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ARE SPANISH GOVERNMENTS REALLY AVERSE TO INEQUALITY? A NORMATIVE ANALYSIS USING THE 1999 SPANISH TAX REFORM

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In this paper we use the methodology proposed by Bourguignon and Spadaro (2000b) in order to analyze the changes in social preferences on inequality since the introduction of the 1999 reform of the Spanish Income Tax. Our starting point is the observed distribution of household incomes and marginal tax rates as computed in standard tax-benefit models. We show that it is possible to identify the social welfare function that would make the observed marginal tax rate schedule optimal, given certain simplifying assumptions on individual preferences. We apply this methodology to the 1998 and 1999 Spanish tax benefit systems, using the Spanish wave of the EC Household Panel[1].

Palabras clave: Micro-Simulation; Optimal Income Taxation; Spanish Income Tax.

(*JEL* D31, H21, H23)

1. Introduction

During the last 20 years, the Spanish redistribution system has undergone wide-scale changes (Cantó et al. (2002)). Since 1979, when a modern Personal Income Tax (PIT) system was introduced in Spain, there have been two main reforms. In 1989, a large-scale reform made

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it possible for married wage earners to file separately. In 1999 PIT was reformed again. Various authors have analyzed its effects using micro-simulation techniques. Castañer et al. (2000) use the Taxpayers Panel of the Spanish Tax Agency (Panel de Declarantes por IRPF), showing that the 1999 scheme reduced total redistribution, mainly as a result of redicing tax receipts. Levy and Mercader-Prats (2002) focus on the withholding mechanism, showing that the 1999 reforms fails in reducing the compliance costs of taxpayers. Sanchis and Sanchis (2001) simulate the new PIT system, taking into account the effects on household consumption of a Value Added Tax (VAT) increase introduced to compensate for the fall in income tax revenue that the reform involved.

Normative analysis, based on a social welfare function, have recently been carried out as well. They analyze the possibility of justifying the most salient features of existing systems by the use of optimal tax arguments. Some papers explore the conditions under which it would be optimal for the marginal tax rate curve to be U-shaped - see Diamond (1998) and Saez (2001) for the US and Salanié (1998) for France. Along the same lines, other authors look at the optimality of a 100% marginal tax rate at the bottom of the distribution, by means of some kind of guaranteed income program - see Bourguignon and Spadaro (2000a) for the case of France and other European countries.

In a recent paper, Bourguignon and Spadaro (2000b) have used the standard model of optimal income taxation in order to reveal social preferences on inequality. They start from the observed distribution of a population's gross and disposable incomes and from the observed marginal tax rates, as computed in standard tax-benefit models. They show that, under a set of simplifying assumptions, it is possible to identify the social welfare function that would make the observed marginal tax rate schedule optimal. Their approach is applied in this paper, in order to analyze whether the 1999 PIT reform reveals a change in social preferences on inequality. We do it by using the micro-simulation model GLADHISPANIA that has been built for the Eurostat (ECHP) dataset on incomes and socio-demographic characteristics of Spanish households. We will also analyze the social preferences implicit in a basic income-flat tax (BI-FT) scheme, in line with recent proposals by various politicians and Spanish economists[2]. The structure of the paper is the following. Section 2 is devoted to the description of

[2]See Oliver and Spadaro (2003).

the dataset, the micro-simulation model and the main features of the systems simulated (1998 PIT, 1999 PIT and the simulated BI-FT). Section 3 deals with the theoretical model and its empirical implementation. In Section 4, we comment on the results of the simulation and, finally, in section 5, we outline our conclusions.

2. The Data, the Micro-simulation Model and the Main Features of Redistribution Systems

We use as the key input of our analysis the Spanish database from the European Community Household Panel (ECHP)[3]. The latest Spanish wave available when the study was done was 1995. Given that we were interested in comparing the 1998 and 1999 scenarios and that the monetary variables contained in the 1995 wave are those of 1994, we have updated them using the nominal growth rate (inflation plus real growth). To update incomes from 1994 to 1998 we have used the factor 1.281, and 1.335 from 1994 to 1999. In table 1 we report the comparison of household net income contained in the 1998 and 1999 ECHP waves (available but not yet implemented in the micro-simulation model) with our updated dataset. It must be recognized that this updating procedure introduces an error that is not negligible[4]. After the updating of the net figures we go from net to gross figures using the micro-simulation model GLADHISPANIA[5] in which we can compute, from net incomes, social contributions, total income tax and also monthly withholdings that workers have to anticipate to fiscal authorities. This is done by a fixed-point algorithm, iterating several times until reaching the values of those variables that fit the net income observed in the dataset [6]. The results of the model's calibration are reported in table 2, in which we show the difference among the values produced by GLADHISPANIA and the corresponding aggregate values reported in official statistics. The number of households of the database is 6,522; after dropping 102 observations with no information about the head of the household (which is important to compute accurately the income tax), we use 6.420 households, which

[3]In Spanish, the Panel de Hogares de la Comunidad Europea (PHOGUE).

[4]Another source of inaccuracy comes from the fact that non-work incomes reported in the Spanish waves of ECHP (especially capital income) are underestimated (see Andrés-Delgado and Mercader-Prats 2001).

[5]A full description is contained in Oliver and Spadaro (2004).

[6]For a full description of net to gross algorithm see Oliver and Spadaro (2004).

are representative of the total number of households in the Spanish population (i.e. 12,068,375 in 1995, according to INE). The three scenarios simulated are described below.

2.1. The 1998 and 1999 Spanish direct redistribution systems

The model replicates social contributions levied on wages (for employers and employees) and on self-employed workers, and income taxes. Table 3 details the contribution rates of the general social affiliation status and the maximum and minimum contribution base-rates in 1998 and 1999. With respect to the 1998 system, the 1999 reform moved from a PIT structure in which personal conditions where taken into account mainly by means of tax deductions to one where they are taken into account by means of tax allowances. Some of the 1998 tax deductions have been included in the subsistence-level minimum income (i.e. personal and family tax deductions). Others became tax deductions on different kinds of expenditure (i.e. on employees wages) and some of them were eliminated (i.e. house rentals). With the new PIT system, earnings allowances and increases in personal or family minimums replace deductions for personal disabilities. Nevertheless, the main feature of the reform (for our purposes) is that there has been a reduction in both the number of tax brackets (from 9 to 6) and tax rates (see Table 4). In particular we observe that the maximum and minimum marginal taxes have fallen asymmetrically: the highest has been reduced from 56% to 48%, whilst the lower has been reduced from 20% to 18%.

2.2. The Basic Income-Flat Tax scenario

The debate about the necessity of reforming the Spanish redistribution system is still open. Recently, the introduction of a scheme similar to that of a basic income-flat tax mechanism has been proposed (Oliver and Spadaro, 2003). The underlying idea is to simplify the tax structure by introducing a sort of "citizenship income". In order to explore the implications on social welfare of the introduction of a BI-FT scheme, we have simulated the following reform. We have defined "basic income" as the amount of money that the government allows each household, independent of income and status. We gave 300 euros per month for each equivalent adult[7]. In order to satisfy the govern-

[7]The equivalence scale used is the square root of the number of household members.

ment's budget constraint for our reference year (1999), we levied a flat rate tax of 38.3% on all extra income.

3. The inversion of the optimal tax model and its empirical implementation

3.1. The optimal tax model

This section is largely based on Bourguignon and Spadaro (2000b). The framework is the one proposed by Mirrlees (1971). Workers, each one characterized by an exogenous productivity, choose the consumption / labor combination that maximizes their preferences, given the budget constraint imposed by the government. The individual problem can be expressed as follows:

$$Max_{y,L}\ U(y,L) \qquad [1]$$

$$s.t.\ y = wL - T(wL) \qquad [2]$$

where w is the productivity of the agent, *U(y, L)* is the agent's utility function whose arguments are the consumption y and the labor supply L, *T(.)* is the tax-benefit system, which is an unrestricted function of the earned income wL. If *f(w)* is the density distribution of the agents' productivity, the government's optimal taxation problem is as follows:

$$Max_{T()} \int_{w_0}^{A} G\{V[w,T(.)]\}f(w)dw \qquad [3]$$

$$s.t.\ V[w,T(.)] = U(y^*,L^*) \qquad [4]$$

$$(y^*,L^*) = \arg\max U(y,L);\ y = wL - T(wL) \qquad [5]$$

$$\int_{w_0}^{A} T(wL^*)f(w)dw \geq B \qquad [6]$$

where the interval $[w_0,\ A]$ defines the domain of *f(w)*, L must be non negative, $G(.)$ is the social welfare function that transforms individual indirect utility *V(.)* into social welfare and B is the government's exogenous budget constraint. We can see that equation [5] is another way of writing the agent maximization problem expressed in equations [1] and [2]. To get an analytical solution of the social planner problem (eqs. [3]-[6]), some assumptions are needed. In what follows we will suppose that the function *U(y, L)* is quasi-linear with respect to y and iso-elastic with respect to L[8]:

$$U(y,L) = y - \left(1+\frac{1}{\varepsilon}\right)^{-1} L^{1+\frac{1}{\varepsilon}} \qquad [7]$$

With this specification of *U(.)*, the optimal labor supply solving the first model (eqs. [1] and [2]) is:

$$L^* = w^{\varepsilon}[1 - T(wL^*)]^{\varepsilon} \qquad [8]$$

It can easily be shown, in equation [8], that ε represents the elasticity of the labor supply with respect to w (the Slustky condition implies that $\varepsilon \geq 0$). Under these conditions, the optimal solution of the government's problem (eqs. [3]-[6]) is given by the following equation[9]:

$$\frac{t(w)}{1-t(w)} = \left(1+\frac{1}{\varepsilon}\right)\frac{1-F(w)}{wf(w)}\left[1-\frac{S(w)}{S(w_o)}\right] \qquad [9]$$

where *F(w)* is the cumulative distribution function, *t(w)* is the marginal tax for an agent with productivity w and, therefore, with earnings *wL**, *S(w)* stands for the average marginal social utility of all agents with productivity above w:

$$S(w) = \frac{1}{1-F(w)}\int_{w}^{A} G'\left[V(w,T(.))\right] f(w)dw \qquad [10]$$

The duality between the marginal rate of taxation and the social welfare function lies in the two preceding relationships (eqs. [9] and [10]). Consolidating them and performing some algebra allow us to characterize precisely the derivative of social welfare function, *G(.)*, in the following way:

$$G'\left[V(w,T(.))\right] = 1 + \left(\frac{1}{1+\frac{1}{\varepsilon}}\right)\left(\frac{t(w)}{1-t(w)}\right)\left(\frac{v(w)}{1-t(w)} + \eta(w) + 1\right) \qquad [11]$$

where $\eta(w) = \; wf'(w)/t(w)$ is the elasticity of the density $f(w)$ and that of the marginal tax rates $t(w)$ with respect to individual productivity. The preceding expression is the results of the inversion of the optimal tax problem (eqs. [3]-[6]). Instead of finding the optimal marginal tax rate maximizing the social welfare function, equation [11]

[8]This assumption reduces the generality of our results given that, with this specification, income effects do not affect labor supply.

[9]See Atkinson (1995) or Diamond (1998).

gives us the derivative of the social welfare function that makes optimal an observed marginal tax rate function. With equation [11], if we know the elasticity and the productivity distribution, we can empirically compute the social marginal weight of a household implicit in a given redistribution system characterized by an observed effective marginal tax rate $t(w)$.

3.2. The empirical implementation

Before applying the inversion procedure described in section 3.1, some work on the data must be performed. First, to retain the logic of the optimal labor income tax model, all households for which unearned income (including pension and unemployment benefits) represented more than 10 per cent of their total income were eliminated from the sample[10]. Second, to compute $f(w)$, we have used the process described in Bourguignon and Spadaro (2000a). We invert the individual utility maximization problem (eqs. [1] and [2]) and recover the implicit productivity of each household by observing the gross earned income wL and the effective marginal tax rate $t(w)$ and by making certain hypotheses on the elasticity of the labor supply (eq. [4]) (in our case $\varepsilon = 0.5$)[11]. After these computations, we apply adaptive kernel density estimation techniques in order to calculate $f(w)$. Third, in order to be able to compute empirically equation [11], jointly with estimates of the elasticity of labour supply, ε, and the distribution of productivities $f(w)$, we need also the marginal tax rate, $t(w)$. This variable is not present in the survey. A possible method of calculation is described in Bourguignon and Spadaro (2000a, 2000b). This approach consists

[10] This filtering reduces the number of households used in our computations from 6,420 to 2,718; divided by category as follows: singles (326), couples (1,456), couples + 1 child (423), couples + 2 children (513). The new sample is not representative of the whole population but it is representative of the worker's population.

[11] We have run simulations for a range of elasticities, from 0.1 to 0.5, and described only one scenario for reasons of space. The values retained for the elasticity may be considered as a rough average estimate obtained in the labour supply econometric literature (see Blundell and MaCurdy, 1999, for an international survey or Martinez-Granado, 2002, and Segura-Bonet, 2002, for Spanish estimations). The results are basically the same for all scenarios. What is different is the intensity of the changes in the social evaluation of inequality. This coincides with what we might expect because, for a given distribution of gross incomes and marginal tax rates, there is less inequality in productivities when the labour supply is more elastic. This implies a stronger preference for redistribution than in the other cases.

of the assignment of a lump-sum amount of gross income[12] to each household and, in the computation with the micro-simulation model, of a new distribution of disposable incomes. The effective marginal rate of taxation is thus obtained from the formula:

$$t(w) = \frac{\Delta Taxes + \Delta Benefits}{\Delta Gross\ Income} = 1 - \frac{\Delta Y_d}{y} \qquad [12]$$

where Y_d is disposable income, defined as the household income once employee social contributions and PIT have been paid. All the functions used in the model of Section 3 are supposed to be continuous and differentiable everywhere. In order to guarantee this, we estimated the density of the productivities $f(w)$ and the observed effective marginal tax rate $t(w)$ by adaptive kernel techniques[13].

4. Results

The results are summarized in the form of curves, showing the marginal social welfare of the household population quantiles, ranked according to their level of productivity. Figure 1 shows the effective net marginal tax rates that correspond to the various different population quantiles, computed by means of the official 1998 and 1999 rules modeled in GLADHISPANIA. The marginal tax rate curves increase consistently, except at the very beginning. This is due to the progressivity of income tax, which basically represents the only source of direct redistribution under both systems. As expected, the 1999 marginal tax curve is systematically lower than the 1998 curve. It is important to highlight that the reduction of the marginal tax rate increases with income.

Figure 2 shows the distribution of productivity consistent with the gross earned income distribution, under the assumption of a moderately elastic labor supply ($\varepsilon = 0.5$). The mean productivity is normalized to one. Figure 3 shows the marginal social welfare consistent with the previous curves for various different population quantiles, ranked according to productivity and computed on the whole sample. The main result is that the marginal social welfare observed declines with the level of household productivity. This is very reassuring, since it

[12]Fixed at 10% of the total population average gross labour income.

[13]The adaptative kernel is a non-parametric interpolation technique that allows the definition of the optimal number of observations that must be used to build an estimation of a function around a given value of the exogenous variable. See Hardle (1990).

suggests that the redistribution systems analyzed exhibit some minimum optimality features, in the sense that they maximize a standard concave social welfare function of individual utility levels. This is interesting, because it is certainly not guaranteed by the inversion methodology used. Another interesting result is that, with the 1999 system, there is a decrease in the social welfare weight of the poorest part of the population that is more than compensated by an increase in the weight of the richest part. This result means that the 1999 government is much more utilitarian than the 1998 one.

Another feature of Figure 3 is that the marginal social welfare function of the 1999 system remains flat over a long interval, from the first decile to almost the 4th decile, while the 1998 curve decreases in a more regular way. Under the present set of assumptions, a shape such as the 1999 one could be justified by some kind of median-voter-type argument or, more generally, by some kind of economic policy decision within the tax system itself. The basic income-flat tax scheme (as expected) gives a strong weighting to less productive sectors of society. Up to decile 4, the marginal social welfare function is higher than in the 1998 and 1999 systems. It is interesting to observe that if we look at the very top of the distribution (decile 9), the marginal weight for this part of the population under the BI-FT scheme is higher than under the 1999 system. This reflects the fact that the marginal tax rate under the BI-FT scheme is lower than the average tax rate paid by this household group.

The analysis performed on the whole sample does not consider that, in reality, redistribution systems are concerned not only with income differences but also with other dimensions as, for example, family size[14]. The theoretical model used does not allow treating explicitly this dimension of the redistribution. A possible way to take into account the size and composition of the households is to apply of the previous methodology to separate household groups with a homogeneous demographic composition. This is equivalent to considering the redistribution that takes place across these groups as being exogenous, independent of productivity and income. Thus, Figures 4, 5, 6 and 7 show the results of the inversion of the marginal rate curve into the marginal social welfare curve for single people, couples, couples with one child, and couples with two children, respectively. In general, the

[14]The recent work of Ayala, Martínez and Ruiz-Huerta (2003) shows that family size is an important element in the design of Spanish income tax.

shape of the marginal social welfare curve is comparable to the one corresponding to the population as a whole. It decreases for the whole household population of a given size, once it is ranked according to productivity levels. However, the general shape of the curve for the 1999 system is slightly different from those observed in the preceding figures, especially because the flat part, at the beginning of the curve, is considerably lower (with the exception of single people). The slope of the curve is now negative from the second decile onwards, whereas it was practically zero until the fourth decile for the whole population. This suggests that part of the flatness of the 1999 marginal social welfare curve could be explained by the heterogeneity in the way in which the tax-benefit system deals with households of differing sizes and compositions. At this stage it is hard to say more; to go further would require the specification of a multidimensional optimal tax model explicitly considering family size as a redistribution variable.

In the case of single people (Figure 4), the picture is very similar to the whole population case. On the contrary, if we analyze the results of the sub-sample for couples, an interesting feature can be observed that was not present in the previous cases. The 1998 system gives greater weight to the first decile than the BI-FT system (which is a little bit surprising) and the 1999 system (as occurred before). This is highly original because, for the rest of the population (90% of households), the marginal social weight is higher under the BI-FT scheme. One possible explanation could be the way in which the subsistence-level minimum income takes into account the number of children in a household. The increase in the minimum threshold per child is independent of the household's income. For the concavity of the individual utility function and of the social welfare function, this implies a greater redistributive effect. When children are involved (Figures 5 and 6), we still have very similar results to the whole population scenario.

5. Conclusions

In this paper, using an original form of application developed by Bourguignon and Spadaro (2000b), based on the Mirrlees optimal income tax model, we have revealed the social aversion to inequality that allows the simulated Basic Income-Flat Tax system and the 1998 and 1999 Spanish tax and benefit systems to be optimal in the Mirrlees framework. We have observed that, in general, the social welfare function is increasing and concave. It seems that there is some type of optimal tax theory behind the design of all of the three systems analyzed. As regards the degree of aversion to inequality of the social planner, the results show that the shift from the 1998 system to the 1999 system involved a clear decrease in importance of less productive households, with a strong increase in the weight of more productive sectors of society. This is coherent with the declared objectives of the reform: to reduce the disincentive effects of redistribution (improving the efficiency of the economy). The BI-FT proposal seems to give strong weight to lower-ability sectors of the population, but the results of this system have to be treated with care, because it was based on the strong hypothesis of no changes to labor supply. As pointed out in Bourguignon and Spadaro (2000b), the optimal income tax model represents an extremely promising framework for the analysis of real tax-benefit models and their performance in terms of equity and efficiency. Instead of summarizing in one value the social welfare property of one tax system with respect to another (this is the standard welfare reform analysis based on the inequality and progressivity index), this approach gives us the social welfare weight of each individual or household composing the whole population. It allows for a complete exploitation of the heterogeneity observed in the micro data. Nevertheless, to conclude, we must stress that this approach has several limitations, which give rise to debates on its validity, although it also paves the way for future research. The first problem is the representation of the economy as a whole and the functioning of the labor market: if households were not on the labor supply curve (due to constraints on the demand side), then the entire story would be different. A second restriction is the one-dimensional nature of the heterogeneity of households: it is well known that redistribution not only affects income, but also other characteristics that are not considered in our analysis. The third problem is that the sample used for the simulations is not representative of the whole population but only of the workers' population and that it is an updated survey in which socio-demographic characteristics are not the ones of 1998: this reduces the generality of the results. Another important limitation of our results comes from the intensive nature of the labor supply model specified. The labor supply depends on the local slope of the budget constraint and responds only along the intensive margin: effort changes a little bit when the marginal tax rate is changed a little bit. It would be interesting to see what happens with a model allowing extensive labor supply responses (i.e. participation decisions). Finally, we must also highlight that this is a static model, meaning that dynamic and uncertainty aspects of household decisions are ignored.

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Abstract

En este trabajo se utiliza la metodología propuesta por Bourguignon y Spadaro (2000b) para analizar cómo han cambiado las preferencias sociales sobre la desigualdad con la reforma del sistema fiscal de 1999. Partiendo de la distribución de renta observada en la población y los tipos marginales efectivos, calculados con un modelo estándar de micro-simulación, demostramos que es posible identificar la función de bienestar social que hace óptimos los tipos marginales efectivos observados. Esta metodología es utilizada para analizar los sistemas fiscales españoles de 1999 y 1998.

Keywords: Micro-simulación, Imposición óptima sobre la renta, IRPF español.

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TABLE 1: Comparison of updated 1995 ECHP with 1998 and 1999 ECHP (in euros)

Household mean disposable income	PHOGUE	PHOGUE 1995 (updated)	Difference
1998	18,334	18,130.6	-1.11%
1999	18,375	19,311	5.09%

TABLE 2: Calibration of GLADHISPANIA (in billions of euros)

		1998			1999	
	Official Statistics	Model	Difference	Official Statistics	Model	Difference
	(1)	(2)	(3) = (2-1)/1	(4)	(5)	(6) = (5-4)/4
Personal Income Tax collection[a]	39.2	39.1	-0.25%	39.54	37.83	-4.33%
Average income Tax rate[c] = (net tax/ taxable income)	15.13%	15.59%	3.03%	23.15%	23.87%	3.12%
Employee Social Security contributions[b]	13.7	13.37	-2.40%	2,424	14.26	-2.13%

(a) Source: Informe Anual de Recaudación Tributaria de 2001; (b) Source: Anuario de Estadísticas Laborales y de Asuntos Sociales 2002; (c) Source: Memoria de la Administración Tributaria 2001.

TABLE 3: Social Security contribution rates (%) and Monthly Minimum and Maximum Base-Rates (in euros)

	1998				**1999**	
Minimum base	477 (= minimum wage/12)				485.7 (= minimum wage/12)	
Maximum base	2,360				2,402.7	
	Firm		**Worker**		**Total**	
Contribution Items	*1998*	*1999*	*1998*	*1999*	*1998*	*1999*
General contingencies	23.6	23.6	4.7	4.7	28.3	28.3
Mean no. of industrial accidents and professional illnesses	4.0	4.0	0.0	0.0	4.0	4.0
Unemployment						
Full-time worker (permanent worker)	6.2	6.2	1.6	1.6	7.8	7.8
Full-time worker (temporary worker)	6.2	6.7	1.6	1.6	7.8	8.3
Part time worker	6.2	7.7	1.6	1.6	7.8	9.3
Social welfare fund	0.4	0.4	0.0	0.0	0.4	0.4
Professional training	0.6	0.6	0.1	0.1	0.7	0.7

TABLE 4: Tax rates schedule (in euros)

1998				**1999**	
Single Person's income tax return		**Family income tax return**		**Single person's and family income tax return**	
Bracket	Tax rate	Bracket	Tax rate	Bracket	Tax rate
0-2,806.73	0	0-5,415.12	0	0-3,606.07	0.18
2,806.73-6,977.75	0.2	5,415.12-13,492.72	0.2	3,606.07-12,621.25	0.24
6,977.75-13,793.23	0.23	13,492.72-19,028.04	0.246	12,621.25-24,641.50	0.283
13,793.23-21,005.37	0.28	19,028.04-26,390.44	0.29	24,641.50-39,666.08	0.372
21,005.37-30,621.57	0.32	26,390.44-35,255.37	0.33	39,666.08-66,111.33	0.45
30,621.57-40,838.77	0.39	35,255.37-47,485.97	0.39	> 66,111.33	0.48
40,838.77-51,837.29	0.45	47,485.97-59,716.56	0.45		
51,837.29-63,106.27	0.52	59,716.56-72,938.83	0.53		
> 63,106.27	0.56	> 72,938.83	0.56		

Figure 1. Marginal taxes for workers 98 & 99 (kernel estimation)

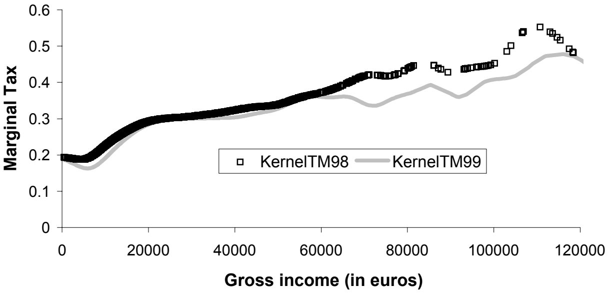


Figure 2. Kernel Density Estimation of Productivities (mean of w = 1)

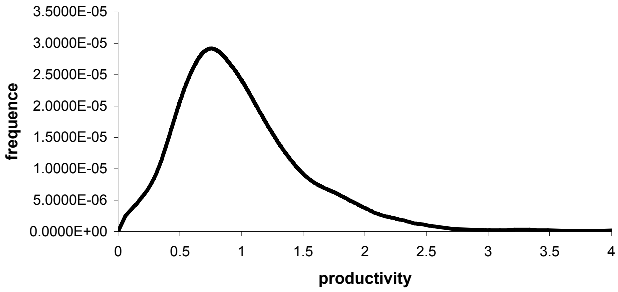


Figure 3. Marginal Social Welfare Functions Whole sample

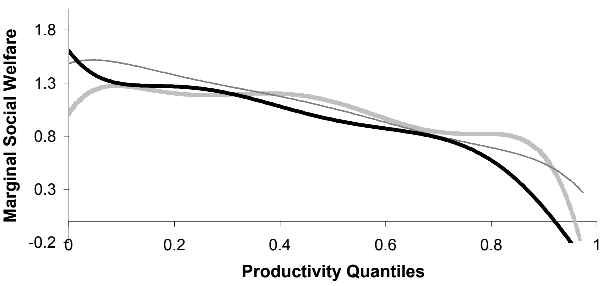


Figure 4. Marginal Social Welfare Functions Singles

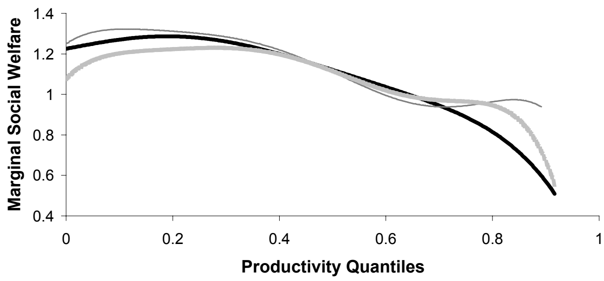


Figure 5. Marginal Social Welfare Functions Couples

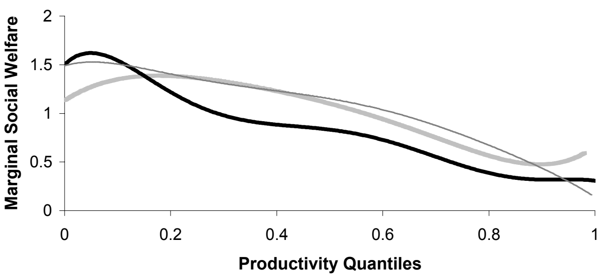


Figure 6. Marginal Social Welfare Functions Couples + 1 child

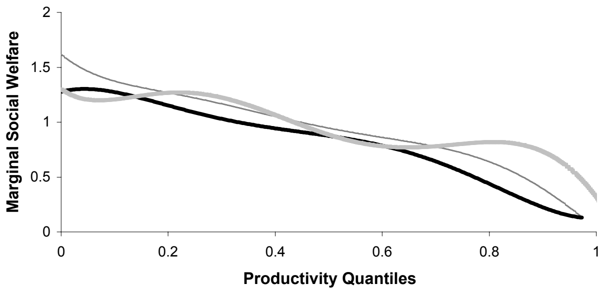
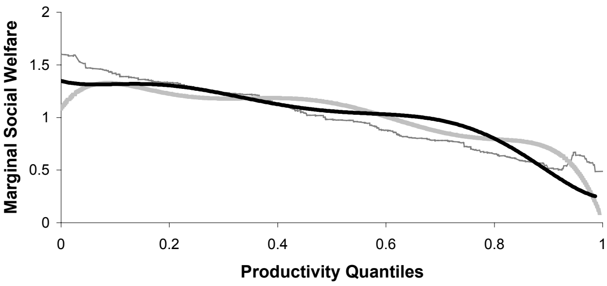


Figure 7. Marginal Social Welfare Functions Couples + 2 children



General note to Figures 3, 4, 5, 6 and 7:
The thick black line corresponds to the 1998 scenario.
The thick grey line corresponds to the 1998 scenario.
The fine grey line corresponds to the BI-FT scenario.