

**PAPER PRESENTED AT THE 54th INTERNATIONAL INSTITUTE OF PUBLIC FINANCE
(IIPF) CONGRESS, CÓRDOBA, ARGENTINA, AUGUST 24-27, 1998**

**TAX PERCEPTION, WELFARE AND LABOUR SUPPLY: THE
SPANISH CASE**

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Abstract

This paper investigates the tax perception of the married Spanish man in the economic context in which he takes labour supply decisions. In order to obtain the marginal tax rate perceived by the worker, we estimate simultaneously and by means of non-linear methods a labour supply function together with a perceived tax scale. The results suggest the existence of prominent divergencies between subjective perception and formal income tax rules. In addition, the effects of this gap on public policy design are also assessed. In particular, this paper is expanded to evaluate the welfare impact of this tax rate discrepancy. A relevant implication of this welfare analysis is that while labour supply models specified in terms of statutory marginal tax rates underestimate the aggregate excess burden associated with income taxation, individuals' welfare loss is overestimated.

Keywords: labour supply, tax perception, Generalized Method of Moments (GMM), welfare, excess burden.

JEL codes: D60, H24, H30, J22.

1. Introduction

The vast majority of empirical work on labour supply is formulated under the assumption that taxpayers use the statutory marginal tax rates formally set up in the personal income tax schedule and in the social security contributions. However, against this view, authors such as Rosen (1976), Hausman(1985), Fujii and Hawley (1988) and Bartolome (1995) suggest that, in evaluating the proper connections between taxes and labour supply, analysts should differentiate between **formal** and **perceived** marginal tax rates. If these two tax rates are divergent, then the latter should be the relevant one in economic analysis.

This paper aims to analyze tax perception and its consequences on Spanish working husbands. The plan of the paper is as follows. Section 2 outlines the main causes for formal and perceived tax rates not to coincide. The origin of this divergence can be found not only in misperception but also in personal adjustments undertaken by the taxpayer in order to eliminate fiscal illusion. Section 3 presents the methodological issues concerned with the econometric estimation of tax perception. Following Brännäs and Karlsson (1996), our methodology consists of estimating simultaneously and by means of non-linear methods a labour supply function together with what we termed a 'perceived tax scale'. The results confirm the existence of strong divergencies between statutory and perceived tax rates. However, we have not found empirical evidence for this gap between tax rates to vary with socioeconomic variables.

Determining whether workers use formal marginal tax rates or not when making marginal labour supply decisions is a relevant question for public policy

implementation. Namely, evaluating the effects on labour supply of a given tax policy implies taking into account the individuals' overall perception of the tax-transfer code as a whole. Any assessment of tax structures exclusively based on formal tax rates may be inaccurate and consequently may lead to incorrect judgements. To illustrate this point, section 4 expands this paper in order to evaluate in our sample the welfare implications of this tax rate gap. In doing this, we compute, by making use of the duality theory (Hausman (1981), King (1983)), the exact excess burden and monetary equivalents induced by the difference between formal and perceived tax rates. Significant inaccuracies have been identified in the quantification of tax-induced deadweight loss and of welfare impact when formal tax rates are presupposed in empirical work. The main conclusions are summarised in section 5.

2. Tax Perception

As mentioned at the outset, there is support for individual tax perceptions to be far from formal tax codes. As suggested by Brännas and Karlsson, one of the origins of this divergence might be in the misperception of legal marginal tax rates. Complex tax schedules, confusing transfer schemes and bizarre tax rules could explain this hypothesis. However, it is an oversimplification simply to note that taxpayers make systematic mistakes with respect to how they perceive the existing tax-transfer structure. In fact, apart from errors in perception, individuals, acting in a rational manner, may bring to bear past experiences, prior beliefs and reference points to think about their actual marginal tax liability. All this information can be used by taxpayers in their decision-making processes. Nevertheless, contrary to what Brännas and Karlsson point out in their paper, this second source of divergence between legal and

perceived tax rates may lead to an improvement in the knowledge of true marginal tax liability by eliminating potential fiscal illusion.

In this respect, there is a number of points that may make taxpayers think that formal tax rates are not the true marginal rates. Firstly, sometimes those who have the actual legal liability for paying the tax are not the ones who, in the end, pay it. A good example of this shifting mechanism in Spain is the existing evidence of the shifting of the social security contributions of the employer to the employee (Argimón and González-Páramo (1987), Zabalza (1988), Escobedo (1991)). Secondly, the marginal yield of extra work is not exclusively affected by the personal income tax and national insurance contributions but by the combined effect of taxes and benefits. That is, an additional unit of income faces not only an explicit marginal tax rate but also it may face implicit taxes that result from the withdrawal of means-tested benefits. This second tax component may be as sizeable as the explicit one and even higher. These facts, effective tax incidence and implicit taxation, can be accurately perceived by the taxpayers who can use them in order not to be deceived by appearances¹. In this sense, tax perception leads taxpayers closer to true marginal tax rates.

Moreover, provision of public goods and services may also affect the overall tax perception to the extent that it may be regarded as the compensation for tax liabilities. To be precise, whereas some goods provided by the public sector may be highly substitutable for private goods or cash, other types of public goods and services are complementary to private consumption. This different nature of public expenditure may induce individuals to perceive marginal tax liabilities in accordance with the expected marginal utility of public expenditure. Whereas substitutive public expenditure may

induce lower and medium income recipients to reduce the perception of marginal tax rates, complementary public spending may have the same effect on high-income taxpayers. This conjecture could be explained by the differences in consumption elasticities among income recipients together with self-exclusion in consumption of substitutive public services by high-income taxpayers, due to congestion and the poor quality of the public services.

In summary, it seems to be clear that any analysis of the interactions between labour supply and taxation should take into account the fact that formal marginal tax rates -those legally imposed- are not necessarily those perceived by taxpayers. In addition, although individual tax perceptions may be erroneous, the gap between formal and perceived marginal tax rates may also be due to subjective corrections which lead to approximate real marginal tax rates. However, despite the importance of this issue, to have an approximation of perceived marginal tax rates is not easy because they are not observable.

Following Brännäs and Karlsson (1996), in this paper we approximate tax perception departing from a labour supply model. This model incorporates some parametric assumptions about the characteristics of the perceived tax scale, which allows to estimate simultaneously the relevant parameters for the labour supply function and for the perceived tax schedule².

3. The Empirical Model

Suppose that individual preferences are such that the labour supply function can be expressed as (Hausman(1985)):

$$h_i = m + a w_i + b y_i + g z_i + e_i \quad (3.1)$$

where h_i represents the actual yearly working hours; $w_i = (1 - t_-)W_i$ denotes the hourly net wage obtained from the gross wage per hour W_i and the *perceived* marginal tax rate t_- ; $y_i = V_i - t_i + t_- W_i h_i$ is the virtual income defined in terms of non-labour income V_i and total *perceived* tax liability t ; z is a vector of socioeconomic variables influencing labour supply; and e is a random variable normally distributed, with a zero mean and constant variance, which shows preference heterogeneity among individuals. Non-labour income, V_i , is defined as the sum of gross capital income (VK_i) and the income of the other members living in the same household (VN_i). Moreover, t_- is a function of the individual's taxable income $I_i = h_i W_i + VK_i$.

However, equation (3.1) can not be identified if the functional form for the *perceived* marginal tax rate is unknown. Therefore, to solve this problem, a close functional form for t_- is imposed. To be precise, under the assumption that t_- and t are continuous and differentiable in h^3 , we select the following modified logistic function⁴:

$$t'_i = \frac{d_u}{1 + e^{d_1 + d_2 (h_i W_i + VK_i)}} + v_i \quad 0 \leq d_u \leq \infty \quad d_2 \leq 0 \quad (3.2)$$

where t_- has two components: one depends on income:

$$t'_i = \frac{d_u}{1 + e^{d_1 + d_2 (h_i W_i + VK_i)}}$$

and the other, v_i , represents potential individual heterogeneities in tax perception. This last random variable follows a normal distribution with mean zero and constant variance and is independently distributed from ϵ and from the other variables in the model⁵.

Substituting (3.2) into (3.1), we get:

$$h_i = m + a (1 - t_i') W_i + b [VK_i + VN_i + t_i' W_i h_i - T_i] + g z_i + u_i \quad (3.3)$$

where:

$$T_i = d_u I_i + \frac{d_u}{d_2} \ln \left[\frac{t_i'}{t'(I=0)} \right] \text{ and}$$

$$u_i = e_i - a v_i W_i + b (v_i W_i - v_i I_i)$$

Estimating (3.3) involves two difficulties: non-linearity and endogeneity of W , VK and VN . Therefore, to tackle this problem, the Generalized Method of Moments (GMM) proposed by Hansen (1982) is implemented. This estimation method is particularly robust in non-linear contexts.

3.1 Results

The sample of working husbands used in the empirical work described above is drawn from the Household Panel (PHOGUE) for 1994, constructed for Spain by the Spanish Statistical Office (Instituto Nacional de Estadística). This survey contains information on income and labour status for 17908 Spanish individuals. The selection procedure resulted in a final sample with 1406 working married men⁶.

The variables used in the analysis are: the number of working hours per year (h), the hourly gross wage expressed in Spanish pesetas (W), the annual individual's gross

capital income (VK) and the net income belonging to the rest of the household members (VN), both of them, expressed in tens of thousands of Spanish pesetas. The age and the number of children living with the individual are the two variables included in the vector z of socioeconomic variables. The definitions and summary statistics for these variables can be found in appendix A.

To estimate our model, instrumental variables other than the original regressors in (3.3) were required. The following variables were used as instruments: the age and the square of the age of the worker and his wife, the work experience and its square, the number of children living in the household, a set of dummy variables giving information about the educational attainment of the husband and his wife (very low, low, medium and high), a group of variables reflecting the economic sector for which the individual works (agriculture, manufacturing, construction industry and services), the type of ownership (public or private) and 15 more interaction variables obtained from these instruments⁷.

The results of the estimation, run in LIMDEP release 7.0, are presented in table 1⁸. This table reveals that only in the case in which the explanatory variables in equation (3.3) are used as instruments (column I), the hypothesis of instrument validity is rejected based on the Hasen test (1982)⁹. In the rest of the cases this hypothesis is not rejected. These results corroborate the necessity to regard regressors in (3.3) as endogeneous. Moreover, neither the age nor the number of children seems to affect the number of working hours supplied by Spanish married men. Hence, table 1 also reports the results of the estimation when the number of children does not influence working time (column III) and when, in addition, labour supply is unaffected by both children

and the age of the individual (column IV). After imposing these constraints, results are quite stable.

[TABLE 1 APPROXIMATELY HERE]

As for the estimated values for α and β , it is noteworthy that, despite the negative value for α , the Slutsky condition is met by all the observations in the sample. The fulfilment of this condition indicates that the underlying utility function is concave and thus coherent with utility maximization. In addition, results imply, on average, that while the wage elasticity is around -0.39, the income elasticity reaches to -0.020.

According to the estimated parameters reported in table 1 (column IV), the perceived marginal tax rate has been imputed to every individual in the sample. Figure 1 depicts these estimated marginal tax rates together with the corresponding legal marginal tax rates existing in 1994¹⁰. As this picture shows, contrary to what Brännäs and Karlsson (1996) obtain for the Swedish case, we get extensive discrepancies between formal and perceived marginal tax rates in the Spanish case¹¹. It does not seem reasonable to think that such significant divergencies are exclusively due to errors in perception¹². In our view, the results obtained in this paper could be behind the reasoning captured in section 2. In particular, the progressivity of the Spanish public expenditure and transfer programmes plus the existing fiscal illusion verified in empirical work may support our results (Pazos and Salas (1997), Calonge and Manresa (1997), Gimeno (1995), Bandrés (1995), Argimón and González-Páramo (1987), Escobedo (1991) and Zabalza (1988)). Moreover, the fact that we have not found empirical evidence for significant tax rate contrasts neither by age nor by educational attainment supports

our interpretation. In addition, in order to disregard the suspicion that individuals could face different legal tax schedules according to the type of tax return filed by the couple, the model was reestimated in accordance with the way married couples filed the tax return -jointly or separately-. The results of this reestimation did not show any evidence to reject equality in tax perception regardless the way personal income tax return is filed.

[FIGURE 1 APPROXIMATELY HERE]

4. Tax Perception and Welfare

This inequality between the marginal tax rates legally imposed and the actual tax rates perceived by workers has implications on the effects of public policies on labour supply¹³. In this sense, we can expect that the efficiency and welfare evaluations based on formal personal income tax schedules and legal social security contributions may be biased in comparison with the same analysis when actually perceived tax rates are used. To illustrate this point, we follow the approach of Hausman (1981) and King (1983) in order to provide some insights into the welfare implications of this tax rate gap. In order to do this, we define two alternative tax scenarios: a benchmark scenario (E_0) and a final scenario (E_1). The former, E_0 , assumes that workers take labour supply decisions according to the marginal tax rates they actually perceive (τ_0); in the latter, E_1 , in contrast, workers are supposed to use formal tax rates (τ_1) "as if" these were the true marginal tax rates¹⁴. The relevant variables for each scenario are summarized in table 2.

[TABLE 2 APPROXIMATELY HERE]

Once these two tax scenarios are defined, the welfare effects of the transition from E_0 to E_1 ($E_0 \rightarrow E_1$) can be analyzed using traditional methods. The study of the move entailed in $E_0 \rightarrow E_1$ permits to identify and quantify the differences in welfare as well as the excess burden variation underlying traditional labour supply models, which are specified in terms of formal marginal tax rates.

The computation of underlying welfare measures is relatively simple. Given the labour supply function defined in (3.1), we can recover, by using the duality theory, the expenditure function and the indirect utility function associated with (3.1), from which the so-called Hicksian welfare measures, the equivalent variation (EV) and the compensating variation (CV), can be derived explicitly. To be precise, the solution of the following differential equation

$$\frac{\partial y}{\partial w} + b y = - (m + a w + g z)$$

gives the subsequent expenditure function

$$y(w, \bar{U}) = \bar{U} e^{-bw} - \frac{1}{b} \left(m + a w + g z - \frac{a}{b} \right)$$

(4.1)

where ω is the marginal net wage and \bar{U} represents the benchmark utility level for welfare analysis. The inversion of (4.1) leads to the underlying indirect utility function

$$v(y, w) = e^{bw} \left[y + \frac{1}{b} \left(m + a w + g z - \frac{a}{b} \right) \right]$$

(4.2)

which captures the overall impact of the tax rate gap under study on the level of the worker's utility. Substituting (4.1) and (4.2) into the standard definitions of the EV and the CV, we can recover the explicit functions for these two monetary equivalents:

$$EV_{E_0 \rightarrow E_1} = [e^{b(w_1 - w_0)} - 1] \left[y_1 + \frac{1}{b} \left(m + a w_1 + g z - \frac{a}{b} \right) \right] - \frac{a}{b} (w_0 - w_1) + (y_1 - y_0) \quad (4.3)$$

$$CV_{E_0 \rightarrow E_1} = [1 - e^{b(w_0 - w_1)}] \left[y_0 + \frac{1}{b} \left(m + a w_0 + g z - \frac{a}{b} \right) \right] + \frac{a}{b} (w_1 - w_0) + \dots \quad (4.4)$$

where w_0 , w_1 , y_0 and y_1 are already defined in table 2. A positive sign in (4.3) and in (4.4) indicates that the assumption that workers react to formal marginal tax rates underestimates the welfare losses induced by income taxation. Conversely, a negative sign implies an overestimation of such losses. In addition, another significant question that arises from this discrepancy between perceived and formal tax rates is what happens to the excess burden (DWL) entailed in this tax rate gap. Again, the answer to this issue can be found in the examination of the change in the deadweight loss as a result of the move from E_0 to E_1 . If we use the EV as the reference monetary equivalent, the variation in the excess burden between these two tax scenarios is given by:

$$DWL_{E_0 \rightarrow E_1} = - \sum_{i=1}^n VE_i(w) - (t_1 - t_0) \quad (4.5)$$

where t_1 and t_0 represent the tax liabilities in E_1 and E_0 , respectively; and $VE(w)$ captures the component of the EV which is exclusively due to the taxation of labour income¹⁵. Here again, the sign in (4.5) conveys important information: a positive (negative) sign indicates that using formal tax rates in empirical work overestimates (underestimates) the actual excess burden of income taxation.

Nevertheless, evaluating equations (4.1)-(4.5) requires the prior knowledge of the relevant marginal wage rate and the virtual income for every observation in the sample in both states, E_0 and E_1 . The benchmark scenario, E_0 , is not a problem since observed working hours are known and perceived marginal tax rates have been estimated. However, in E_1 , labour supply response to formal marginal tax rates is a prerequisite. In order to do this, we had to face the problem of simulating labour supply responses in E_1 . This was done through an iterative routine programmed in STATA 5.0. This simulation routine is embedded in a partial equilibrium framework which predicts hours of work from formal marginal tax rates by using (3.1) and by regarding gross wage rate as exogeneous. This simulation algorithm together with the estimations obtained in section 3.1 and the existing tax rules in 1994 permitted the computation of the required marginal wage rates and the virtual incomes.

4.1 Implications on Public Policy Analysis

According to the analysis outlined above, table 3 summarizes the main effects involved in the transition from E_0 to E_1 . This table contains information about the changes induced on the labour supply (column I) together with information on welfare measures and deadweight variation (columns III, IV and V). Moreover, this overall information is broken down into the effects by income deciles and by the sort of the tax return filed by the taxpayers. The referred table also reports the proportion of people perceiving marginal tax rates under and in excess of the marginal tax rates legally imposed (column II). As can be observed, the majority of taxpayers perceive marginal tax rates below formal tax rates (71.48%).

[TABLE 3 APPROXIMATELY HERE]

Effects on Labour Supply

If we focus on the aggregate effects, it can be seen that, on average, formal marginal tax rates would reduce the yearly supply of working time by 5.92%. This reduction in the number of working hours is specially important in couples who filed their tax return separately, whose labour supply would be reduced by 12.26%. However, the different income deciles exhibit large variations. Whereas the top three deciles would reduce their supply of work very intensively, the rest of the income classes would increase it. To be precise, those who would increase their labour supply are the ones whose perceived rates are well below formal rates; the contrary applies to those who would work less. It is noteworthy the huge tax rate gap in the top decile. For this income class, the difference between tax rates reaches, on average, 49.7 points, indicating that the perceived rate of these highest income recipients is well above statutory rates.

Effects on Efficiency Cost Evaluation and Welfare Assessment

With regard to welfare analysis, the first thing to note is that only 8.11% of the workers in the sample would be better off with formal tax rates than with the marginal tax rates they actually perceive. Moreover, according to the sign rule presented above, we can confirm that the legal tax rate presumption overvalues the welfare losses induced by income taxation (as indicated by the negative sign for both, the EV and the CV). Thus, in aggregate terms, it can be said that the actual tax perception generates beneficial effects on individuals' welfare. This also holds regardless taxpayers filing

jointly or separately. By income deciles, however, although the first nine deciles mimic the aggregate result, for the last income group formal tax rates imply an undervaluation of welfare losses.

As for the excess burden, the negative sign in overall deadweight variation suggests that if workers switched to using the marginal tax rates legally assigned to them, total excess burden would be significantly reduced (50.41% of tax revenue in 1994). Namely, presuming formal tax rates in empirical work underpredict the efficiency costs of income taxation. However, results by income classes indicate that this does not hold for every income group: for lower income recipients (the first five deciles), by contrast, the formal tax rate presumption implies an overvaluation of the excess burden.

5. Conclusions

By estimating a labour supply function and a perceived tax scale simultaneously, in this paper we have computed the marginal tax rates actually perceived by Spanish working husbands. The results show strong disparities between formal and perceived marginal tax rates. Our conjecture about this tax rate gap is that it is not only a consequence of errors in perception but it may also be due to subjective corrections which lead to avoiding fiscal illusion. Namely, the tax rates actually perceived by the workers may be closer to true marginal tax rates than the tax rates legally imposed.

The first consequence of these results is that formal tax rates must not be presupposed in empirical work. Moreover, this tax rate divergency has important

implications on public policy evaluation. The welfare analysis undertaken in this paper shows that, in aggregate terms, assuming that workers respond to legal marginal tax rates rather than to perceived tax rates overpredicts the tax-induced welfare losses whereas the efficiency cost of labour income taxation is underreported. In addition, this assumption of formal tax rates would imply a reduction in labour supply.

In summary, the econometric testing of tax perception undertaken in this paper has proved the existence of strong discrepancies between statutory and perceived marginal tax rates. This tax rate gap, apart from inducing inaccurate evaluations of tax effects on labour supply, also suggests that labour supply models defined in terms of formal marginal tax rates may be misspecified and may need to be reestimated.

Acknowledgments

Finance for this research has been provided by the Fundación de las Cajas de Ahorros Confederadas para la Investigación Económica y Social (FUNCAS). This funding is gratefully acknowledged.

APPENDIX A: THE DATA

The data employed are drawn from the Household Panel (*Panel de Hogares de la Unión Europea*) developed for Spain by the Spanish Statistical Office (under EUROSTAT guidelines). It provides information on 17908 individuals for the years 1993-1994. Only married men in employment, for whom no fundamental information is lacking, are included in our sample. The resulting analysis sample has 1406 observations.

The variables

- h =annual hours of work

They are calculated by summation hours of work over all jobs at which individuals worked during 1994. To construct h , we consider that the number of working weeks per year is 47.8572. We make this assumption because the survey provides data only on weekly hours.

- W =gross wage per hour

All work done during 1994 is taken into account. It is calculated by dividing weekly earnings by reported weekly hours of work. The individuals are asked their earnings per month at each job. To convert information on wage earnings to a weekly basis, we assume that the number of weeks per month is 4.3452.

- V =non-labor income= VK (gross capital income)+ VN (rest of the household members net income)

- VK=gross capital income

This was calculated using data for 1993 because in the survey individuals are not asked about their capital income in 1994. It includes interest payments, dividends, etc. When individuals report their net capital income, we assume that the corresponding tax rate is 25%. If the capital income is reported in brackets, we assign the average of the range.

- VN=rest of the household members net income

It is the sum of the net income of the rest of the family members for the year 1993. In the survey there is a variable that reflects the net income of each individual and a code that indicates which individuals belong to the same family.

Means and standard deviations of variables

Variable	Mean	Standard deviation
h	2080.869	426.237
W	1159.082	692.686
VK*	57831.58	168796.8
VN*	819528.8	1029656
Age	42.449	9.611
Experience	25.25	11.285

* There are 779 individuals with VK=0; 485 with VN=0 and 280 with both, VK and VN, equal zero.

Distribution of observations by education level

	Education		
	High	Medium	Low
n. of observations	387	527	492
%	27,5	37,5	35

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Notes

1. Implicit taxation has been widely studied in literature. See, for instance, Fraker, Moffit and Wolf (1985); Fraker and Moffit (1988) and Dick and Edlin(1997).

2. In this respect, it is important to point out that:

-The concept of tax perception considered in Brännäs and Karlsson (1996) is significantly different to the one in this paper. For these authors the difference between legal and perceived marginal tax rates is only due to misperception.

- There are other potential ways to approach the problem of labour supply and tax perception. A different approach could be the complete modelling of all the elements, tax and benefits, that form the public budget. However, due to its complexity, this approach has been explored only partially, see Fraker and Moffit (1988) and Aronsson and Palme (1998).

3. In this respect, see MaCurdy et al. (1990).

4. Given the characteristics of the Spanish tax structure, it is reasonable to think that τ_* must be positively related with income, thus $\partial \tau_* / \partial h > 0$. Moreover, it is also sensible to believe that τ_* is bounded ($0 \leq \tau_* \leq d_u$).

5. Brännäs and Karlsson (1996) also use a logistic tax perception function. However, their perception function is deterministic since they do not consider the random variable v_i as we do (i.e. they do not allow for individual heterogeneity).

6. The overall sample of married working males in the survey was 1424. However, 18 individuals were eliminated because of lack of complete information to carry out the estimation.

7. We had over 66 interaction variables among all the potentially valid instruments. However, although an *a priori* reasoning may lead to think that using all of them might improve efficiency, results from Monte Carlo experiments run in the GMM context, such as in Tauchen (1986) and in Kocherlakota (1990), indicate that overidentification must be taken with caution. Nevertheless, we tested wider sets of instruments without significant gains in efficiency.

8. To solve some convergence problems with the iterative procedure of estimation we had to re-scale the components of the virtual income variable, which are expressed in tens of thousands of Spanish pesetas.

9. Apart from VN, VK, W, the age of the worker, the number of cohabiting children and the square of all these variables were also used as instruments.

10. In constructing the formal marginal tax rate both, the personal income tax schedule and the social security marginal tax rates, have been taken into consideration. Moreover, the existing choice in the personal income tax for married people between joint or separate tax return has been also considered. The best choice for the taxpayer is the one that has been allocated.

11. Given the specific characteristics of the model, the inconsistency of the estimations run by Brännäs and Karlsson can not be disregarded.

12. Apart from the modified logistic function finally used in this paper, we tried other functional forms such as ratios of linear functions and quadratic functions. The results obtained from these alternative functions also confirm strong contrasts in marginal tax rates. However, we do not report these alternative estimations because the models involved suffered from identification problems.

13. This is just part of the whole story. In addition to the effects on labour supply there may also be effects on labour demand, on individual investment and saving decisions and on government revenue, among others. That is, behind the difference between perceived and legal marginal tax rates there are general equilibrium effects which are not considered in this paper.

14. Formal tax rates ($\tau_{1_}$) not only includes personal income statutory marginal tax rates but also incorporates marginal social security contributions.

15. This "substitution effect" component is the part of the EV which is due to changes in relative prices (see, Sanz (1997)). The explicit function for $EV(\omega)$ is given by:

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