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# Tax Parameters in the Portuguese Economy *

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**Abstract.** In this paper, we formally discuss the correspondence between statutory and effective tax rates in the Portuguese economy. This correspondence depends on the details of the Portuguese tax law, on a wealth of data information, and on certain priors about the values of behavioral parameters in the economy. Accordingly, in addition to the general correspondence, we present our own estimates of the effective tax rates at the different tax margins. More importantly, however, using the information in this paper any practitioner of tax policy evaluation can obtain his own estimates of the relevant tax parameters.

**Keywords:** Tax parameters; Tax reform

**JEL Classification:** H20

## 1. Introduction

The objective of this paper is to establish the mapping between statutory and effective tax rates in the Portuguese economy. Ultimately, it addresses the question of how changes in statutory tax rates induce changes in effective tax rates. This is a critical question from the perspective of tax policy evaluation.

From time to time, the topic of tax reform reenters the political arena. Tax reform proposals are invariably phrased in terms of changes in the statutory tax rates (see, for example, Cavaco Silva, 1999, where the former Portuguese prime minister presents a comprehensive tax reform package for Portugal). This is understandable since statutory tax rates are under the direct jurisdiction of the legislative powers. Furthermore, statutory tax rates are easily available and readily understood by the general public.

From the standpoint of the practitioner of tax policy evaluation, the formulation of tax reform proposals in terms of statutory tax rates presents several challenges.

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In general terms this is because, from the perspective of tax policy evaluation, statutory tax rates are close to irrelevant (see, for example, Primarolo, 2000, where the Paymaster General of the UK's Treasury addresses this point in the context of tax harmonization in the EU).

In fact, for the economic analysis of the incentives to work, consume, save and invest, induced by the tax code, what matters most is the agent's behavior at the margin. As such, ideally, the proposed tax rate changes should be framed in terms of changes in the marginal tax rates. These, however, are notoriously difficult to obtain. An approximation that is often used in tax policy evaluation is the average or effective tax rate.

The relationship between statutory and effective tax rates is a rather complex matter. It depends, first and foremost, on the details of the tax law, which was clearly not written by nor for economists or policy analysts. It also depends on data information which is either not available or comes from varied and not necessarily compatible sources. Furthermore, it depends on behavioral parameters for the economy that are often difficult to identify and that, at any rate, reflect the priors of the tax policy analyst.

The effective tax rate, $\tau_{tax}$, can be defined simply as the ratio between total tax revenues, $T_{tax}$, and the tax base from which they were obtained, $B_{tax}$, i.e.,

$$\tau_{tax} = T_{tax}/B_{tax}.$$

Observed tax revenues, however, are the result of a myriad of tax rules. In reality, statutory tax rates, $t_{tax}$, along with deductions, $D_{tax}$, and tax credits, $CR_{tax}$, are the instruments of tax legislation. A highly stylized description of how these three variables come together to determine tax revenues is

$$T_{tax} = t_{tax}(B_{tax} - D_{tax}) - CR_{tax}.$$

Note that only when there are no credits and no deductions are effective and statutory tax rates equal, i.e., $\tau_{tax} = t_{tax}$.

In this highly simplified framework, changes in the statutory tax rates lead to changes in the effective tax rates according to

$$\frac{\partial \tau}{\partial t} = 1 - \frac{D_{tax}}{B_{tax}}.$$

This mapping is independent of the existence of credits but the same cannot be said about the effective tax rate, i.e., $\partial \tau_{tax}/\partial CR_{tax} \neq 0$. Note also that, if there are no deductions but credits are non-zero, then the correspondence is one-to-one, even though effective and statutory tax rates differ by $CR_{tax}/B_{tax}$. In that case,

$$\tau_{tax} = t_{tax} - \frac{CR_{tax}}{B_{tax}}.$$

In this paper we explore the relationship between statutory and effective tax rates at the most significant tax margins in the Portuguese economy. Indeed, the corporate

income tax, employers' social security contributions, employees' social security contributions, the personal income tax, and the value-added and other indirect taxes are considered in great detail. We present several tables with the technical details on the correspondence between statutory and effective tax rates at the different margins. We highlight not only the mathematical mapping but also the data information and economic parameters necessary to establish such mappings. As such, the accompanying text is essentially a guided tour of the different tables complemented with a detailed reference to sources. For a comprehensive description of the Portuguese tax system, in legal terms, the reader is referred to CEF (1997) and KPMG (1997).

## 2. The corporate income tax

Under the Portuguese tax law, the corporate income tax is known as the *imposto sobre o rendimento de pessoas colectivas* or more simply, as $IRC$. Corporate income tax revenues, $T_{CITd}$, which include municipal taxes called "derramas", averaged 3.1% of GDP measured at market prices, $Y^{MP}$, for the period between 1990 and 1998 (DGEP, 1999). Averages over this period are used to capture long-term trends and to minimize business cycle effects.

The Portuguese corporate income tax code (CIRC) enumerates as taxable entities all types of resident enterprises such as corporations (SA), quota companies (Lda) and any type of business partnerships. Resident corporate taxpayers are liable to IRC on their world-wide income and capital gains. Companies are considered resident if their head office of effective place of management is located in Portuguese territory. A permanent establishment exists when any agent of a company carries out business acts in Portugal for more than 120 days in a year, or has fixed installations or a permanent representation from which a commercial, agricultural or industrial activity is exercised (KPMG, 1997).

Resident companies are subject to IRC on both domestic and foreign-source income. The taxable base is made up of net profits for the year plus certain changes in equity minus allowable previous years' losses and tax incentives. Profit is defined in balance sheet terms as representing the difference in net equity at the beginning and the end of the accounting period, adjusted in accordance with CIRC rules. Resident corporate enterprises may be subject to a local surcharge levied by municipalities, i.e., a "derrama", $t_{der}$.

The corporate income tax is levied upon taxable profit, i.e., the difference between sales revenues and the costs that are accepted as such by the tax administration (CEF, 1997). Generally all costs associated with the normal activity of a company are deductible subject to limitations. These are essentially comprised of fiscal depreciation allowances and wage payments including employers' social security contributions. In practice, however, the calculation of the taxable base is more complex. On the revenue side, net capital gains have to be added and a firm's inventory is evaluated according to specific rules. In particular, the stock must be valued according to an historic

Table I. The corporate income tax

*In statutory terms ...*

$$T_{CITd} = t_{CIT}(1+t_{der})\phi[(Y^{MP} - T_{VATET})(1-\theta_L) - \alpha\frac{I^{MP}}{1+\tau_{VATET,I}}] + \\ -\tau_{ITC}\frac{I^{MP}}{1+\tau_{VATET,I}} \quad (1)$$

*In effective terms ...*

$$T_{CITd} = \tau_{CITd}[(Y^{MP} - T_{VATET})(1-\theta_L) - \alpha\frac{I^{MP}}{1+\tau_{VATET,I}}] - \tau_{ITC}\frac{I^{MP}}{1+\tau_{VATET,I}} \quad (2)$$

*How a change in the statutory tax rate induces a change in the effective tax rate*

$$\frac{\partial\tau_{CITd}}{\partial t_{CIT}} = (1+t_{der})\phi \quad (3)$$

*Data*

$T_{CITd} = 0.031Y^{MP}$, $T_{VATET} = 0.142Y^{MP}$, $I^{MP} = 0.215Y^{MP}$,

$t_{CIT} = 0.34$, $t_{der} = 0.10$, $\theta_L = 0.475$,

*Parameters*

$\tau_{VATET,I} = 0.08401641$, $\tau_{ITC} = 0.00446$, $\alpha = 0.82787$, $\phi = 0.338152857$

*The calculated effective tax rate*

$\tau_{CITd} = 0.111385962$

*The calculated differential effect*

$\frac{\partial\tau_{CITd}}{\partial t_{CIT}} = 0.371968143$

cost method, i.e., it must be valued at its effective acquisition cost. Other deductions include representation expenses, travel allowances, eligible donations, research and development expenditures and provisions for irrecoverable debts.

Data limitations regarding the distinction between taxable profits of the incorporated and of the unincorporated sector, as well as information concerning firms' net capital gains, the valuation of their inventories and the other deductions mentioned above, require us to define the corporate income tax base in a roundabout way. The corporate income tax base is measured, in statutory terms (see equation (1) in Table I), as a fraction, $\phi$, of the difference between GDP measured at factor cost, $Y^{FC}$, which is a proxy for the economy-wide sales revenues, and the sum of total labor costs, $\theta_L Y^{FC}$, and fiscal depreciation allowances, $\alpha I^{FC}$, both for the economy as a

whole. GDP at factor cost is simply GDP at market prices minus value-added and excise taxes, i.e., $Y^{FC} = Y^{MP} - T_{VATET}$.

With $\theta_L$ as the labor share in production, total economy-wide labor costs are $\theta_L Y^{FC}$ and include gross wages and employers' social security contributions which are a fraction, $\tau_{FSSC}$, of gross wages. Total labor costs comprise all labor-related income derived in the public or private sector and accruing to dependent or self-employed workers. In theory one would want to single out the total wage bill of the incorporated sector. In reality, however, such a distinction is difficult to make. For the purposes of this paper computing $\phi$ residually provides an adequate approximation.

Fiscal depreciation allowances are $\alpha I^{FC}$. Private investment expenditure measured at factor cost is computed by netting out the corresponding value-added and excise taxes from investment valued at market prices, i.e., $I^{MP} = (1 + \tau_{VATET,I})I^{FC}$, where $\tau_{VATET,I}$ is the *effective* value-added and excise tax on private investment expenditure. See subsection 5.2 on how to calculate $\tau_{VATET,I}$.

A straight-line fiscal depreciation method over $NDEP$ periods was used. Depreciation allowances are thus

$$(I_t + I_{t-1} + ... + I_{t-NDEP+1})/NDEP.$$

Under the assumption that the life expectancy of the asset is 16 years and that, over the same time period, investment has grown at a rate of $g$ depreciation allowances simplify to $\alpha\phi I^{FC}$, with

$$\alpha = [1 - (1+g)^{-NDEP}]/NDEP[1 - (1+g)^{-1}].$$

This formula was obtained by computing the difference between two infinite geometric progression sums.

A flat tax rate of $t_{CIT}$ is applied to the corporate income tax base

$$\phi \left[ (Y^{MP} - T_{VATET})(1 - \theta_L) - \alpha \frac{I^{MP}}{1 + \tau_{VATET,I}} \right].$$

In addition, a municipal tax rate of $t_{der}$ is levied on the firms' (pre-tax credit adjusted) tax liability.

Finally, investment tax credits, ITCs, reduce the total amount due by the corporations. These credits are determined as a fraction, $\tau_{ITC}$, of gross private investment expenditure measured at factor cost. The effective investment tax credit rate, $\tau_{ITC}$, is determined as the product of three terms – the statutory tax rate, $t_{ITC}$, an eligibility ratio, and the utilization ratio – that we further detail.

With the exception of financial intermediaries – such as banks and insurance companies – all entities that are subject to the corporate income tax can apply for an ITC. Under the current tax code, a firm's ITC can never exceed

$$min\{0.3\Upsilon; t_{ITC} \cdot I^{Eligible}\}$$

where $\Upsilon$ is the corporate income tax liability *before* investment tax credits have been deducted. This condition effectively prevents a firm from reducing its pre-ITC tax

Table II. Investment tax credits

| Variable | | Value |
|---|---|---|
| $T_{CIT,1995}$ | | 372.4 bn PTE |
| $-T_{CIT,banks,1995}$ | | −41.6 bn PTE |
| $+T_{ITC,1995}$ | (A) | +10 bn PTE |
| $\Upsilon_{1995}$ | | 340.8 bn PTE |
| $= T_{CIT,1995} - T_{CIT,banks,1995} + T_{ITC,1995}$ | | |
| $I_{1995}$ | (B) | 3734.1 bn PTE |
| $I_{1995}^{Eligible}$ | (C) | 1666.1 bn PTE |
| $min\{0.3\Upsilon_{1995}; t_{ITC} I_{1995}^{Eligible}\}$ | (D) | 102.2 bn PTE |
| $\tau_{ITC} = t_{ITC} \cdot \frac{C}{B} \cdot \frac{A}{D}$ | | 0.4461% |
| $t_{ITC}$ | | 10.00% |
| Eligibility ratio, (C)/(B) | | 44.61% |
| Utilization ratio, (A)/(D) | | $\approxeq$ 10% |

liability, $\Upsilon$, by more than 30% by acquiring eligible capital goods. According to CEF (1997), eligible investment, $I^{Eligible}$, comprises all new capital investment with the exception of land (except for firms operating in the primary sector), buildings (except for factories), furniture and light automobiles.

The effective investment tax credit rate, $\tau_{ITC}$, is evaluated at a little under half a percent and is quite low by international standards. Table II explains how this effective tax rate was calculated. For 1995, eligible investment was only 44.61% of the total (INE 1997a). This figure is obtained by calculating the ratio between items (C) and (B) in Table II, a ratio we term eligibility ratio. With a statutory tax credit rate of $t_{ITC}$, parameterized at 10%, investment tax credits would have been 166.61 billion PTEs, in the absence of the 30% of the pre-ITC tax liability ceiling. To assess whether this constraint was in fact active for 1995, we determine the value of $\Upsilon_{1995}$. The first part of Table II focuses on just that.

Since all firms of the incorporated sector with the exception of financial intermediaries are eligible for investment tax credits, to determine $\Upsilon$, the pre-ITC tax liability for non-financial firms of the incorporated sector, the following calculations were carried out. From total IRC revenues for 1995 (DGCP, 1995), we subtract the banks' corporate income tax liability, $T_{CIT,banks,1995}$ (APB, 1996), and add the investment

tax credits effectively handed out, $T_{ITC,1995}$ (OE, 1996), to reach a grand total of 340.8 billion PTEs. Thirty percent of this is 102.2 billion PTEs, which is smaller than the 166.61 billion PTEs. In light of this, investment tax credits for 1995 would have been capped at 102.2 billion PTEs. However (see (A) in Table II), only 10 billion PTEs of investment tax credits were attributed. This means that, either firms acquired a lot of eligible capital goods and failed to take advantage of the ITCs provided, or, more convincingly, a severe underreporting of corporate profits, lowered the corporate tax liability and ultimately capped the amount of ITCs handed out. In any way, on aggregate, our calculations suggest a utilization ratio of around 10% (see (A)/(D) in Table II).

## 3. Social security contributions

The Portuguese social security system operates on a pay-as-you-go (PAYG) basis in accordance to an intergenerational solidarity principle. Under the conventional taxonomy of the three pillars, only the first – a state-operated regime with mandatory contributions – and the third – an individual complementary regime with favorable tax treatment that is managed by pension funds – exist. The state-operated social security comprises two systems: a general system for private sector workers and a civil servants' system. In addition to these two, a special system for banking employees exists that operates on a capitalization basis. Within the general system two regimes exist – a general contributory regime funded by employers' and employees' contributions, and a non-contributory regime funded by Government transfers.

Employers social security contributions are 23.75% of gross wages while employees contribute 11% of their gross remunerations with no upper limit. Members of corporate boards contribute 10% but the base of their contribution is capped at twelve times the national statutory minimum wage per company in which they hold an office. Self-employed individuals may choose to contribute at a rate of 25.4% for the mandatory minimum coverage or they may opt for 32% for broader coverage. Self-employed individuals may choose a base for contributions of between 1 and 12 times the national statutory minimum wage (KPMG, 1997).

The general contributory system grants pensions in substitution for lost income due to old age and other contingencies such as sickness, invalidity, death and unemployment. The non-contributory scheme provides a minimum protection to persons not covered and suffering from social and/or economic hardships with an income level below a certain threshold.

### 3.1. *Employers' social security contributions*

Employers' social security contributions (*contribuições patronais para a segurança social*) represent an average of 5% of GDP for the period 1990-98 (DGEP, 1999).

Table III. The employers' social security contributions

*In statutory terms ...*

$$T_{FSSC} = \xi \cdot t_{FSSC}[\theta_L(Y^{MP} - T_{VATET}) - T_{FSSC} - Wages_{PS}] \quad (4)$$

*In effective terms ...*

$$T_{FSSC} = \tau_{FSSC}[\theta_L(Y^{MP} - T_{VATET}) - T_{FSSC}] \quad (5)$$

*How a change in the statutory tax rate induces a change in the effective tax rate*

$$\frac{\partial \tau_{FSSC}}{\partial t_{FSSC}} = \frac{(1+\tau_{FSSC})^2}{\theta_L(Y^{MP}-T_{VATET})} \cdot \frac{\xi[\theta_L(Y^{MP}-T_{VATET})-Wages_{PS}]}{(1+\xi t_{FSSC})^2} \quad (6)$$

*Data*

$T_{FSSC} = 0.05Y^{MP}$, $t_{FSSC} = 0.2375$, $Wages_{PS} = 0.161224Y^{MP}$,

$T_{VATET} = 0.142Y^{MP}$, $\theta_L = 0.475$,

*Parameters*

$\xi = 1.072330$

*The calculated effective tax rate*

$\tau_{FSSC} = 0.139841$

*The calculated differential effect*

$\frac{\partial \tau_{FSSC}}{\partial t_{FSSC}} = 0.534911$

The taxable base in this case is comprised of gross wages paid out to dependent workers in the private sector. These are computed by netting out civil servants' wages, $Wages_{PS}$, self-employed workers' income and employers' social security contributions, $T_{FSSC}$, from total economy-wide labor costs, $\theta_L Y^{FC}$. Once more, because the self-employed share of total gross wages is unknown, $\xi$ is used as a compensating parameter (see equation (4) in Table III). Following this discussion a $\xi < 1$ would be expected. It turns out that $\xi$ is greater than one. A possible explanation for this is that, over the 1990-1998 period, through initiatives such as the Mateus Plan, employers' social security contribution arrears were recouped.

To determine $\frac{\partial \tau_{FSSC}}{\partial t_{FSSC}}$, the partial derivative that reports on how changes in the statutory tax rate, $t_{FSSC}$, induce changes in the effective tax rate, $\tau_{FSSC}$, we factor out $T_{FSSC}$ in equations (4) and (5) of Table III and compute the derivative according

Table IV. The employees' social security contributions

*In statutory terms ...*

$$T_{WSSC} = \zeta \cdot t_{WSSC}[\theta_L(Y^{MP} - T_{VATET}) - T_{FSSC}] \tag{7}$$

*In effective terms ...*

$$T_{WSSC} = \tau_{WSSC}[\theta_L(Y^{MP} - T_{VATET}) - T_{FSSC}] \tag{8}$$

*How a change in the statutory tax rate induces a change in the effective tax rate*

$$\frac{\partial \tau_{WSSC}}{\partial t_{WSSC}} = \zeta \tag{9}$$

*Data*

$T_{WSSC} = 0.041Y^{MP}$, $t_{WSSC} = 0.11$, $T_{VATET} = 0.142Y^{MP}$, $T_{FSSC} = 0.05Y^{MP}$

*Parameters*

$\zeta = 1.0170224$

*The calculated effective tax rate*

$\tau_{WSSC} = 0.1118725$

*The calculated differential effect*

$\frac{\partial \tau_{WSSC}}{\partial t_{WSSC}} = 1.0170224$

to

$$\frac{\partial \tau_{FSSC}}{\partial t_{FSSC}} = \left(\frac{\partial T_{FSSC}}{\partial \tau_{FSSC}}\right)^{-1} \frac{\partial T_{FSSC}}{\partial t_{FSSC}}.$$

This yields the expression (6) in Table III.

### 3.2. *Employees' social security contributions*

Employees' social security contributions (*contribuições dos empregados para a segurança social*) averaged 4.1% of GDP over 1990-98 (DGEP, 1999).

In contrast to the employers' social security contributions, all wages are subject to a statutory tax rate of $t_{WSSC}$, be they derived from the private or the public sector. We assume that social security contributions of the self-employed are accounted for here. While dependent workers' gross labor incomes are subject to a statutory contribution rate of $t_{WSSC} = 11\%$ the self-employed choose between 25.4% and 32%

for a minimum or a broader coverage respectively. In addition they get to choose their contribution base – between 1 and 12 statutory minimum wages.

In light of the fact that self-employed labor income cannot be distinguished from that of dependent workers, $\zeta$, a residually determined scale parameter is used (see equation (7) in Table IV). We expect $\zeta$ to capture two inversely related effects. The self-employed face a higher statutory contribution rate but choose as a contribution base a reference wage that typically understates their wage income. It turns out that $\zeta$ is slightly larger that one which means that the first effect is the dominant one.

## 4. The personal income tax

Under the Portuguese tax legislation (CIRS) the personal income tax is designated by *imposto sobre o rendimento de pessoas singulares*, or $IRS$. Personal income tax revenues averaged 6.1% of GDP for the period 1990-98 (DGEP, 1999).

Residents are liable to IRS on their world-wide income. The concept of income encompasses nine categories according to the source – A - employment income including fringe benefits, B - self-employment and independent professional income, C - business income, D - agricultural income, E - investment or capital income, F - real-estate income, G - capital gains, H - pensions including annuities and alimony payments and I - other income which includes proceedings from lotteries, gambling and other competitions.

Taxable income of individual taxpayers is calculated under the cash receipts and disbursements method, i.e., income is taxable in the year it is received by or made available to the taxpayers; capital gains accrue in the year the underlying transfer is made. In computing the net income in each category, expenses directly related to producing the income are deductible either on an actual or percentage basis (KPMG, 1997).

From the total income from the various categories, the taxpayer may deduct certain allowances for duly substantiated expenses including unreimbursed health-related expenditures, the interest on health-related loans, compulsory pension payments, a part of the taxpayer's home mortgage interest payments, a fraction of premiums paid on qualifying insurance policies, trade union dues, education expenses, housing and living expenses for the elderly, costs of acquisition of equipment for production of renewable energy sources and part of the contributions made to a complementary pension plan (PPR). The balance is the taxable base to which the progressive rate structure is applied. Finally, a resident taxpayer may credit against his final tax liability lump-sum family credits, which increase with the number of dependents and the marital status of the taxpayer, and, if rent income was obtained, the taxpayer may credit the amount of the municipal real estate tax (*contribuição autárquica*) paid on the underlying real estate (KPMG, 1997).

The taxable unit is the family unit or *agregado familiar* which is composed of either a married couple living in a joint household with their dependent children; or each

Table V. The personal income tax

*In statutory terms ...*

$$T_{PIT} = T_{DistributedProfits} + T_{InterestIncome} + T_{PIT,NonCapitalIncome}$$

$$T_{PIT} = t_{\Pi^d} \cdot \Gamma \cdot \Pi + t_r r^{PD} PD + T_{PIT,NCI} \tag{10}$$

*In effective terms ...*

$$T_{PIT} = \tau_{\Pi}\Pi + \tau_r r^{PD} PD + \tau_{PIT,NCI}[(1-\tau_{WSSC})\theta_L(Y^{MP} - T_{VATET}) + \varphi TR1] \tag{11}$$

$$\begin{aligned}\tau_{PIT,NCI} = &\left[\sum_{i=1}^{40000} RL_i 1(RL_i \geq E_0)[1 - Pr(RL < E_0)]^{-1}\right]^{-1} \cdot \\ &\cdot\{t_{PIT,1}\left[\sum_{i=1}^{40000}(E_1 - E_0)1(RL_i \geq E_1)\right] + \\ &+t_{PIT,2}\left[\sum_{i=1}^{40000}(E_2 - E_1)1(RL_i \geq E_2)\right] + \\ &+t_{PIT,2}\left[\sum_{i=1}^{40000}(RL_i - E_1)1(E_2 > RL_i \geq E_1)\right] + \\ &+t_{PIT,3}\left[\sum_{i=1}^{40000}(E_3 - E_2)1(RL_i \geq E_3)\right] + \\ &+t_{PIT,3}\left[\sum_{i=1}^{40000}(RL_i - E_2)1(E_3 > RL_i \geq E_2)\right] + \\ &+t_{PIT,4}\left[\sum_{i=1}^{40000}(RL_i - E_3)1(RL_i > E_3)\right] - Credits\}\end{aligned} \tag{12}$$

*How a change in the statutory tax rate, $t_{PIT,4}$, induces a change in the effective tax rate*

$$\begin{aligned}\frac{\partial \tau_{PIT,NCI}}{\partial t_{PIT,4}} = &\sum_{i=1}^{40000}(RL_i - E_3)1(RL_i > E_3)\cdot \\ &\cdot\left(\sum_{i=1}^{40000} RL_i 1(RL_i \geq E_0)[1 - Pr(RL < E_0)]^{-1}\right)^{-1}\end{aligned} \tag{13}$$

*Data*

$T_{PIT} = 0.061Y^{MP}$, $TR1 = 0.093Y^{MP}$, $t_{\Pi} = 0.20$, $t_r = \tau_r = 0.20$, $Pr(RL < E_0) = 0.054$,

$\Gamma = 0.437461235$, $\varphi = 0.075$, $t_{PIT,1} = 0.15$, $t_{PIT,2} = 0.25$, $t_{PIT,3} = 0.35$, $t_{PIT,4} = 0.40$,

In 1997: $E_0 = 793800PTE$, $E_1 = 1050000PTE$, $E_2 = 2435000PTE$, $E_3 = 6150000PTE$

*Parameters*

$\tau_{\Pi} = 0.087492247$, $\Pi_{1998} = 0.20300289Y^{MP}_{1998}$, $K_{1998} = 1.6296581Y^{MP}_{1998}$, $r^{\Pi} = 0.12456777$,

$r^{PD} = 0.0525$, $PD_{1998} = 0.617Y^{MP}_{1998}$

*The calculated effective tax rate*

$\tau_{PIT,NCI} = 0.09964$

*The calculated differential effect for the tax rate associated with the highest income bracket*

$\frac{\partial \tau_{PIT,NCI}}{\partial t_{PIT,4}} = 0.07100$

divorced, or separated persons, unmarried parents and their dependents. A married couple living in a single household is taxed according to an income splitting system which allows spouses to divide their combined income by two for the purpose of being levied at lower progressive tax rates. The resulting tax liability is then multiplied by two. Non-residents are liable to IRS only on their Portuguese source income. An individual is deemed to be a resident if he remains within Portuguese territory for more than 183 days.

From a practical point of view, personal income tax revenues are essentially comprised of taxes on capital income and taxes on pensions and labor income. In fact, these different income tax bases are subject to different tax treatment.

Capital income comprises interest income, $r^{PD}PD$, where $r^{PD}$ is the rate of return and $PD$ is the financial asset. Interest income is taxed at a statutory rate of $t_r$. Capital income also includes distributed profits, that are a fraction, $\Gamma$, of total corporate profits, $\Pi$. Distributed profits are subject to a statutory tax rate of $t_{\Pi^d}$.

To determine the fraction of corporate profits that is distributed it suffices to notice that, from equation (11) we can determine taxes collected on distributed profits, $\tau_{\Pi} \cdot \Pi$, as 1.7761179% of GDP measured at market prices. In addition, these tax revenues can be re-written as $t_{\Pi} \cdot \Gamma \cdot \Pi$ in statutory terms. Using an estimate for $\Pi$ of 20.3% of $Y^{MP}$ we obtain an estimate of $\tau_{\Pi} = 0.087492247$. This allows us to determine $\Gamma$ as 0.437461235. Furthermore, with a capital stock estimated at $1.63Y^{MP}$, its implicit rate of return, $r^{\Pi}$, is determined as the ratio between $\Pi_{1998}$ and $K_{1998}$. This yields an estimate of 0.125 for 1998.

Non-capital income, NCI, comprises labor income net of employees' social security contributions $(1-\tau_{WSSC})\theta_L Y^{FC}$ and old-age, survivors and disability pensions, $TR1$. Only a fraction, $\varphi$, of pensions enters the personal income tax base. This fraction corresponds to the percentage of all monthly pensions that exceed the statutory minimum wage, $W_{min}$. The non-capital personal income tax is progressive in nature. This is depicted by equation (12) of Table V, where net income, $RL$, equal to declared income minus specific deductions, is subject to a rising schedule of marginal tax rates, $t_{PIT,1} < ... < t_{PIT,4}$, one for each of the income brackets that have $E_0 < ... < E_3$ as their upper limits.

The effective tax rate applied to non-capital incomes, $\tau_{PIT,NCI}$, was determined with the aid of the DGITA (1999) panel database, a source of information normally used to build tax calculators and perform policy analysis in a micro-simulation framework. Reporting is only compulsory for households with annual incomes that exceed the threshold of fourteen times the statutory minimum wage, that is $E_0$. The proportion of all non-capital income that is received by these households is $Pr(RL < E_0) = 5.4\%$ (DETEFP, 1997). For this reason, and because the non-capital income base is $(1 - \tau_{WSSC})\theta_L Y^{FC} + \varphi TR1$, the database's income base has to be scaled up by dividing it by $1 - Pr(RL < E_0)$.

A different statutory tax rate exists for each of the non-capital income brackets. Therefore, there are just as many correspondences between the statutory tax rates

and the non-capital income effective tax rates. For illustration purposes we chose to present how a change in the statutory tax rate of the highest income bracket would induce a change in the effective non-capital income tax rate. This is depicted by equation (13) in Table V. Very simply, what this means is that a change in the statutory tax rate, $t_{PIT,4}$, only impacts the effective tax rate by altering the tax liability of the households with the highest incomes.

## 5. Value-added and excise taxes

Under the Portuguese tax legislation (CIVA), the value-added tax is designated *imposto sobre o valor acrescentado* or $IVA$. Any importer or supplier of goods and services, operating in Portuguese territory, is liable to VAT. The taxable base is the value of the goods declared for custom purposes and increased by import duties; or the total amount charged. In computing the final tax liability, input VAT is credit against output VAT or refunded so that, in practice, only the value-added is taxed. In general, the Portuguese value-added tax rules follow the general pattern of VAT in other European countries (KPMG, 1997).

The IVA is a tax with economic incidence on purchases of final goods and service. As such, private consumption spending, public consumption spending and, partially, investment decisions are distorted. In addition, the Portuguese tax system considers other indirect taxes. These include an excise tax on alcohol and alcoholic beverages (*imposto sobre bebidas alcoólicas e sobre o álcool*) or $IBAA$, an excise tax on automobiles (*imposto automóvel*) or $IA$, an excise tax on petroleum products (*impostos sobre produtos petroliferos*) or $ISP$, and finally, an excise tax on tobacco (*imposto sobre o tabaco*) or $IST$.

### 5.1. *Value-added and excise taxes on private consumption spending*

Value-added and excise tax revenues collected upon private consumption expenditure totalled 11.416% of GDP for the 1990-1998 period (DGEP, 1999).

For a private consumer different goods and services purchased are subject to an array different tax rates. For this reason, we decompose private consumption related value-added and excise tax revenues into nine categories, four general categories to be detailed below, alcoholic beverages, automobiles, petroleum products, tobacco products, and a residual category. For these categories the basic shares in the households' budget, $\theta_{HH,1}$, $\theta_{HH,2}$, $\theta_{HH,3}$, $\theta_{HH,4}$, $\theta_{HH,alcohol}$, $\theta_{HH,autos}$, $\theta_{HH,petrol}$, $\theta_{HH,tobacco}$, and $\theta_{HH,rest}$, are obtained from INE (1997), a 1994 household budget survey. The original shares where slightly adjusted to account for business cycle effects and brought into line with our priors regarding the composition of an average household's consumption in 1998. Essentially (see columns 4 and 5 of Table VII), automobiles, petrol and tobacco substitute for foodstuffs. The adjusted shares (see column 5 in Table VII)

Table VI. The value-added and excise taxes on private consumption

*In statutory terms ...*

$$T_{VATET} = T_{VATET,C} + T_{VATET,CG} + T_{VATET,I} + T_{VATET,IG} + T_{VATET,IH}$$

$$\begin{aligned} T_{VATET,C} = [&t_{VAT,1}\tilde{\theta}_{HH,1} + t_{VAT,2}\tilde{\theta}_{HH,2} + t_{VAT,3}\tilde{\theta}_{HH,3} + t_{VAT,4}\tilde{\theta}_{HH,4} + \\ &+(1+t_{VAT,5})\tau_{alcohol}\tilde{\theta}_{HH,alcohol} + (1+t_{VAT,5})\tau_{tobacco}\tilde{\theta}_{HH,tobacco} + \\ &+(1+t_{VAT,5})\tau_{autos}\tilde{\theta}_{HH,autos} + (1+t_{VAT,5})\tau_{petrol}\tilde{\theta}_{HH,petrol} + \\ &+t_{VAT,5}(\tilde{\theta}_{HH,alcohol} + \tilde{\theta}_{HH,tobacco} + \tilde{\theta}_{HH,autos} + \tilde{\theta}_{HH,petrol} + \tilde{\theta}_{HH,rest})]\cdot \\ &\cdot\frac{C^{MP}}{1+\tau_{VATET,C}} \end{aligned} \tag{14}$$

*In effective terms ...*

$$T_{VATET,C} = \tau_{VATET,C}C^{FC} \tag{15}$$

$$\tau_{alcohol} = \frac{ETR_{alcohol}(1+t_{VAT,5})}{\theta_{HH,alcohol}C^{MP}-(1+t_{VAT,5})ETR_{alcohol}} \tag{16}$$

$$\tau_{tobacco} = \frac{ETR_{tobacco}(1+t_{VAT,5})}{\theta_{HH,tobacco}C^{MP}-(1+t_{VAT,5})ETR_{tobacco}} \tag{17}$$

$$\tau_{autos} = \frac{ETR_{autos}(1+t_{VAT,5})}{(\theta_{HH,autos}C^{MP}+\theta_{Firms,autos}I^{MP}+\theta_{PS,autos}CG^{MP})-(1+t_{VAT,5})ETR_{autos}} \tag{18}$$

$$\tau_{petrol} = \frac{ETR_{petrol}(1+t_{VAT,5})}{(\theta_{HH,petrol}C^{MP}+\theta_{Firms,petrol}I^{MP}+\theta_{PS,petrol}CG^{MP})-(1+t_{VAT,5})ETR_{pterol}} \tag{19}$$

*How a change in the statutory general VAT rate induces a change in the effective tax rate*

$$\frac{\partial\tau_{VATET,C}}{\partial t_{VAT,5}} = \frac{(1+\tau_{VATET,C})^2}{(1+t_{VAT,5})^2}\left[\frac{\theta_{HH,alcohol}}{1+\tau_{alcohol}} + \frac{\theta_{HH,tobacco}}{1+\tau_{tobacco}} + \frac{\theta_{HH,petrol}}{1+\tau_{petrol}} + \theta_{HH,rest}\right] \tag{20}$$

*Data*

$T_{VATET,t} = 0.142Y_t$, $T_{VATET,C,t} = 0.11416Y_t$,

$ETR_{alcohol} = 0.0050\%Y^{MP}$, $ETR_{autos} = 0.8564\%Y^{MP}$,

$ETR_{petrol} = 1.5579\%Y^{MP}$, $ETR_{tobacco} = 0.4852\%Y^{MP}$

*Parameters*

$\tilde{\theta}_{HH,1} = 0.08726$, $\tilde{\theta}_{HH,2} = 0.17567$, $\tilde{\theta}_{HH,3} = 0.02360$, $\tilde{\theta}_{HH,4} = 0.11067$, $\tilde{\theta}_{HH,rest} = 0.44851$,

$\tilde{\theta}_{HH,alcohol} = 0.01440$, $\tilde{\theta}_{HH,autos} = 0.10458$, $\tilde{\theta}_{HH,petrol} = 0.03119$, $\tilde{\theta}_{HH,tobacco} = 0.00042$,

See Table VII for households' budget shares and total tax burdens

*The calculated effective tax rate*

$\tau_{VATET,C} = 0.211493$

*The calculated differential effect for the general VAT rate*

$\frac{\partial\tau_{VATET,C}}{\partial t_{VAT,5}} = 0.62414469$

Table VII. Tax parameters of private consumption taxation

| Category | $\tau_{category}$ | $t_{VAT,category}$ | budget share (INE) | $\theta_{HH,category}$ | $\tau_{VATET,category}$ |
|---|---|---|---|---|---|
| (1) | – | 4% | 0.07491 | 0.07491 | 4.000% |
| (2) | – | 5% | 0.16225 | 0.15225 | 5.000% |
| (3) | – | 6% | 0.02065 | 0.02065 | 6.000% |
| (4) | – | 12% | 0.13178 | 0.10232 | 12.000% |
| (alcohol) | 6.490% | 17% | 0.01481 | 0.01481 | 24.593% |
| (autos) | 11.791% | 17% | 0.07291 | 0.11291 | 30.796% |
| (petrol) | 129.099% | 17% | 0.02855 | 0.06900 | 168.046% |
| (tobacco) | 390.191% | 17% | 0.01099 | 0.02000 | 473.523% |
| (rest) | – | 17% | 0.48315 | 0.43315 | 17.000% |

relate to the fraction of the household's consumption expenditure valued at market prices that is allocated to each category.

Total expenditure on a class of goods will typically include value-added as well as excise taxes. For tax purposes, the base upon which these taxes are imposed is the pre-tax cost to the buyer, or total expenditure at factor cost. Total expenditure on the alcoholic beverages category is given by

$$\theta_{HH,alcohol}C^{MP} = (1+\tau_{alcohol})(1+t_{VAT,5})\frac{\tilde{\theta}_{HH,alcohol}C^{MP}}{1+\tau_{VATET,C}}$$

from which we can retrieve $\tilde{\theta}_{category}$, the real budget share as

$$\tilde{\theta}_{HH,alcohol} = \frac{\theta_{HH,alcohol}(1+\tau_{VATET,C})}{(1+\tau_{alcohol})(1+t_{VAT,5})}.$$

Using data on excise tax revenues, the corresponding effective excise tax rates can easily be determined. A subtle distinction, however, must be made clear. Whereas alcoholic beverages and tobacco are assumed to be consumed only by households, petroleum products and automobiles are also purchased by firms and the public sector. This feature proves to be important in determining the effective excise tax rates for each category. In light of this, excise tax revenues (ETR) collected on alcoholic beverages related expenditure is calculated, in effective terms, as a fraction, $\tau_{alcohol}$, of the pre- value-added and excise taxes expenditure, i.e.,

$$ETR_{alcohol} = \tau_{alcohol}\tilde{\theta}_{HH,alcohol}C^{FC}.$$

Accordingly, excise taxes levied on petroleum products related expenditures are obtained in a similar fashion, i.e.,

$$ETR_{petrol} = \tau_{petrol}(\tilde{\theta}_{HH,petrol}C^{FC} + \tilde{\theta}_{Firms,petrol}I^{FC} + \tilde{\theta}_{PS,petrol}CG^{FC}).$$

In what follows, we detail the composition of each of the four general expenditure categories. Category 1 captures the fact that the islands of Açores and Madeira enjoy

a special regime for certain goods under which value-added tax is only $t_{VAT,1}$. On the Continent, fruit, vegetables, grain potatoes, water, electricity, public transportation, medicine, hotels and cultural shows pay a rate of $t_{VAT,2}$. These goods comprise category 2. Category 3 is created to accommodate the fact that certain fish, meat, milk and dairy products pay a reduced rate of 5% but shellfish and yogurts, e.g., pay the general rate of 17%. For this reason we assume that the applicable rate for this category is $t_{VAT,3}$, an arbitrary weighted average of both type of goods. Category 4 encompasses goods like oils, fats, coffee, tea, cocoa, mineral waters and restaurants that are subject to a rate of $t_{VAT,4}$. Also included in this category are other expenditures from Açores and Madeira that, if sold on the Continent would pay a rate of 17%, but enjoy a reduced rate of 12%.

Each of the first four categories is subject to a different statutory value-added tax rate, $t_{VAT,1...4}$ (see Table VI for the values). Other goods like automobiles, petroleum products, tobacco and alcoholic beverages, that are subject to different (effective) excise tax rates, $\tau_{autos}$, $\tau_{petrol}$, $\tau_{tobacco}$ and $\tau_{alcohol}$ respectively, are surcharged with a general value-added income tax rate of $t_{VAT,5}$, (see equation (14) in Table VI). These effective excise tax rates are calculated as the ratio of excise tax revenues, (DGAIEC 1998, DGE 1999 and ACAP 1995), and the tax base from which they were collected. In particular (see equations (16)–(19) in Table VI), notice that alcohol and tobacco are only consumed by households, while automobiles and petroleum products are also acquired by firms and the public sector. All other goods and services that do not fall under one of the above mentioned categories are assumed to pay the general value-added tax rate of $t_{VAT,5}$. For the numerical values of the households' budget shares and the tax rates, see Table VII.

Similarly to the tax rates on non-capital personal income, there are a wide selection of statutory tax rates to choose from to establish a mapping between statutory and effective tax rates. For illustration purposes, we choose to determine how a change in the general value-added tax rate, $t_{VAT,5}$, would induce changes in the effective value-added and excise taxes collected on private consumption, public consumption, private investment, public investment and investment in human capital. For private consumption expenditure, the relevant partial derivative, $\frac{\partial \tau_{VATET,C}}{\partial t_{VAT,5}}$, is determined indirectly from the following equation

$$\frac{\tau_{VATET,C}}{1+\tau_{VATET,C}} = A + \frac{t_{VAT,5}}{1+t_{VAT,5}}\left[\frac{\theta_{HH,alcohol}}{1+\tau_{alcohol}} + \frac{\theta_{HH,tobacco}}{1+\tau_{tobacco}} + \frac{\theta_{HH,petrol}}{1+\tau_{petrol}} + \theta_{HH,rest}\right]$$

where $A$ is a term that is independent of $t_{VAT,5}$. By defining the LHS as $f(\tau_{VATET,C})$, and the RHS as $g(t_{VAT,5})$, the relevant derivative is determined as

$$\frac{\partial \tau_{VATET,C}}{\partial t_{VAT,5}} = \left(\frac{\partial f(\tau_{VATET,C})}{\partial \tau_{VATET,C}}\right)^{-1} \cdot \frac{\partial g(t_{VAT,5})}{\partial t_{VAT,5}}.$$

This yields equation (20) in Table VI.

Table VIII. The value-added and excise taxes on other spending

*In statutory terms ...*

$$T_{VATET,I} = \frac{I^{MP}}{1+\tau_{VATET,I}}[t_{VAT,5}(\rho_I + \tilde{\theta}_{Firms,autos} + \tilde{\theta}_{Firms,petrol}) + \\ + \tilde{\theta}_{Firms,autos}(1+t_{VAT,5})\tau_{autos} + \tilde{\theta}_{Firms,petrol}(1+t_{VAT,5})\tau_{petrol}] \quad (21)$$

$$T_{VATET,CG} = \frac{CG^{MP}}{1+\tau_{VATET,CG}}[1 - \frac{Wages_{PS,CG}}{CG^{MP}}(1+\tau_{VATET,CG})]\cdot \\ \cdot[t_{VAT,5} + \tilde{\theta}_{PS,autos}(1+t_{VAT,5})\tau_{autos} + \tilde{\theta}_{PS,petrol}(1+t_{VAT,5})\tau_{petrol}] \quad (22)$$

$$T_{VATET,IG} = [1 - \frac{Wages_{PS,IG}}{IG^{MP}}(1+\tau_{VATET,IG})]t_{VAT,5}\frac{IG^{MP}}{1+\tau_{VATET,IG}} \quad (23)$$

$$T_{VATET,IH} = [1 - \frac{Wages_{PS,IH}}{IH^{MP}}(1+\tau_{VATET,IH})]t_{VAT,5}\frac{IH^{MP}}{1+\tau_{VATET,IH}} \quad (24)$$

*In effective terms ...*

$$T_{VATET,I} = \tau_{VATET,I}I^{FC} \qquad T_{VATET,CG} = \tau_{VATET,CG}CG^{FC} \quad (25), (26)$$

$$T_{VATET,IG} = \tau_{VATET,IG}IG^{FC} \qquad T_{VATET,IH} = \tau_{VATET,IH}IH^{FC} \quad (27), (28)$$

*How a change in the statutory general VAT rate induces a change in the effective tax rate*

$$\frac{\partial\tau_{VATET,I}}{\partial t_{VAT,5}} = \rho_I + \tilde{\theta}_{Firms,autos}(1+\tau_{autos}) + \tilde{\theta}_{Firms,petrol}(1+\tau_{petrol}) \quad (29)$$

$\frac{\partial\tau_{VATET,CG}}{\partial t_{VAT,5}}$ = see text.

$$\frac{\partial\tau_{VATET,IG}}{\partial t_{VAT,5}} = \frac{1-Wages_{PS,IG}/IG^{MP}}{(1+t_{VAT,5}Wages_{PS,IG}/IG^{MP})^2} \quad (30)$$

$$\frac{\partial\tau_{VATET,IH}}{\partial t_{VAT,5}} = \frac{1-Wages_{PS,IH}/IH^{MP}}{(1+t_{VAT,5}Wages_{PS,IH}/IH^{MP})^2} \quad (31)$$

*Data*

$T_{VATET,I} = 0.01841Y^{MP}$, $T_{VATET,CG} = 0.00471Y^{MP}$,

$T_{VATET,IG} = 0.00380Y^{MP}$, $T_{VATET,IH} = 0.00092Y^{MP}$,

$\theta_{PS,autos} = 0.06303$, $\theta_{PS,petrol} = 0.0218$, $\rho_I = 0.32$,

$\theta_{Firms,autos} = 0.06848$, $\theta_{Firms,petrol} = 0.02283$

$\frac{Wages_{PS,CG}}{CG^{MP}} = 0.7750$, $\frac{Wages_{PS,IG}}{IG^{MP}} = 0.4114$, $\frac{Wages_{PS,IH}}{IH^{MP}} = 0.9164$

*Parameters*

$\tilde{\theta}_{PS,autos} = 0.0514$, $\tilde{\theta}_{PS,petrol} = 0.0087$, $\tilde{\theta}_{Firms,autos} = 0.05676$, $\tilde{\theta}_{Firms,petrol} = 0.00923$

*The calculated effective tax rates*

$\tau_{VATET,I} = 0.08402$, $\tau_{VATET,CG} = 0.06638$, $\tau_{VATET,IG} = 0.09352$, $\tau_{VATET,IH} = 0.01230$

*The calculated differential effects for the general VAT rate*

$\frac{\partial\tau_{VATET,I}}{\partial t_{VAT,5}} = 0.404459$, $\frac{\partial\tau_{VATET,CG}}{\partial t_{VAT,5}} = 0.16047$, $\frac{\partial\tau_{VATET,IG}}{\partial t_{VAT,5}} = 0.51417$, $\frac{\partial\tau_{VATET,IH}}{\partial t_{VAT,5}} = 0.07233$

5.2. *Value-added and excise taxes on other spending activities*

Value-added and excise tax revenues collected upon private investment spending averaged 1.841% of GDP for the 1990-98 period (DGEP, 1999).

All private investment expenditures, with the exception of building or infrastructure investment, that represent $\rho_I$ of the total (AECOPS, 1996), are exempt from value added tax (see equation (21) in Table VIII). As in the case of public consumption, we assume that firms acquire automobiles and petroleum products that are not exempt neither of excise taxes nor of the general value-added tax.

Value-added and excise tax revenues collected upon public consumption, public investment and investment in education averaged 0.471%, 0.380% and 0.092% of GDP respectively, for the period 1990-98 (DGEP, 1999). Looking at equation (22) in Table VIII, we see that public consumption expenditures are decomposed into four categories – public sector wages (excluding wages paid in the public investment and investment in education sectors), automobiles, petroleum products and all the rest, the budget shares for which taken from INE (1997a) and DGCP (1997). Wage expenditure is distinct from the rest in that it is exempt from value added and other indirect taxes. In terms of public investment and investment in human capital, all non-wage related expenditures are subject to the general value-added tax rate. Once again, data on public sector wages, decomposed by economic activity, $wages_{PS,CG}$, $wages_{PS,IG}$, and $wages_{PS,IH}$, were obtained from INE (1997a).

The partial derivatives that characterize the mapping between statutory and effective tax rates are easily determined and result in equations (29-31) in Table VIII. To obtain the effective value-added and excise tax on private investment spending, all one must do is equalize expressions (21) and (25), the calculation of total tax revenues in statutory and effective terms respectively, and factor out $\tau_{VATET,I}$ as a function of $t_{VAT,5}$. For public consumption, public investment and investment in human capital, the same procedure applies. For the public consumption case in particular, to factor out $\tau_{VATET,CG}$, we have to solve a quadratic equation. This results in a cumbersome, albeit algebraicly tedious, expression that we choose not to include in Table VIII.

## 6. Some concluding remarks

In this paper, we formally discuss the correspondence between statutory and effective tax rates in the Portuguese economy. The corporate income tax, employer's social security contributions, employees' social security contributions, the personal income tax and the value-added and other indirect taxes are considered in great detail. The correspondence between statutory and effective tax rates depends on the details of the Portuguese tax law, on a wealth of data information, as well as on certain priors about the values of behavioral parameters in the economy. In addition to the general correspondence, we present our own estimates of the effective tax rates at the different tax margins. In doing so, a wealth of tax information was organized in a systematic

way and the main characteristics of the Portuguese tax system were sketched and parameterized.

The information in this paper was recently put to good use by Pereira and Rodrigues (2000), in the context of an ongoing research project on tax reform in Portugal. In that paper the numerical results of the present study are used to facilitate the evaluation of the efficiency and welfare effects of a tax package recently proposed by Cavaco Silva (1999). More importantly, however, using the technical information in this paper any practitioner of tax policy evaluation can obtain his own estimates of the relevant tax parameters to be used in his own work.

## References


Associação de Empresas de Construção e Obras Públicas, AECOPS, (1996), *Relatório da Construção*.

Associação do Comércio Automóvel de Portugal, ACAP, (1995), *O Comércio e a Indústria Automóvel em Portugal*.

Associação Portuguesa de Bancos, APB, (Dezembro 1996), *Boletim Informativo*, **18**.

Cavaco Silva, A., (1999), "Um Choque Fiscal Precisa-se", in *Diário de Notícias*, p. 41, 18 de Junho de 1999.

Centro de Estudos Fiscais, CEF, (1997), *The Portuguese Tax System*, Direcção-Geral de Contribuições e Impostos, DGCI, Ministério das Finanças.

Departamento de Estatística do Trabalho, Emprego e Formação Profissional, DETEFP, (1997), *Estatísticas Sobre a Estrutura e a Distribuição dos Ganhos – 1995*, Ministério do Trabalho e Solidariedade.

Direcção-Geral das Alfândegas e dos Impostos Especiais sobre o Consumo, DGAIEC, (Dezembro 1998), *Receitas Cobradas*, Ministério das Finanças.

Direcção-Geral de Contabilidade Pública, DGCP, (1997), *Conta Geral do Estado*, Ministério das Finanças.

Direcção-Geral de Contabilidade Pública, DGCP, (Dezembro 1995), *Boletim Informativo*, Ministério das Finanças.

Direcção-Geral de Energia, DGE, (Janeiro 1999), *Preços de Energia*, **30**, Ministério da Economia.

Direcção-Geral de Estudos e Previsão, DGEP, (September 1999), *The Portuguese Economy – Statistical Annex*, Ministério das Finanças.

Direcção-Geral de Informática e Apoio aos Serviços Tributários e Aduaneiros, DGITA, (1999), *Um Painel de 40000 Declarações de IRS, 1994–1997*, Ministério das Finanças.

Instituto Nacional de Estatística, INE, (1997), *Inquérito aos Orçamentos Familiares 1994–1995*.

Instituto Nacional de Estatística, INE, (1997a), *Contas Nacionais de 1995*.

KPMG, (1997), *European Tax Handbook*, KPMG, International Tax Services.

Orçamento do Estado, OE, (1996), Ministério das Finanças.

Pereira, A., and P. Rodrigues, (2000), "On the Impact of a Tax Reform Package in Portugal", *DGEP Working Paper*, (forthcoming), Ministério das Finanças.

Primarolo, D., (2000), "Troca de Informação Bancária é a Forma de Combater a Evasão", interview in *Diário Económico*, p. 4, 6 de Abril de 2000.