), 17-37.

Francesconi M, W Van der Klaauw (2007) `The Socioeconomic Consequences of 'In-Work' Benefit Reform for British Lone Mothers`, *Journal of Human Resources*, 42(1), 1-31.

Haan P, and M Mick (2007) `Apply with Caution: Introducing UK-Style In-Work Support in Germany`, *Fiscal Studies*, 28(1), 43-72

Haan P. (2006), Much ado about nothing: conditional logit vs. random coefficient models for estimating labour supply elasticities, Applied Economics Letters, 13(4), 251-256.

HM Revenue and Customs (2005) `Child and Working Tax Credits Statistics. Finalised annual awards 2003-2004`. London: National Statistics Publication.

Ilmakunnas S. and Pudney S. (1990), *A Model of Female Labour Supply in the Presence of Hours Restrictions*, Journal of Public Economics, 41: 183-210.

Lietz C and Sutherland H (2005) `Social Indicators and other Income Statistics using EUROMOD: an assessment of the 2001 baseline and changes 1998-2001`, EUROMOD Working Paper, EM7/04.

McFadden D. (1974), Conditional Logit Analysis of Qualitative Choice Behavior, in Frontiers in Econometrics, ed. P. Zerembka, 105-142. NewYork: Academic Press.

OECD (2003) `Employment Outlook`, Paris: OECD.

OECD (2006) `Employment Outlook`, Paris: OECD.

Owens J (2006) `Fundamental Tax Reform: An International Perspective`, National Tax Journal LIX(1), 131-164.

Pearson M, and S Scarpetta (2000) `An Overview: What Do We Know About Policies to Make Work Pay?` OECD Economic Studies, no. 31, Paris: OECD

Phelps E (1994), Raising the Employment and Pay of the Working Poor: Low wage Employment Subsidies vs the Welfare State. AER Papers and Proceedings, May, 54-88.

Saez E (2002) `Optimal income transfer programs: intensive versus extensive labour supply responses`, The Quarterly Journal of Economics 117, 1039-1073.

Stern N. H. (1986), On the Specification of Labour Supply Functions, in Blundell R. W. and Walker I. (eds.) Unemployment, Search and Labour Supply, Cambridge University Press.

Sutherland H (2007) `EUROMOD: the tax-benefit microsimulation model for the European Union` in Gupta A and A Harding (Eds), Modelling Our Future: population ageing, health and aged care. International Symposia in Economic Theory and Econometrics Vol 16, Elsevier 483-488.

Train K. E. (2003), Discrete Choice Methods with Simulation, Cambridge University Press.
Van Soest A. (1995), Structural Models of Family Labor Supply. A Discrete Choice Approach, The Journal of Human Resources, 30: 63-88.

Tables

Table 1. Heckman regression

Hourly wage (ln)		
Lower Secondary education	0.14	***
Higher Secondary education	0.46	***
Tertiary education	0.76	***
Experience	0.03	***
Experience^2	0.00	***
Female regional unemployment rate	-0.80	***
Constant	1.49	***
Selection equation		
Lower Secondary education	0.24	***
Higher Secondary education	0.85	***
Tertiary education	1.10	***
Experience	0.09	***
Experience^2	0.00	***
Couple	-0.40	***
Number of children < 3 years	-0.39	***
Number of children > 3 and < 6 years	-0.33	***
Number of children > 6 years	-0.17	***
Female regional unemployment rate	-4.99	***
Other household income	0.00	***
Other household earnings	0.00	***
Constant	-0.16	**
Rho	0.24	
Number of observations	10130	
Censored observations	5672	
Uncensored observations	4458	
Log likelihood	-6603.02	
Wald chi2(5)	1349.98	
Prob > chi2	0.00	
LR test of indep. Eqns (rho = 0): chi2(1)	11.21	
Prob > chi2	0.00	

* p<0.10, ** p<0.05, *** p<0.01

Table 2. Estimates of labour supply model – Women in couples

	Conditional logit		**Mixed logit**	
Income	1.1391	***	2.1750	***
x Aged over 40	-0.0135	***	-0.0228	***
x Primary education	-0.4534	***	-0.9928	***
x Lower Secondary education	-0.1933	**	-0.6054	***
x Higher Secondary education	-0.1072		-0.3387	**
x Children	0.0913	**	0.0855	
$Income^2$	-0.0014	*	-0.0014	
Hours	-0.3323	***	-0.5597	***
x Aged over 40	0.0023	***	0.0038	***
x Primary education	0.1204	***	0.2813	***
x Lower Secondary education	0.0748	**	0.2134	***
x Higher Secondary education	0.0532	**	0.1455	***
x Children	-0.0439	***	-0.0557	**
$Hours^2$	0.0002	*	-0.0005	*
Income x Hours	0.0008		0.0006	
Fixed cost of work	1.6652	***	1.7744	***
x Children	-0.0244		-0.0301	
Std. Dev. Income			0.5052	***
Std. Dev. Hours			0.1207	***
Corr. Income Hours			-0.0551	**
Log-Likelihood	-6663.76		-6648.59	

* p<0.10, ** p<0.05, *** p<0.01

Table 3. Estimates of labour supply model – Lone mothers

	Conditional logit		**Mixed logit**	
Income	1.1799	***	1.5644	***
x Aged over 40	0.0013		-0.0102	*
x Primary education	0.0177		-0.3389	
x Lower Secondary education	0.0079		-0.2527	
x Higher Secondary education	0.0443		-0.2774	
x No of children	0.0437	**	-0.1819	***
Income^2	0.0005		-0.0030	
Hours	-0.3418	***	-0.4423	***
x Aged over 40	-0.0091	*	0.0014	
x Primary education	-0.1103		0.0875	
x Lower Secondary education	-0.0417		0.0719	
x Higher Secondary education	-0.1595		0.0827	
x No of children	-0.1688	***	0.0485	**
Hours^2	0.0014	**	0.0013	*
Income x Hours	-0.0033		-0.0020	
Fixed cost of work	2.1991	***	2.2819	***
x No of children	-0.1585		-0.2299	
Std. Dev. Income			0.3472	**
Std. Dev. Hours			0.0815	*
Corr. Income Hours			-0.0283	
Log-Likelihood	-988.70		-987.37	

* p<0.10, ** p<0.05, *** p<0.01

Table 4. Labours supply and redistributive effects – Women in couples

	Pre reform	Family based in-work benefit	Individual in-work benefit
Labour supply, %			
0 - 7 hours	42.76	39.79	37.17
8 - 19 hours	5.46	6.67	9.11
20 - 30 hours	19.00	19.68	21.30
31 - 40 hours	26.49	27.30	26.11
41+ hours	6.29	6.56	6.30
Poverty rates			
40%	6.43	4.03	4.78
60%	14.53	12.48	12.40

Table 5. Labours supply and redistributive effects – Lone mothers

	Pre reform	Family based in-work benefit	Individual in-work benefit
Labour supply, %			
0 - 7 hours	27.71	23.89	26.43
8 - 19 hours	5.72	8.22	7.89
20 - 30 hours	19.35	23.39	20.52
31 - 40 hours	36.95	35.87	35.55
41+ hours	10.26	8.63	9.61
Poverty rates			
40%	15.99	11.89	13.21
60%	27.40	21.58	24.44

Table 6. Transition matrix (Labours supply, %) - Women in couples

Family based in-work benefit **Individual in-work benefit**

All couples

	Post reform							Post reform					
Pre reform	**0**	**8**	**20**	**31**	**41**		Pre reform	**0**	**8**	**20**	**31**	**41**	
0 - 7 hours	**39**	1	1	1	1	43	0 - 7 hours	**37**	2	2	1	1	43
8 - 19 hours	0	**5**	0	0	0	5	8 - 19 hours	0	**5**	0	0	0	5
20 - 30 hours	0	0	**19**	0	0	19	20 - 30 hours	0	0	**19**	0	0	19
31 - 40 hours	0	0	0	**26**	0	26	31 - 40 hours	0	1	1	**25**	0	26
41+ hours	0	0	0	0	**6**	6	41+ hours	0	0	0	0	**6**	6
	40	7	20	27	7			37	9	21	26	6	

1st quintile group

	Post reform							Post reform					
Pre reform	**0**	**8**	**20**	**31**	**41**		Pre reform	**0**	**8**	**20**	**31**	**41**	
0 - 7 hours	**81**	2	2	1	0	86	0 - 7 hours	**78**	3	3	1	0	86
8 - 19 hours	0	**3**	0	0	0	4	8 - 19 hours	0	**4**	0	0	0	4
20 - 30 hours	0	0	**4**	0	0	5	20 - 30 hours	0	0	**5**	0	0	5
31 - 40 hours	0	0	0	**3**	0	4	31 - 40 hours	0	0	0	**3**	0	4
41+ hours	0	0	0	0	**1**	2	41+ hours	0	0	0	0	**1**	2
	82	5	7	4	1			78	7	8	4	2	

5th quintile group

	Post reform							Post reform					
Pre reform	**0**	**8**	**20**	**31**	**41**		Pre reform	**0**	**8**	**20**	**31**	**41**	
0 - 7 hours	**9**	0	0	0	0	10	0 - 7 hours	**9**	0	0	0	0	10
8 - 19 hours	0	**5**	0	0	0	5	8 - 19 hours	0	**5**	0	0	0	5
20 - 30 hours	0	0	**23**	0	0	23	20 - 30 hours	0	1	**22**	0	0	23
31 - 40 hours	0	0	0	**47**	0	47	31 - 40 hours	0	1	1	**45**	0	47
41+ hours	0	0	0	0	**15**	15	41+ hours	0	0	0	0	**14**	15
	9	5	23	47	15			9	8	24	45	14	

Table 7. Transition matrix (Labours supply, %) – Lone mothers

Family based in-work benefit **Individual in-work benefit**

All couples

	Post reform							Post reform					
Pre reform	**0**	**8**	**20**	**31**	**41**		Pre reform	**0**	**8**	**20**	**31**	**41**	
0 - 7 hours	**25**	1	1	0	0	28	0 - 7 hours	**26**	1	1	0	0	28
8 - 19 hours	0	**5**	0	0	0	6	8 - 19 hours	0	**6**	0	0	0	6
20 - 30 hours	0	0	**19**	0	0	19	20 - 30 hours	0	0	**19**	0	0	19
31 - 40 hours	0	1	1	**34**	0	37	31 - 40 hours	0	1	1	**35**	0	37
41+ hours	0	1	1	0	**9**	10	41+ hours	0	0	0	0	**10**	10
	25	9	22	35	9			26	8	21	36	10	

1st quintile group

	Post reform							Post reform					
Pre reform	**0**	**8**	**20**	**31**	**41**		Pre reform	**0**	**8**	**20**	**31**	**41**	
0 - 7 hours	**59**	3	3	1	0	66	0 - 7 hours	**63**	2	2	0	0	66
8 - 19 hours	0	**7**	0	0	0	7	8 - 19 hours	0	**7**	0	0	0	7
20 - 30 hours	0	0	**11**	0	0	12	20 - 30 hours	0	0	**11**	0	0	12
31 - 40 hours	0	1	0	**8**	0	9	31 - 40 hours	0	0	0	**9**	0	9
41+ hours	0	0	0	0	**4**	5	41+ hours	0	0	0	0	**5**	5
	59	11	16	10	5			63	9	13	9	5	

5th quintile group

	Post reform							Post reform					
Pre reform	**0**	**8**	**20**	**31**	**41**		Pre reform	**0**	**8**	**20**	**31**	**41**	
0 - 7 hours	**11**	0	0	0	0	11	0 - 7 hours	**11**	0	0	0	0	11
8 - 19 hours	0	**7**	0	0	0	7	8 - 19 hours	0	**7**	0	0	0	7
20 - 30 hours	0	0	**12**	0	0	13	20 - 30 hours	0	0	**12**	0	0	13
31 - 40 hours	0	1	1	**46**	0	47	31 - 40 hours	0	2	0	**45**	0	47
41+ hours	0	1	1	0	**20**	22	41+ hours	0	1	0	0	**21**	22
	11	9	14	46	20			11	9	13	45	21	

Figures

Figure 1. Structure of family based in-work benefit

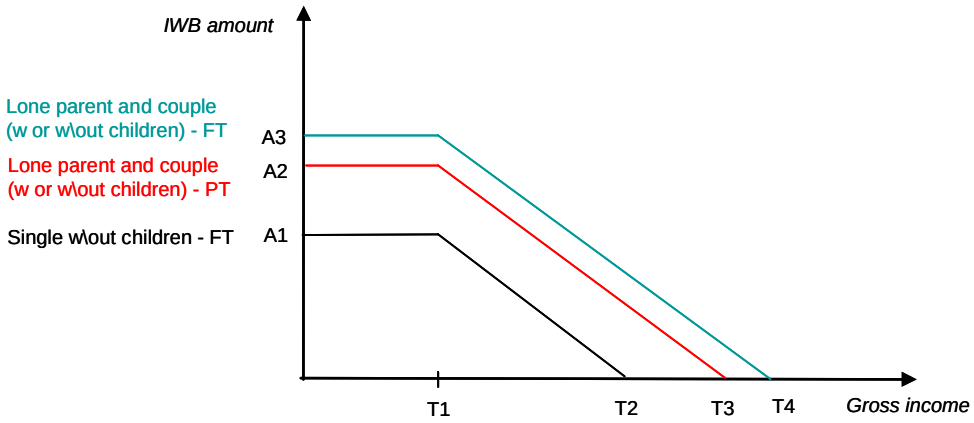


Figure 2. Structure of individual in-work benefit

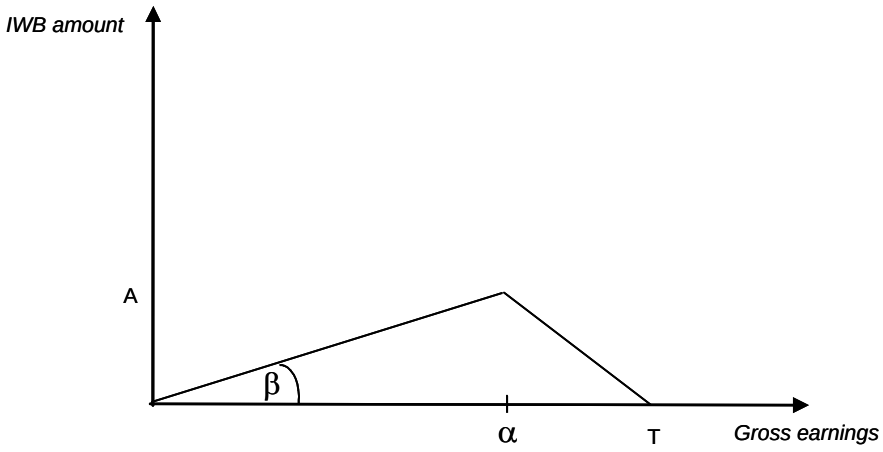


Figure 3. Behavioural Tax-Benefit Model

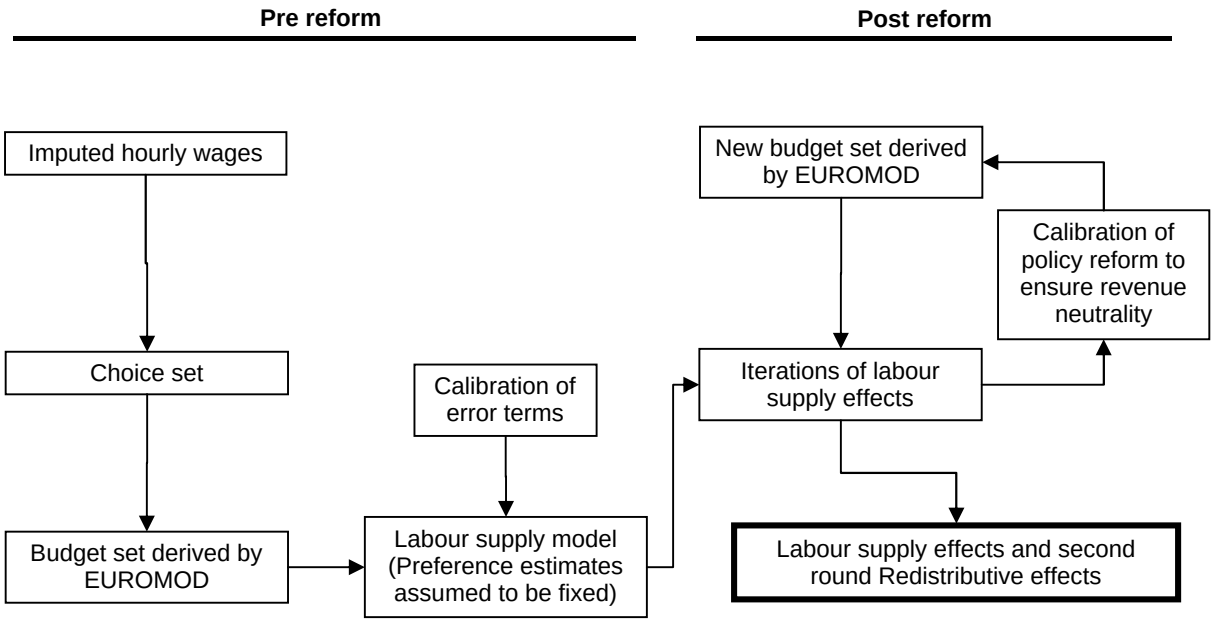
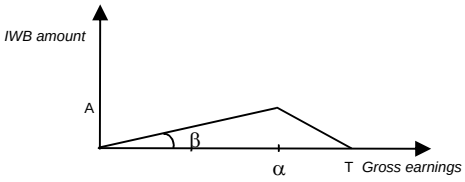


Figure 4. Parameters (€ per year) of the in-work benefits

Individual in-work benefit

α	9,647
β (%)	21.137
T	15,156



Family based in-work benefit

T1	5,512
A1 (Single, FT)	1,661
T2	10,002
A2 (Lone/couple, PT)	3,296
T3	14,420
A3 (Lone/couple, FT)	3,971
T4	16,245

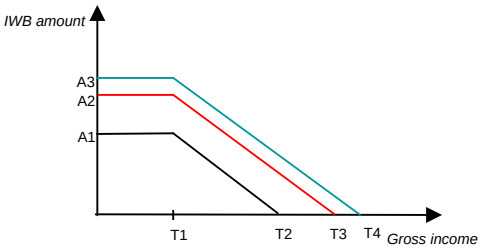


Figure 5. % of gainers and losers after the in-work benefits – Women in couples

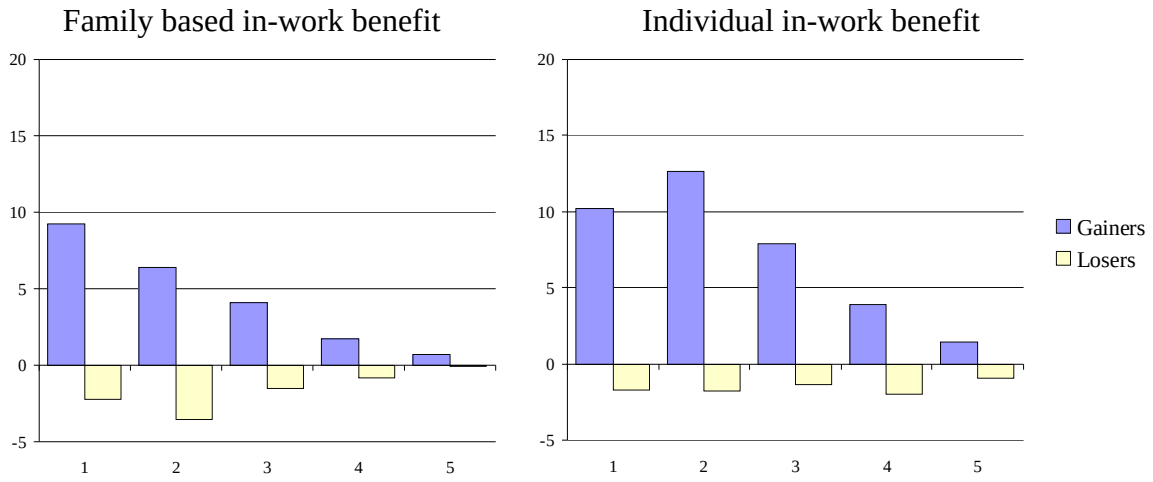


Figure 6. % of gainers and losers after the in-work benefits – Lone mothers