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CLOSING THE GENDER GAP: GENDER BASED TAXATION, WAGE SUBSIDIES OR BASIC INCOME?

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Closing the Gender Gap:

Gender Based Taxation, Wage Subsidies or Basic Income?

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Abstract

Gender based taxation (GBT) has been recently proposed as a promising policy in order to close the gender gap, i.e. promote gender equality and improve women’s status in the labour market and within the family. We use a microeconometric model of household labour supply in order to evaluate, with Italian data, the behavioural and welfare effects of GBT as compared to other policies based on different optimal taxation principles. The comparison is interesting because GBT, although technically correct, might face implementation difficulties not shared by other policies that in turn might produce comparable benefits. Our results support to some extent the expectations of GBT’s proponents. However, it is not an unquestionable success. GBT induces a modest increase of women’s employment, but similar effects can be attained by universal subsidies on low wages. When the policies are evaluated in terms of welfare, GBT ranks first among single women but among couples and in the whole population the best policies are unconditional transfers and/or subsidies on low wages.

JEL Classification: H2, I3, J2.

Keywords: Gender based taxation, wage subsidies, basic income, guaranteed minimum income, labour supply, social welfare.

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1. Introduction

Gender based taxation (GBT), in the form of lower marginal tax rates for women, has been recently proposed as a desirable reform that might contribute to closing the gender gap by improving women's status in the labour market and within the family.[1] In particular, with GBT women's participation rate and income would increase and the family chores would be allocated more equally among genders. These effects might also make the policy self-financed thanks to the increase in tax revenue due to higher tax rates for men and higher income for women. The policy might look particularly appealing for a country like Italy, where large gender-gaps persist in participation rates, incomes, occupations and allocation of family chores.

The GBT proposal is based on a classical result of second-best optimal taxation theory and on the empirical evidence that the wage elasticity of labour supply is higher for women than for men.[2] Ramsey's inverse elasticity rule then suggests that women's labour income should be taxed at lower marginal rates than men's.[3]

There is another theory-based motivation giving support to GBT. In principle, we want to tax the exogenous endowment, i.e. the amount of inborn resources (ability, say) that ultimately allow people to attain a certain level of welfare. Since the endowment is not directly observable, we typically tax income, which is observable and correlated with the endowment. However income is endogenous, i.e. it depends on people's decisions. This creates an incentive for people to "hide" their own endowment

[1] A recent analysis is presented in Alesina et al. (2011). The idea that women's labour earnings should be taxed at lower rates than men's has been the subject of many contributions that are surveyed in Apps and Rees (2009).
[2] For Italy see Aaberge et al. (1999, 2004).
[3] Ramsey (1927).

by producing less income. The theory then says that it would be more efficient to tax exogenous characteristics, i.e. something that people cannot change and yet is correlated with the endowment.[4] Characteristics such as age, height and gender might qualify for this purpose. Mankiw and Weinzierl (2010) investigate – more as an academic exercise than as a serious proposal – a tax differentiated by height and argue that tall taxpayers should be taxed more than short taxpayers, based on the empirical evidence upon the positive correlation between height and wage rate. Kremer (2002) argues that age is also an exogenous variable that contributes to determine individual earnings. Moreover, he notes that younger workers have larger labour supply elasticities and therefore they should face lower income tax rates than older workers.[5] Analogously, GBT promises to be more efficient both because it implies lower taxes for the more elastic labour supplied by women and because it shifts part of the tax burden from an endogenous decision (income) to an exogenous characteristic (gender) correlated (hypothetically) with the productive endowment.[6]

As we will see below, the microecometric simulations to a certain extent confirm expectations regarding the effects of GBT on female participation and income. However GBT presents some problems when it comes to the implementation. The differential in gender-specific labour supply elasticities mostly regards married women: single women's elasticities are more similar to men's (whether married or single). Second, labour supply elasticity is not exogenous, it varies with the amount of labour, with income level etc. Of course, one can design optimal gender-specific taxes that account for the endogeneity of

[4] A version of this principle is known in the tax literature as "tagging" (Akerlof 1978).
[5] See also Weinzierl (2011).
[6] Ichino and Moretti (2009) give an interesting contribution to the analysis of the issue of the correlation between gender and productive endowment.

elasticities (as done in Alesina and Ichino 2011): however, the result cannot be anymore proposed as a simple and clear-cut recipe as it is the case in the model with exogenous elasticities. In other words, endogenous elasticities can certainly be accommodated but the results might be difficult to implement in practice.

More generally, GBT might conflict with a principle of universality that is intrinsically attached to the institution of personal income taxation: besides being a more or less efficient tool to finance public expenditure, income taxation is also viewed as a certificate of citizenship. This is a political constraint, not a technical one, but it is likely to become important in view of a hypothetical implementation of the GBT proposal.[7] It is therefore interesting to investigate whether other reforms might bring similar benefits to those brought by GBT while avoiding its implementation problems.

As mentioned above, the idea of gender based taxation is rooted in optimal taxation theory. However, the same theory contains other and possibly alternative arguments that might be competitive in view of the same purposes addressed by gender based taxes. In this paper – besides gender based taxes – we will consider two of these ideas.

The first idea is again a second-best argument. Labour supply elasticity also differs with respect to income: high (low) income people respond less (more) to changes in the wage rate.[8] Income is endogenous, so the analysis is more complicated than with exogenous characteristics such as gender, age or height. However, under certain conditions and to a certain extent, the same principle might apply: higher income

[7] Differentiated taxes based on height would obviously face the same problem as gender-based taxation. Instead, age-based taxation might still be judged as consistent with a universality principle, since every citizen goes through different ages.
[8] Aaberge et al. (1999, 2002).

should be taxed more than lower incomes.[9] This looks like plain progressive taxation, but the motivation here is an efficiency one: so that we end up with the nice result that progressive taxation is good both for distributive justice and for efficiency. Moreover, since more women than men are likely to belong to low income brackets, a sufficient degree of progressivity might serve the same purposes of gender based taxation although maintaining the character of a universal rule.

The second idea might be interpreted as inspired by a first-best optimal taxation result, which states that the most efficient policies to redistribute income are lump-sum transfers (rather than differential taxes or prices). The policies of Basic Income or Guaranteed Minimum Income, especially in their non mean-tested versions (Unconditional Basic income, Citizen's Income etc.), do not exactly implement a lump-sum transfer but are somehow close to the idea of minimizing the distortions. Although these policies do not discriminate in favour of women by construction, they are nonetheless equalizing and therefore they favour those who start from low levels of income or welfare (and, among them, women).

In this paper we evaluate and compare the behavioural and welfare effects in Italy of various hypothetical reforms inspired by the ideas of: i) gender based taxation; ii) subsidies on low wage rates; (iii) basic income. We use a microeconometric model of labour supply that simulates the choices of an Italian sample composed of couple and single households given the budget sets implied by the different reforms. The simulation procedure guarantees the fiscal neutrality of the reforms and also accounts

[9] Diamond and Saez (2011)

for the constraints implied by equilibrium on the labour market by using a new method specifically appropriate for the microeconometric model used (Colombino 2013).

Section 2 and the Appendix describe the alternative reforms. Section 3 explains the simulation procedure and the methodology adopted for the social evaluation of the policies. Section 4 illustrates the results and Section 5 contains the concluding remarks.

2. The policies

Many studies have provided evidence that the current Italian system of taxation and income support is defective with respect to both efficiency and equity goals and creates distortions unfavourable to female labour market participation.[10] In this note we compare GBT and other reforms inspired by alternative principles derived from the optimal taxation literature, with special focus on women's behaviour and welfare.

Some of the reforms presented hereafter are specified in terms of a "threshold" $G = aP\sqrt{N}$, where

N = total number of components of the household;

$\sqrt{N}$ = equivalence scale;[11]

$P = \text{median}\left(C/\sqrt{N}\right)/2$ = Poverty Line;

C = total net available income (current) of the household;

a = "coverage" rate, i.e. the proportion of the poverty line covered by G. In this exercise we set $a = 0.75$, so that – for example – $G = 0.75P\sqrt{3}$ means that for a household with 3 components the threshold is 3/4 of the Poverty Line times the equivalence scale $\sqrt{3}$.

Gender based taxation (GBT). This is a basic version of the policy proposed by A&I. We consider a simplified version of the current tax rule, where the marginal tax rates applied to labour earnings are applied to total personal income.[12] We then multiply the marginal tax rates by two different coefficients τ_F (for females) and τ_M (for males),

[10] See for example Onofri (1997), Baldini et al. (2002), Boeri and Perotti (2002), Sacchi (2005) and Colonna and Marcassa (2012). A first microeconometric evaluation of alternative reforms of the Italian tax-transfer system was done by Aaberge et al. (2004).

[11] The "square root scale" is one of the equivalence scales commonly used in OECD publications.

[12] In the true current system some incomes (e.g. capital income) are taxed according to a different rule.

with $\tau_F < \tau_M$, so that the total net tax revenue remains the same as under the current system. The result is a gender-specific tax rule. In practice we start from some initial values of the coefficients τ_F and τ_M and run the microeconometric model that simulates the labour supply choices and the total net tax revenue; the process is iterated by adjusting the value of the coefficients τ_F and τ_M until the public budget constraint is satisfied.[13]

Wage Subsidy (WS). Each individual receives a 10% subsidy on the gross hourly wage and she/he is not taxed as long as her/his gross income (including the subsidy) does not exceed *G* if single or *G/2* if partner in a couple. This policy can be interpreted as exploiting the fact that the labour supply elasticities appear to be inversely related to household income. In this case, the progressivity of the tax schedule is reinforced by a subsidy on low wage rates. The policy is also close to various in-work benefits or tax-credits reforms introduced for example in the USA (Earned Income Tax Credit), in the UK (In-Work Benefits) and in Sweden.[14]

Guaranteed Minimum Income (GMI). Each individual receives a transfer equal to $G - I$ if single or $G/2 - I$ if partner in a couple provided $I < G$ (or $I < G/2$), where I denotes individual gross income. Taxes are applied to $I - G$ (or $I - G/2$). This is the standard conditional (or means-tested) income support mechanism.

Unconditional Basic Income (UBI). Each individual receives an unconditional (untaxed) transfer equal to *G* if single or *G/2* if partner in a couple. It is the basic version of the system discussed for example by Van Parijs (1995) and also known in the policy

[13] Actually there are many solutions: we choose the one that maximizes the Social Welfare function defined in Section 3.
[14] Many authors have recently analysed or suggested in-work-benefits policies for Italy (Colonna and Marcassa 2012, Figari 2011, De Luca et al. 2012)

debate as “citizen income” or “social dividend” (Meade 1995; Van Trier 1995). Taxes are applied to the individual gross income I.

Last, we also consider policies that combine wage subsidies and transfers: **GMI&WS** and **UBI&WS** are mixed mechanisms where the GMI or UBI transfer is complemented by the wage subsidy WS. For these mixed policies the threshold G is redefined as $0.5G$.[15]

As with GBT, in all the above policies WS, GMI, UBI, GMI&WS and UBI&WS the tax rule replicates a simplified version of the current system where the labour income marginal tax rates (common to both females and males – differently from GBT) are applied to the whole income and proportionally adjusted according to a multiplicative constant τ. The parameter τ is used in the simulation as a calibrating device in order to fulfil the public budget constraint.

Under the reforms, all the transfers and benefits envisaged by the current system are cancelled. Instead the contributions paid toward the current policies remain as a source of financing of the new policies.

A more detailed description of the tax-transfer rules under the various reforms is provided in the Appendix.

[15] A mixed system close to GMI&WS has been proposed in Italy by De Vincenti and Paladini (2009).

3. The simulation and evaluation procedure

Hereafter we present an illustrative exercise where we use a microeconometric model of household labour supply in order to simulate and evaluate the effects of implementing in Italy the hypothetical reforms illustrated in Section 2. The model is similar to the one used in Colombino et al. (2010) and is fully explained in Colombino (2011). Hereafter we present the model's basic features. Although both couples and singles are analysed, for simplicity we explain here the case of a single. We assume the household chooses a job from a set of alternatives characterized by hours of work *h* and other (unobserved) attributes of *z*. The problem solved by the agent is the following:

$$\max_{(h,z)\in\Omega} U\left(C,h,z\right)$$
$$\text{s.t.}$$
$$C = R(wh, y)$$

where

h = hours of work,

w= the pre-tax wage rate,

z = unobserved (by the analyst) attributes of the household-job match,

y = the pre-tax non-labour income (exogenous),

C = net disposable income,

R = tax-benefit rule that transforms gross pre-tax incomes (*wh*,*y*) into net disposable income *C*,

Ω = set of all opportunities available to the household (including non-market opportunities, or "leisure" activities, i.e. "jobs" with $h=0$).

Households can differ not only in their preferences and in their wage but also in the number of available jobs of different types. Let $p(h)$ denote the relative frequency of available jobs of type h. By representing the composition of the opportunity set Ω with a probability density $p(.\ )$, we can allow for the fact that jobs with hours of work in a certain range are more or less likely to be found or for the fact that for different households the relative number of market opportunities may differ. We assume that the utility function can be factorised as follows: $U\left(R(wh,y),h,z\right)=V\left(R(wh,y),h\right)+\varepsilon(z)$, where V and $\varepsilon(z)$ are respectively the systematic and the random component. The term $\varepsilon(z)$ is a random variable that accounts for the effect on utility of all the characteristics of the household–job match that are observed by the household but not by us. Assuming that $\varepsilon(z)$ is i.i.d. according to the Type I Extreme Value distribution and letting A represent the set of distinct values of h available in the opportunity set Ω, it can be shown that the probability that $h = h^*$ is chosen is a "weighted" multinomial logit expression, i.e.

$\Pr(h=h^*)=\dfrac{V(R(wh^*,y),h^*)\,p(h^*)}{\sum_{h\in A}V(R(wh,I),h)\,p(h)}$.[16] The intuition is that the probability that h^* is chosen can be expressed as the relative attractiveness of jobs of type h^*, weighted by a measure of job availability. Given convenient parametric specifications of the functions V and p, the parameters of the model can be estimated by maximizing likelihood. The systematic component V is assumed to be quadratic in $R(\ )$ and h while $p(h)$ is assumed to uniform with peaks (whose mass is to be estimated) at "non participation", "part-time job" and "full-time job". The estimated model can then be used to simulate the effect of a reform by replacing the current tax-transfer function, say R^0, with the new one, say R^1.

[16] The choice probability is a simplified version of the one derived in Aaberge et al. (1999) and Aaberge and Colombino (2013), where however wage rates and other observed job characteristics can vary across jobs for the same households. A general formulation is given by Dagsvik (1994). The model is also close to Ben-Akiva and Watanatada (1981).

The estimation of the model and the policy simulations are based on a sample of couple and single households from the Bank-of-Italy's Survey of Household Income and Wealth (SHIW) for the year 1998.[17] Both partners of couple households and heads of single households are aged 20 – 55 and are wage employed, self-employed, unemployed or inactive (students and disabled are excluded). As a result of the above selection criteria we are left with 2955 couples, 366 single females and 291 single males.

Each reform defines a new budget constraint for each household. The simulation consists of running the model after replacing the current budget constraint with the reformed one. The procedure adopted in this paper has two distinctive features that are not common in the tax reform literature. First, the reforms are simulated under the constraint of being fiscally neutral, i.e. each reform generates the same total net tax revenue as the current 1998 system. This requires a two-level simulation procedure. At the "low" level, household choices are simulated given the values of the tax-transfer parameters. At the "high" level, the tax parameters τ, τ_F and τ_M (defined in Section 2) are calibrated so that the total net tax revenue remains constant. Second, the simulation is conducted under equilibrium conditions for different hypothetical values of the elasticity of the demand for labour. We adopt a procedure that is specifically appropriate for the microeconometric model and makes the simulation results consistent with a comparative statics interpretation of the results (Colombino 2013).[18] The standard procedure adopted

[17] We use a microeconometric model that was originally developed for a larger project on the design of income support mechanisms. More recent surveys are of course available. However, the years following 2000 envisage a more turbulent macroeconomic scenario with respect 1998. In any case, the analysis presented in this paper is a comparative statics exercise: it concerns the evaluation and design of institutions, i.e. policies that should be assumed to stay for a relatively long period; as a counterpart, preferences should be assumed to be stable.

[18] The procedure adopted here is different from the one proposed by Creedy and Duncan (2005), which would not be consistent with the specification of our microeconometric model.

in tax reform simulation when using microeconometric models of labour supply consists of ignoring market equilibrium. When instead equilibrium is taken into account the reform induces a new location of the labour supply curve. Therefore a new equilibrium is determined by the intersection of the new labour supply curve and the labour demand curve (assumed to be unchanged). The changes in the new equilibrium employment and the new equilibrium wage depend on the wage elasticity of labour demand (say η): if $\eta = 0$, employment does not change and the whole effect of the reform is absorbed by a change in the wage rate; if $\eta = -\infty$, the wage rate does not change and the whole effect is absorbed by the change in employment; for values of η lower than 0 and greater than $-\infty$, both wage rates and employment change and the closer η is to $-\infty$ the larger will be the employment change relative to the wage change. The empirical evidence upon η suggests values around -0.5 or -1.0. The results reported here are obtained under the assumption that $\eta = -1$. Besides the 6 alternative reforms we also simulate a tax-transfer system that we call **Current**. It is the same true current system, but the tax rule is given a simplified representation as in the reforms: namely, we apply the labour income marginal tax rates to the whole personal income, while in the true current system some incomes (e.g. capital income) are taxed according to a different rule. Moreover, we simulate this tax rule with the same equilibrium procedure adopted for the reform. Therefore, we are able to compare what would happen with this system and with the reforms under the same equilibrium conditions. We think this procedure is preferable to the standard one consisting of comparing the observed *status quo* to the reforms.

For the evaluation of the reforms, besides simulating various behavioural and fiscal effects, we adopt the procedure originally suggested by King (1983). First, the estimated attained utility level attained by each household is translated into an interpersonally comparable money-metric index of Individual Welfare (defined as "equivalent income" by King (1983)). Second, the Individual Welfare indexes are "aggregated" into Social Welfare function. We adopt the Gini Social Welfare (GSW) function, i.e.: [19]

(*Average Individual Welfare*) × (1 – *Gini index of the distribution of Individual Welfare*).

[19] A procedure similar to the one proposed by King (1983) is also suggested by Deaton and Muellbauer (1980). For a general treatment of the class of Rank-dependent social welfare functions (of which the GSW function is a member) see Aaberge (2007). For other applications see Aaberge and Colombino (2011, 2013) and Colombino (2011). The Gini Social Welfare function is also analogous to the Sen (1976) Index: (Average Income) × (1 – Gini index of income distribution).

4. Results

Tables 1 – 4 report the simulation results. The policies are identified by the acronym in the first column. Table 1 presents some general results for the whole sample. The policies are ranked in descending order (the best one at the top) according to the GSW function defined in Section 3. As explained in Section 3, when simulating the reforms, the marginal tax rates are proportionally adjusted in order to generate – taking behavioural responses into account – the same total net tax revenue as under the Current system. The top marginal tax rates of GBT are 38.4% for females and 46.1% for males, to be compared to the common 44% top marginal tax rate of the Current system.[20] The other reforms are more costly and imply a (common) top marginal tax rate that ranges between 47.2 (GMI) and 55.2 (UBI). As far as the GSW criterion is concerned, Table 1 definitely speaks in favour of unconditional universal transfers (UBI) or universal subsidies on low wage rates (WS) or – even better – a combination of the two principles (UBI&WS). We also note that GBT ranks better than the current system but is dominated by the other reforms. This judgement, however, is based on the GSW function and concerns the whole sample, while the GBT reform focuses on the effects upon women's employment, income and welfare. Tables 2-4 address more specifically GBT's focus. Table 2 ranks the policies according to employment (average annual hours of work). The first two columns concern the whole sample and are reported as reference information. The other columns concern women's employment as partners in couples (where WS ranks best) or as singles (where GBT ranks best). Colonna and Marcassa (2012) also find similar effects for GBT and a

[20] The top marginal tax rate of the true current system is 45%. In our simulated Current system (explained in Section 3) we get 44% as a result of a more comprehensive definition of taxable income.

Tax Credits policy (which in turn is similar to our WS policy). The expectations upon GBT are confirmed, although the WS policies obtain very similar results. Overall, the employment effects are small. The equilibrium simulation procedure that we adopt certainly contributes to the modest size of the employment effects: lower taxes or wage subsidies shift the female supply curve to the right, but the labour demand curve pushes down the equilibrium wage and moderates the increase in employment. In Table 3 we rank the policies according to net income. The results to a large extent replicate the ranking of Table 2. A somewhat new result is the large effect of GBT on single women's net income: however, when read together with the small increase in employment, this result appears more as a rent rather than an incentive effect. Table 4 presents the policy rankings according to the percentage of winners (in terms of Individual Welfare as defined in Section 3) in the whole sample and among couples and single women. GBT performs very well among single women but not so well among couples and in the whole sample (where essentially the same ranking of Table 1 is confirmed). Table 4 reveals in a dramatic way the heterogeneous effect of GBT, which (winners-wise) ranks first among single women but ranks last among couples and in the whole sample. The same holds (but in the opposite direction) for WS, which turns out to be the worst (winners-wise) among single women and the best among couples and in the whole sample. Clearly, the heterogeneous effect depends on the discriminatory principles which GBT and WS are built upon. By contrast, a more universalistic policy such as UBI&WS ranks third among single women and second among couples and in the whole sample.

5. Conclusions

We have used a microeconometric model of household labour supply in order to evaluate, with Italian data, the behavioural and welfare effects of gender based taxation as compared to other policies based on different optimal taxation principles. This comparison is interesting because in our view the main implementation problem with GBT is the violation of the universality of personal income taxation. The results give support to the expectations concerning the effects on women's employment and income but we cannot declare an unquestionable success for GBT. First, the employment effect is modest. The effect on income is large for single women, but when read together with the small employment effect it appears more as a rent than as a reward to effort. Second, similar effects can be attained by WS policies (based on a different kind of tax-subsidy discrimination). Third, when a general social welfare evaluation criterion (the GSW function) is adopted for the whole sample, the best policies (UBI&WS, UBI, WS) are universalistic and based on unconditional transfers (UBI) or subsidies on low wages (WS) or both (UBI&WS). It might be argued that we might obtain even better results with a combination of UBI&WS policies with GBT. However, the specific message of the results presented in this paper is that GBT, although technically correct, might face "political economy" difficulties not shared by other policies that in turn are able to produce comparable benefits.

Two limitations of our analysis must be noted at this point. First, the microeconometric model of labour supply adopts a unitary approach, i.e. we assume that the household maximizes a utility function that represents the aggregate preferences of all the members. This approach implies that we cannot separately identify the welfare gain or losses of couples' female partners. It might then be argued that the gains received from GBT by women living in a couple are larger than those suggested by Table 4 according to the results on winners among couples. However, the men in the same couples are losers due to their higher marginal tax rates and the resources are shared within the couple: if the sharing parameter remains close to .5 (as the collective models of household behaviour typically estimate[21]), the welfare level of married women is reasonably approximated by the welfare level of couples. It remains true that we are not able to identify a possible change in the sharing rule due to a higher level of women's employment and income. The second possible limitation concerns the weak employment response obtained in the policy simulation. We have already noted how the equilibrium simulation contributes to this result. Moreover, our model accounts for the quantity constraints faced by the households and – at least in part – the weak supply effects might be due to the limited flexibility of the labour market prevailing in the survey year (1998).

[21] See for example Cherchye et al. (2012).

Table 1. Policies ranked according to GSW function. Whole sample.

<table>
<tr><th rowspan="2"></th><th rowspan="2">GSW gain</th><th rowspan="2">Net Income</th><th colspan="2">Employment</th><th colspan="2">TMTR</th><th rowspan="2">Winners</th></tr>
<tr><th>Females</th><th>Males</th><th>Females</th><th>Males</th></tr>
<tr><td>UBI&WS</td><td>1248</td><td>26496</td><td>1007</td><td>2042</td><td colspan="2">50.2A</td><td>69</td></tr>
<tr><td>UBI</td><td>1224</td><td>26232</td><td>994</td><td>2038</td><td colspan="2">55.2</td><td>61</td></tr>
<tr><td>WS</td><td>1140</td><td>26616</td><td>1019</td><td>2046</td><td colspan="2">46.5</td><td>70</td></tr>
<tr><td>GMI&WS</td><td>1068</td><td>26472</td><td>1008</td><td>2043</td><td colspan="2">48.3</td><td>67</td></tr>
<tr><td>GMI</td><td>876</td><td>26304</td><td>995</td><td>2041</td><td colspan="2">47.2</td><td>58</td></tr>
<tr><td>GBT</td><td>96</td><td>27012</td><td>1017</td><td>2046</td><td>38.4</td><td>46.1</td><td>56</td></tr>
<tr><td>Current</td><td>---</td><td>26772</td><td>1010</td><td>2047</td><td colspan="2">44.0</td><td>---</td></tr>
</table>

Note to Table 1

GWS gain: average annual money-metric gain (computed according to the GWS function) with respect to the current system (S-Current) (Euros translated from 1998 *Lire*).

Net Income: average annual net available income (Euros translated from 1998 *Lire*).

Employment: average annual hours worked, including zero hours for the non-participants. Annual hours are computed by conventionally multiplying weekly hours times 52.

TMTR: top marginal tax rate(s).

Winners: percentage of households whose Individual Welfare (Section 3) increases with respect to the current system (Current).

Table 2. Policies ranked according to women's employment.

All		Couples		Single women	
WS	1019	**WS**	954	**GBT**	1545
GBT	1017	**GBT**	952	**WS**	1543
Current	1010	**UBI&WS**	946	**Current**	1540
GMI&WS	1008	**GMI&WS**	945.	**GMI&WS**	1514
UBI&WS	1007	**S-Current**	945	**UBI&WS**	1504
GMI	995	**UBI**	936	**GMI**	1470
UBI	994	**GMI**	936	**UBI**	1466

Note to Table 2

Employment: average annual hours worked, including zero hours for the non-participants. Annual hours are computed by conventionally multiplying weekly hours times 52.

Table 3. Policies ranked according to net income.

All		Couples		Single women	
GBT	27012	**WS**	27744	**GBT**	24204
Current	26772	**GMI&WS**	27588	**Current**	21912
WS	26616	**GBT**	27540	**UBI**	20844
UBI&WS	26496	**UBI&WS**	27504	**UBI&WS**	20568
GMI&WS	26472	**GMI**	27444	**GMI&WS**	19968
GMI	26304	**Current**	27408	**GMI**	19968
UBI	26232	**UBI**	27216	**WS**	19944

Note to Table 3

Net Income: average annual net available income (Euros translated from 1998 *Lire*).

Table 4. Policies ranked according to the percentage of winners.

All		Couples		Single women	
WS	70	**WS**	86	**GBT**	96
UBI&WS	69	**GMI&WS**	81	**UBI**	55
GMI&WS	67	**UBI&WS**	80	**UBI&WS**	36
UBI	61	**UBI**	68	**GMI**	35
GMI	58	**GMI**	67	**GMI&WS**	15
GBT	56	**GBT**	55	**WS**	0

Note to Table 4

Winners: percentage of households whose Individual Welfare (Section 3) increases with respect to the Current system.

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References

Aaberge, R. (2007) Gini's Nuclear Family, *Journal of Economic Inequality*, 5 (3), 305-322.

Aaberge, R. and U. Colombino (2013) Designing Optimal Taxes with a Microeconometric Model of Labour Supply, *Scandinavian Journal of Economics*, 115(2), 449–475.

Aaberge, R., Colombino, U. and S. Strøm (1999) Labour Supply in Italy: An Empirical Analysis of Joint Household Decisions, with Taxes and Quantity Constraints, *Journal of Applied Econometrics*, 14, 403-422.

Aaberge, R., U. Colombino and S. Strøm (2004) Do More Equal Slices Shrink the Cake? An Empirical Evaluation of Tax-Transfer Reform Proposals in Italy, *Journal of Population Economics*, 17(4), pp. 767-785.

Akerlof, G. (1978) The Economics of 'Tagging' as Applied to the Optimal Income Tax, Welfare Programs, and Manpower Planning, *American Economic Review*, 68, 8-19.

Alesina, A, Ichino, A. and L. Karabarbounis (2011) Gender-Based Taxation and the Division of Family Chores, *American Economic Journal: Economic Policy*, 3(2), 1 - 40.

Apps, P. and R. Rees (2009), *Public Economics and the Household*, Cambridge University Press, UK.

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

Blundell, R. and A. Shephard (2012) Employment, Hours of Work and the Optimal Taxation of Low Income Families, *Review of Economic Studies* (forthcoming).

Boeri, T. and R. Perotti (2002) *Meno pensioni, più Welfare*, Il Mulino, Bologna.

Busilacchi, G. (2008) The different regimes of minimum income policies in the enlarged Europe, Proceedings of BIEN 12th International Conference, 20-21 June 2008, Dublin.

Cherchye, L., De Rock, B., Lewbel, A. and F. Vermeulen (2012) Sharing Rule Identification for General Collective Consumption Models, IZA Discussion Papers No. 6571, Institute for the Study of Labor.

Colombino, U. (2011) Designing a universal income support mechanism in Italy. An exploratory tour, Department of Economics Cognetti De Martiis, Working Paper No. 12/2011.

Colombino, U. (2013) A new equilibrium simulation procedure with discrete choice models, *International Journal of Microsimulation*, 6(3), 25-49.

Colombino, U., M. Locatelli, E., Narazani and C. O'Donoghue (2010) Alternative Basic Income Mechanisms: An Evaluation Exercise with a Microeconometric Model, *Basic Income Studies*, 5(1).

Colonna, F. and S. Marcassa (2012) Taxation and Labor Force Participation: The Case of Italy, CEPREMAP Working Papers (Docweb) 1203.

Creedy, J. and A. Duncan (2005) Aggregating Labour Supply and Feedback Effects in Microsimulation, *Australian Journal of Labour Economics*, 8(3), 277-290.

Deaton, A and J. Muellbauer (1980) *Economics and Consumer Behavior*, New York: Cambridge University Press.

De Luca, G., Rossetti, C. And D. Vuri (2012) In-work benefit policies for Italian married couples: design and labor supply effects, mimeo, ISFOL.

De Vincenti, C. and R. Paladini (2009) Personal Income Tax Design for Italy: Lessons from the Theory, *Rivista Italiana degli Economisti*, XIV, 1, 7-46.

Diamond, P. and E. Saez (2011) The Case for a Progressive Tax: From Basic Research to Policy Recommendations, *Journal of Economic Perspectives*, 25(4), 165–90.

Figari, F. (2011) From housewives to independent earners: Can the tax system help Italian women to work? ISER Working Paper No. 2011-15.

Kremer, M. (2002) Should Taxes be Independent of Age, Working Paper, Harvard University.

King, M. (1983) Welfare Analysis of Tax Reforms Using Household Data, *Journal of Public Economics*, 21, 183-214.

Ichino, A. and E. Moretti (2009) Biological Gender Differences, Absenteeism and the Earning Gap, *American Economic Journal: Applied Economics*, 1(1) 183-218.

Mankiw, N. G. and M. C. Weinzierl (2010) The Optimal Taxation of Height: A Case Study of Utilitarian Income Redistribution, *American Economic Journal: Economic Policy* 2(1), 155-176.

Meade, J.E. (1995), *Full Employment Regained?*, Cambridge University Press, Cambridge.

Onofri, P. (Ed.) (1997), *Relazione finale della Commissione per l'analisi delle compatibilità macroeconomiche della spesa sociale*, Roma, Presidenza del Consiglio dei Ministri.

Ramsey, F. (1927) A Contribution to the Theory of Taxation, *Economic Journal*, 47-61.

Sacchi, S. (2005) Reddito minimo e politiche di contrasto alla povertà in Italia, *Rivista del Diritto e della Sicurezza Sociale*, 4, 467-509.

Sen, A. (1976) Real National Income, *Review of Economic Studies*, 43(1), 19-39.

Van Parijs, P. (1995) *Real Freedom for All*, Oxford, Oxford University Press.

Van Trier, W. (1995) Every One a King, Department of Sociology, Katholieke Universiteit Leuven.

Weinzierl, M. C. (2011) The Surprising Power of Age-Dependent Taxes, *Review of Economic Studies*, 78(4), 1490-1518.

Appendix

The reforms

Tables A1 and A.2 specify net available income as a function of taxable income under the reforms.

Definitions:

$x_F = w_F h_F$ = female gross earnings; $x_M = w_M h_M$ = male gross earnings; $x = x_F + x_M$

y_F = female unearned gross income; y_M = male unearned gross income

m = other household net income

S_F = social security contributions (female); S_M = social security contributions (male);

$S = S_F + S_M$

$I_F = x_F + y_F - S_F =$ taxable income (female); $I_M = x_M + y_M - S_M =$ taxable income (male);

$I = I_F + I_M$

P = poverty line

N = number of people in the household

$G = \alpha P\sqrt{N}$ with α 0.75 (defined Section 2)

$C_F =$ net available income (female); $C_M =$ net disposable income (male); $C = m + C_F + C_M$

T = taxes paid by the household

B = benefits or transfers received by household

q = average propensity to consumption

r = average VAT rate

ω = proportional subsidy on the gross wage rate

$\varphi(.)$ = tax rule under the non-gender-based reforms

$\varphi_F(.), \varphi_M(.)$ = tax rules under GBT.

The current marginal tax rates are as follows:

Income Brackets	Marginal Tax Rates
0 – 7.7	18
7.7 – 15.5	26
15.5 – 31	33
31 – 69.7	39
> 69.7	45

Income brackets (originally in Italian *Lire*) are expressed in thousands of Euros.

Under the 1998 system the above rates are applied to personal incomes with some exceptions: for example capital income is taxed differently. Under the reforms, the income brackets are kept unchanged and the marginal tax rates – proportionally adjusted (as explained in Section 3) in order to satisfy the public budget constraint – are applied to the whole personal income. The current system also envisages deductions, allowances and benefits. Under the reforms (except for GBT) all current deductions, tax credits and benefits are cancelled. Instead the contributions paid toward the current policies remain as a source of financing of the new policies. The public budget constraint is defined as follows:

$$\sum T^1 - \sum B^1 + r\sum qC^1 + \sum S^1 = \sum T^0 - \sum B^0 + r\sum qC^0 + \sum S^0$$

where the superscript R denotes a generic reform and the superscript 0 denotes the current system.

Table A.1. Net available income as a function of taxable income - Couples

GBT	$C_F = \varphi_F(I_F) +$ current transfers and benefits $C_M = \varphi_M(I_M) +$ current transfer and benefits
GMI	$C_F = \begin{cases} G/2 \text{ if } I_F \leq G/2 \\ G/2 + \varphi\left(I_F - G/2\right) \text{ if } I_F > G/2 \end{cases}$ $C_M = \begin{cases} G/2 \text{ if } I_M \leq G/2 \\ G/2 + \varphi\left(I_M - G/2\right) \text{ if } I_M > G/2 \end{cases}$
UBI	$C_F = G/2 + \varphi(I_F)$ $C_M = G/2 + \varphi(I_M)$
WS	$C_F = \begin{cases} \left(I_F + \omega x_F\right) \text{ if } \left(I_F + \omega x_F\right) \leq G/2 \\ G/2 + \varphi\left(\left(I_F + \omega x_F\right) - G/2\right) \text{if } \left(I_F + \omega x_F\right) > G/2 \end{cases}$ $C_M = \begin{cases} \left(I_M + \omega x_M\right) \text{ if } \left(I_M + \omega x_M\right) \leq G/2 \\ G/2 + \varphi\left(\left(I_M + \omega x_M\right) - G/2\right) \text{if } \left(I_M + \omega x_M\right) > G/2 \end{cases}$
GMI&WS	$C_F = \begin{cases} 0.5G/2 \text{ if } \left(I_F + \omega x_F\right) \leq 0.5G/2 \\ \left(I_F + \omega x_F\right) \text{ if } 0.5G/2 < \left(I_F + \omega x_F\right) \leq G/2 \\ G/2 + \varphi\left(\left(I_F + \omega x_F\right) - G/2\right) \text{if } \left(I_F + \omega x_F\right) > G/2 \end{cases}$ $C_M = \begin{cases} 0.5G/2 \text{ if } \left(I_M + \omega g_M\right) \leq 0.5G/2 \\ \left(I_M + \omega x_M\right) \text{ if } 0.5G/2 < \left(I_M + \omega x_M\right) \leq G/2 \\ G/2 + \varphi\left(\left(I_M + \omega x_M\right) - G/2\right) \text{if } \left(I_M + \omega x_M\right) > G/2 \end{cases}$
UBI&WS	$C_F = \begin{cases} 0.5G/2 + (\mathrm{I}_F + wx_F) \text{ if } (\mathrm{I}_F + wx_F) \leq 0.5G/2 \\ 0.5G/2 + \varphi(I_F + wx_F) \text{ if } (I_F + wx_F) > 0.5G/2 \end{cases}$ $C_M = \begin{cases} 0.5G/2 + (\mathrm{I}_M + wx_M) \text{ if } (\mathrm{I}_M + wx_M) \leq 0.5G/2 \\ 0.5G/2 + \varphi(I_M + wx_M) \text{ if } (I_M + wx_M) > 0.5G/2 \end{cases}$

Table A.2. Net available income as a function of taxable income - Singles

GBT	$C_F = \varphi_F(I_F) +$ current transfers and benefits $C_M = \varphi_M(I_M) +$ current transfer and benefits
GMI	$C = \begin{cases} G \text{ if } I \leq G \\ G + \varphi(I - G) \text{ if } I > G \end{cases}$
UBI	$C = G + \varphi(I)$
WS	$C = \begin{cases} (I + \omega x) \text{ if } (I + \omega x) \leq G \\ G + \varphi((I + \omega x) - G) \text{if } (I + \omega x) > G \end{cases}$
GMI&WS	$C = \begin{cases} 0.5G \text{ if } (I + \omega x) \leq 0.5G \\ (I + \omega x) \text{ if } 0.5G < (I + \omega x) \leq G \\ G + \varphi((I + \omega x) - G) \text{if } (I + \omega x) > G \end{cases}$
UBI&WS	$C = \begin{cases} 0.5G + (\mathrm{I} + wx) \text{ if } (\mathrm{I} + wx) \leq 0.5G \\ 0.5G + \varphi(I_F + wx_F) \text{ if } (I_F + wx_F) > 0.5G \end{cases}$