

THE DUAL TAX AS A FLAT TAX WITH A SURTAX ON LABOUR INCOME

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ABSTRACT

Flat tax and dual tax are alternative models for traditional global income taxes with progressive rates. Although there are significant differences between them, a dual tax characterised by a general base, where all income is taxed at a proportional rate, and a personal base, composed only of labour income and taxed according to a progressive schedule that includes a wide zero-rate bracket, could be deemed a flat tax with a surtax on high labour income. A micro-simulation exercise applied to Spain confirms that under equal-yield assumption most individuals would only be taxed on the general base, in the same way as a flat tax. The personal base increases progressivity and redistributive effect.

Key words: dual tax, flat tax, micro-simulation, tax reform.

JEL classification: H23, H24.

1. INTRODUCTION

In the 1980s a worldwide trend to reform tax systems took place. For income tax, the main features of this international movement were lower marginal rates, especially at the top, higher thresholds, fewer steps in the tax scale and a broader tax base (Sandford, 1993). This movement continued in the nineties. Countries that had reformed their income tax in the previous decade maintained it without relevant modifications, and those that had not yet adopted the new directives introduced them (Gago, 2001). And this movement appears to be continuing into the first decade of the 21st century.

The extreme discontent with the existing tax system, the widespread belief that taxes were failing to achieve the social and economic objectives they had been designed to meet, the growing concern about the distortions of high marginal tax rates, a changing economic environment affecting all countries, international influences and a change in economic philosophy are pointed out by Sandford as the key reasons for tax reform in the eighties. Of all these factors international influences have played an increasing important role to the extent economic globalisation has intensified its impact. As Tanzi suggests (1998, p. 339), "In the present environment the actions of many governments are greatly limited by the action of other governments and spillover effects across frontiers generated by taxation have become very important".

In this context the question is whether the traditional prescriptions given by public policy are still appropriate. Synthetic or global income taxes with progressive rates have traditionally been considered the sole way to fulfil the requirement of correctly adapting the tax burden to the ability-to-pay principle. The same treatment for all income sources has been seen as the most equitable way of taxing people. Nonetheless, as Sorensen (2000) notes, capital income can take many different forms, can derive from different organisational forms and even can become negative. Therefore, when comprehensive income tax has to be implemented treatment of income from capital raises important problems, to which the consequences of increasing capital mobility have to be added.

In order to improve income taxation there are two basic alternatives. One is to introduce a flat income tax, which would mean a step further in the worldwide trend initiated in the eighties and a continuation with comprehensive taxation. The other option is to adopt a dual tax following the Nordic countries' experience, which implies explicit abandonment of synthetic taxation. Here we analyse these two alternative models. They are based on different arguments, but depending on how dual tax is structured they may share important features and even dual taxation could be deemed a sort of flat tax. Following the Norwegian experience, dual tax can be implemented through two tax bases or parts: a general one composed of all income sources and taxed at a proportional



rate, and another only consisting of labour income and subject to progressive tax rates. As long as the latter part includes a wide zero-rate bracket, a dual tax would be equivalent to a flat tax with a progressive surtax on high labour income. In fact, by carrying out a micro-simulation exercise based on data from Spain, we show that, for six different dual-tax tariffs, which represent a wide range of alternative tax rates, dual taxation would be equivalent to a flat income tax for most people. The personal base would augment progressivity and redistributive effect because it only levies taxpayers at the upper end of the income scale. Progressivity and redistributive impact of different options are assessed through global measures, which according to Pfähler methodology, adapted for dual taxation, are decomposed to distinguish between the base component and the tariff component of every part of the tax. Furthermore, progressivity and redistribution are analysed along the income scale through two local-distributional measures.

The paper is organised as follows. Section 2 provides an overview of flat and dual taxes as well as the consideration of dual taxation as a flat tax with a surtax on high labour income. Global and local-distributional measures of progressivity and redistribution are explained in Section 3. Section 4 describes the micro-data used and the process followed to carry out simulations. The main results of simulations are explained in Section 5, and concluding remarks are given in Section 6.

2. THE FLAT INCOME TAX AND THE DUAL TAX: MAIN FEATURES

2.1. The income flat tax

An income tax with a single rate, a high general allowance, whose amount varies according to personal circumstances, and a broader base are the main characteristics of the flat tax¹.

By eliminating special exemptions or allowances and deductions, except for personal or family allowances, the tax base would be broadened. Furthermore,

¹ In this article I only refer to flat income tax, usually called flat tax. Nonetheless, there are other flat-tax concepts within the literature. Hall and Rabushka (1995) propose a flat tax, which consists of the application of a consumption tax on all businesses and of a tax on individuals' wages, both at the same marginal rate. On the other hand, Atkinson (1995) studies a flat-rate income tax applied jointly a guaranteed basic income. In addition, Kotlikoff (1996) analyses a flat tax on consumption at retailer's level. Finally, Feige (2000) puts forwards a flat tax on all payment transactions.

the new tax would be simpler and easier to understand, which would reduce both administrative and compliance costs. Tax unit selection would no longer affect the tax due and uneven income would not require any particular treatment as they both do with a multi-rate tax schedule². In addition, under the new tax it would be much easier to establish a withholding system by which the amount withheld equals the final tax liability, eliminating any subsequent payment or refund.

Flat tax matches very well with the aim of horizontal equity because all sources of income are equally taxed. Moreover, by eliminating special treatments it would do away with distortions in the employment of disposable resources as well as reducing the pressure from different lobbies searching for particular tax relief (Fuentes Quintana, 1986). Despite the single marginal rate, average tax rate increases with income, therefore the tax is progressive.

Other possible advantages are efficiency gains, although as it is not a lump sum tax, a flat tax would also cause deadweight losses like any multi-rate income tax. With regard to labour supply, theory demonstrates that substitution and income effects have opposite sign, therefore the final result is not conclusive. Under the revenue neutral assumption, the final empirical effect on the labour supply would depend on the elasticity of supply of taxpayers, which, in turn, depends on the group. One could expect a reduction in the tax rate faced by richest taxpayers, whose labour offer seems to be fairly elastic, but at the same time youngsters, married women or single mothers may suffer an increase in their marginal tax rate. Consequently, the effect on labour supply is unclear. And the same applies to overall saving. However, savings composition seems to be quite sensitive to differences in the tax treatment, therefore flat tax would introduce more neutrality.

Nonetheless, regarding capital taxation feasibility considerations should also be taken into account. Lodin (2000, p. 210) points out that “the accelerating economic globalisation and the deregulation of monetary systems and financial flows and trade, in combination with the fast development of electronic communication and trade, make national borders less important”. As capital is an increasingly mobile factor, “the tax differential creates a strong temptation for the saver to save abroad without reporting the capital (...) and the return on the capital to the tax authorities in the home country, as the risk of discovery is minimal and the market is safe and easily accessible”. The consequence has been an explosive growth of financial cross-border investments. Exchange of information and withholding taxation are two solutions, but despite efforts by international organisations, particularly the OECD and the EU, several countries are reluctant to cooperate, which would undermine the effectiveness of these

² Unless one spouse’s income or one-year uneven income are below the personal allowance.



solutions. Therefore, the question is whether the flat income tax proposal would be suitable in this context.

The answer depends on the allowance-single-rate combination needed to raise the expected tax revenue. The higher the personal allowance, the more progressive the tax, and also the higher the single rate, unless governments are willing to lose tax revenue. However, too high a tax rate may affect the taxation of the most mobile factors, particularly on financial capital. Hence, it is important to consider the possible impact of a flat income tax on more mobile savings. As an analysis of the recent income tax legislation in OECD countries shows, most countries offer their own residents special treatment for several capital assets, especially for capital gains from financial assets.

In conclusion, capital mobility and feasibility considerations may recommend studying a sort of flat tax, under which capital income receives a special treatment.

2.2. The dual tax

In 1980 Nielsen suggested replacing comprehensive income tax, with progressive rates, by a dual tax, which levies capital income at a proportional rate while labour income is subject to progressive rates³. Capital income rate should equal corporation tax rate, so that all capital-income sources receive the same treatment, regardless of whether they proceed from the incorporated or unincorporated sector⁴. Furthermore, the lowest rate on labour income is fixed at the same level as the proportional rate on capital, in order to minimise tax arbitrage (Cnossen, 1999).

An important feature that distinguishes dual taxation from a flat tax and other alternative models of personal taxation is that the dual model is already being applied. At the beginning of the 1990s three Nordic countries, Finland, Norway and Sweden, replaced the traditional global income tax by a dual tax⁵. We review, briefly, how dual tax has been applied in these countries.

³ Niels Christian Nielsen, professor of Economics was a member of two important Danish commissions about fiscal reform that proposed a dual tax. (Quoted by Sorensen, 1998).

⁴ Capital income retained in the corporate sector can defer progressive taxation as no country imposes a tax on accrued capital gains on shares at the shareholder level. Under a dual tax that avoids double taxation of dividends, profits retained in the companies would receive the same treatment as profits pay out to shareholders.

⁵ Actually, Denmark was the first Nordic country introducing a sort of dual taxation in 1987, since capital income was still taxed at progressive rates, although reduced compared to the labour ones. However, subsequent reforms "marks a retreat from the principles underlying the 1987 reform and a move towards a rather incoherent type of schedular income taxation which bears little resemblance to either a global income tax or a pure dual income tax" (Sorensen, 1998, p. 24).

Income is separated into either labour income (also called earned income or personal income) or capital income, because they are levied at different rates. Countries have employed two alternative ways of separation. One option, followed by Finland and Sweden, consists of establishing two categories of income or tax bases: one composed only of labour income and the other composed only of capital income. Labour and capital income are taxed separately at their respective tax rates, so losses from the capital income category cannot be offset against positive labour income⁶. In the second alternative, applied by Norway, either labour or capital income constitute a so-called general base, which is taxed at a proportional rate. Furthermore, only earned income constitutes a second base, called a personal base, which is levied on a progressive schedule. As all income, included that from labour, has already been taxed at the general base, the tax-rate structure fixes a wide zero-rate bracket, so that only earned income that exceeds the first bracket is taxed at additional rates⁷.

Nonetheless, the experience of the Nordic countries shows that taxation of income from small enterprises is “the Achilles heel” of the dual income taxation system (Sorensen, 1994). Profits of unincorporated business usually derive from both the work of entrepreneurs and the capital invested in the activity. As a main purpose of dual taxation is to offer a homogeneous and rational system of taxing capital income all income from the self-employed is split into a labour component and a capital component, and each one is taxed accordingly. Equally, a similar situation occurs with small corporations controlled by active owners, since true labour income (wages) can easily be converted into capital income (dividends or capital gains) in order to avoid labour-income progressive rates. Therefore, the question is how to split income without causing distortions.

There are two alternative ways to separate income from the self-employed: either to impute an estimated wage income to the business proprietor while the remaining profits are considered capital income, or the other way around, to estimate first capital income and to categorise the remaining business income as earned income. The first option implies the average tax rate would go down with increasing income, so the solution would be regressive. Apart from

⁶ However, both countries indirectly permit such losses to be deducted, to a certain limit, from earned income, since an amount equal to the tax rate on income from capital times the losses is credited against gross tax liability on labour income. Therefore, losses do not modify progressivity on labour income.

⁷ The system followed to split labour and capital income also determines the level of government that levies each source of income. While in Norway the state and municipalities and provinces levy general base, and so labour and capital income, in Finland and Sweden only the state levies capital income, while local governments only tax labour income. In all countries additional progressive rates levied on labour income are only fixed by central governments.



that, it seems quite difficult to assess the work effort of the self-employed as well as to fix an appropriate wage rate per hour (Sorensen, 1994). Therefore, Nordic countries first impute capital income and then the remaining profits are treated as earned income⁸. Nonetheless, this procedure also raises several controversial issues, particularly the choice of the proper rate of return, which besides should include a risk premium, the criterion to assess the value of business assets, and whether financial assets and liabilities ought to be included within business assets⁹. In addition, as long as the split model is applied to closely held corporations with active owners, a legal definition of both concepts introduces more arbitrariness¹⁰. In conclusion, taxation of income from small enterprises and closely held societies constitutes the main drawback of dual taxation.

Nevertheless, the dual model does offer a rational system of taxing capital income, a target usually forgotten in developed countries, which, under in theory comprehensive income taxes, usually offer special concessions for particular types of capital income. According to Cnossen (1999, p. 24), the case for the dual income tax rests on two considerations. "First, the mobility and fungibility of capital necessitate the application of low and proportional tax rates on capital income. Second, the immobility of labour and the unequal distribution of human capital make it possible and desirable to impose higher and progressive tax rates on labour income". One might rather see the development of dual taxation in Nordic countries as surprising, because of the important role played by income taxation in these countries, and the high progressive rates normally applied by them. On the contrary, according to Mutén (1996, p. 8), "it is perhaps because the rates used to be so high, that the weaknesses of the global income tax came to the fore and gave rise to a fundamental tax reform".

On the other hand, the different rates on the two types of income permit us to consider the different sensitivity of labour supply and savings with respect to the after-tax real wage rate and the after-tax real interest rate, which makes sense from an efficiency point of view. However, the experience of Nordic countries regarding the tax treatment of the self-employed makes it advisable to keep the gap between labour and capital taxation as small as possible. As Van den Noord and Heady (2001, p. 55) indicates "the introduction of dual income taxation requires a careful trade-off between the efficiency gains stemming from neutral and low taxation of capital income and the efficiency losses associated

⁸ Sweden establishes another alternative because she also permits all profits reinvested in the firm, to a certain amount, to be taxed only at the corporate tax rate.

⁹ Vid. Hagen and Sorensen (1998) for an exhaustive study of these issues.

¹⁰ Finland avoids both concepts by defining as closely held companies all companies that are not listed on the Stock Exchange, an option that is also quite arbitrary and less fair.

with the opening-up of opportunities for arbitraging between labour and capital income by small entrepreneurs”¹¹.

Regarding equity and the principle of ability to pay, under the income dual taxation system the taxpayer’s total bill depends not only on his total amount of income but also on the sources of income, which may harm both horizontal and vertical equity. On the other hand, Sorensen (1994) analyses other aspects that justify the dual tax from the equity point of view. Dual tax can be defended from a life-cycle perspective, since it reduces discrimination between individuals with different time profiles of earnings and consumption. In addition, tax is usually levied on nominal income from capital, which under inflation implies effective much higher tax rates than the statutory ones. Furthermore, both income tax and annual wealth tax give favourable treatment to investment in human capital, which discriminates against financial and physical capital. However, it should also be considered that in many countries social security contributions include a real tax component, which therefore could even justify a more lenient tax on labour income. Consequently, as far as equity is concerned there are arguments both in favour and against dual income taxation. Nevertheless, it cannot be forgotten in most current comprehensive income-tax systems there are also aspects that are incompatible with horizontal and vertical equity. Only empirical analysis can show whether those are more important under dual taxation, but it will also depend on how the dual tax is applied.

Finally, whether dual taxation succeeds in avoiding capital evasion is also difficult to assess. Taxpayers may be willing to pay taxes providing rates are not too high. Therefore, the discussion focuses on what tax rate can be considered reasonable from the point of view of capital earners but also from the perspective of governments and the revenues yield.

2.3. The dual tax as a flat tax with a progressive surtax on high labour income

According to the Norwegian dual tax all sources of income (including capital) constitute the general base, while the personal base is only composed of labour income. While the former is taxed at a proportional rate, the latter is taxed according to a progressive schedule, which establishes a zero-rate first bracket because earned income is also taxed on the general base. As long as the zero-rate bracket is wide enough, only high-labour-income earners would be taxed at the personal base, while most taxpayers might only face the general tax liability.

¹¹ Other trade-offs to consider take place between the choice of a reduced tax rate on capital and, on the one hand, restricting the incidence of the personal tax base (as we will see in the simulations), and, on the other hand, keeping the gap between labour and capital taxation small.



Therefore, the dual tax could be considered as a flat tax with a progressive sur-tax on high labour income. For most taxpayers dual taxation would equal an income flat tax, and only a minority would be taxed at additional progressive rates.

Furthermore, under the Norwegian tax all costs of earning income and all allowances are only deductible from the general base, which improves equity since all taxpayers obtain the same benefit, regardless of their income, and they cannot alter the additional progressivity introduced by the rate schedule of the personal base¹². For instance, tax concessions for private pension plans usually discriminate in favour of rich taxpayers, since the higher income, the larger the tax savings from deductions or exemptions. The Norwegian system encourages this class of long-term savings but gets rid of the regressive effect¹³. This system of separation between two types of income also allows the taxpayer to offset, on the general base, negative capital income against positive earned income and to apply a joint basic allowance. Both features make dual tax more equitable¹⁴.

Taxation of income from the self-employed and the separation between labour and capital income continue to be controversial issues, although as long as most taxpayers do not have personal tax liability its impact could be reduced. Entrepreneurs would pay the same regardless of the split between labour and capital income, so they would not obtain any benefit from converting earned income into capital income. Consequently, the dual tax would be more efficient, and also simpler because as long as all business income is below the first bracket, the split model does not need to be applied. Finally, possible situations that harm against horizontal and vertical equity could only occur with respect to taxpayers taxed on the personal base, and to those who benefit from the proportional rate on capital income because under a global tax their income from capital would be taxed at progressive rates. Therefore, the likelihood of occurring is reduced.

3. METHODOLOGY

3.1. Progressivity and redistributive effect: measures and decompositions

3.1.1. *Global measures*

A common global measure of tax progressivity is the Kakwani index, which compares the concentration index of tax liability with the Gini coefficient of be-

¹² Although it means taxing gross labour income, which discriminates against wage earners because entrepreneurs are taxed only on their net income (Cnossen, 1999).

¹³ The taxation of private pensions is another issue that should also be discussed, because as long as pensions are treated as earned income real returns on capital will be taxed as labour income.

¹⁴ Finland and Sweden do not apply any basic allowance for capital income.

fore-tax income ($K = C_{TL} - G_{BT}$). A progressive tax causes a redistributive effect, since there is a reduction in the inequality of income distribution. The Reynolds-Smolensky index measures the redistributive effect by relating the Gini coefficient of income after tax with the Gini coefficient of pre-tax income ($RS = G_{AT} - G_{BT}$).¹⁵

Kakwani (1977) demonstrates that the redistributive effect of taxation is a function of either tax progressivity or average tax rate (t), since

$$RS = \frac{-t}{1-t} (C_{TL} - G_{BT}). \quad [1]$$

Therefore, average tax rate can change while progressivity is held constant, but it would affect the redistributive effect.

A step towards a better identification of the various elements of the tax structure was given by Pfähler (1990), who introduces decomposition formulae for the redistributive effect, so that overall redistributive impact can be split into a tax rate component and a tax base component. The former is caused by the progressive tax schedule levy on taxable income and by tax credits, and it can be identified as direct progressivity; the latter proceeds from the difference between gross income before tax and tax base or taxable income, which is caused by tax allowances, exemptions and deductions, and it is identified as indirect progressivity.

According to Pfähler's decomposition the overall redistributive effect can be expressed as a weighted sum of both direct (A) and indirect (B) redistributive effects

$$RS = G_{AT} - G_{BT} = \underbrace{\frac{\overline{Y_{RES}}}{\overline{Y_{AT}}} (G_{Y_{RES}} - G_{TB})}_A - \underbrace{\frac{\overline{TL}}{\overline{Y_{AT}}} (G_{TB} - G_{BT})}_B \quad [2]$$

where $\overline{Y_{RES}}$ is average residual income, that is, tax base minus tax liability, $\overline{Y_{AT}}$ average post-tax income, $G_{Y_{RES}}$ the Gini coefficient of residual income, G_{TB} the Gini coefficient of tax base, \overline{TL} average tax liability and G_{BT} the Gini coefficient of pre-tax income.

Consequently, this decomposition splits the overall redistributive effect of income taxation into two partial redistributive effects. For instance, "the equalizing effect of a progressive tax rate structure can be reinforced, mitigated, just compensated or even outweighed by the redistributive effect of tax base structure" (Pfähler, 1990, p. 126).

¹⁵ In fact Reynolds and Smolensky employ concentration coefficient of after-tax income. Nonetheless, in order to isolate re-ranking effect, taxpayers are arranged again according to post-tax income and the Gini coefficient of income after tax is calculated.

If Pfähler's method is applied to flat income tax all the redistributive effect proceeds from allowances in the tax base. If, for political constraints, a few tax credits were also included in the flat tax, they could have a slight effect, either positive or negative, on the overall redistributive impact, which nonetheless would continue to be provoked mainly by differences between before-tax and taxable incomes. As far as dual tax is concerned Pfähler decomposition cannot be applied directly because there are two different bases and two different tax structures. Therefore the methodology has to be adjusted.

Following the Norwegian system dual tax can be structured with a general base, consisting of both labour and capital income, and a personal base composed of only labour income, being each one taxed at the respective rates. Hence, there are two different parts in the dual tax: the general one and the personal one. According to the Reynolds-Smolensky index, the redistributive effect equals $G_{AT} - G_{BT}$, which can be decomposed as

$$RS = \underbrace{(G_{AT^G} - G_{BT})}_1 + \underbrace{(G_{AT} - G_{AT^G})}_2 \quad [3]$$

where G_{AT^G} is the Gini coefficient after the general part of the tax. Consequently, Reynolds-Smolensky is divided into two components, the first, which refers to the redistributive effect of the general part of dual tax, and the second, which indicates the additional redistributive effect generated by the personal part of the tax.

Therefore, assuming the general part, which affects all taxpayers, is applied first and the personal part, which only affects high-labour-income taxpayers, is applied later, Pfähler methodology can be applied and allow us to identify tax base and tax rate components for both parts of dual tax. Hence, replacing, in [3], 1 and 2 by the respective decomposition according to expression [2], we obtain

$$G_{AT} - G_{BT} = \underbrace{\frac{\overline{Y_{RES^G}}}{\overline{Y_{AT^G}}} (G_{Y_{RES^G}} - G_{TB^G}) - \frac{\overline{TL^G}}{\overline{Y_{AT^G}}} (G_{TB^G} - G_{BT})}_{\text{GENERALPART}} + \underbrace{\frac{\overline{Y_{RES^P}}}{\overline{Y_{AT}}} (G_{Y_{RES^P}} - G_{TB^P}) - \frac{\overline{TL^P}}{\overline{Y_{AT}}} (G_{TB^P} - G_{AT^G})}_{\text{PERSONALPART}} \quad [4]$$

where $\overline{Y_{RES^G}}$ is the average of general residual income, that is, taxable income for the general part minus the respective tax liability, $\overline{Y_{AT^G}}$ average income after general tax-liability, $G_{Y_{RES^G}}$ the Gini coefficient for general residual income, G_{TB^G} the Gini index for general tax base, $\overline{TL^G}$ the average of general tax liability,

$\overline{Y_{RES^P}}$ the average of personal residual income, which means the difference between personal tax base and personal tax liability, $G_{Y_{RES^P}}$ the Gini index for personal residual income, G_{TB^P} the Gini index for personal tax base, $\overline{TL^P}$ the average of personal tax liability and G_{ATG} the Gini coefficient for income after general tax liability.

3.1.2. *Local-distributional measures*

Global progressivity and redistributive measures are easy and simple because they resume all information in a single number. Nonetheless, they do not give any information about the effect of the tax along the income scale.

Taking a redistributive effect measure proposed by Baum (1987), Aggarwal (1994) puts forward a similar index for progressivity and refers to both indexes as local-distributional measures since they combine the character of either the local or distributive measures¹⁶.

The Baum index assesses, for population subgroups, changes in the share of post-tax income generated by a tax, which is a suitable measure of the redistributive impact. For the i th group of taxpayers, the Baum index is defined as the ratio of the i th group's share of total post-tax income to its share of total pre-tax income, therefore it can be identified as relative income share (*RIS*), that is,

$$RIS_i = \frac{(Y_{BT_i} - TL_i)/(Y_{BT} - TL)}{(Y_{BT_i})/(Y_{BT})} = \frac{1 - t_i}{1 - t} \quad [5]$$

where Y_{BT} denotes income before tax, TL tax liability and t average tax rate for the whole population and the subscript i indicates values refer to the i th group of taxpayers.

An RIS_i less (more) than 1 means the i th group has lost (won) through the tax process. If RIS_i equals 1 the relative share of the i th group has not been changed by the tax. Descending RIS_i along the scale from low income to high income groups of taxpayers indicate the tax generates an income redistribution from the wealthy to the poor, which means is a progressive tax.

Based on the concept that a non-proportional income tax generates a different distribution of tax liability from that of pre-tax income, Aggarwal proposes a lo-

¹⁶ Baum names her index relative share adjustment (RSA). To differentiate between the two measures Aggarwal modifies the notation RSA by relative income share progressivity (RISP) and refers to his own measure as relative tax share progressivity (RTSP). I prefer to follow Aggarwal's notation but in order to avoid any confusion between progressivity and redistribution I eliminate the word progressivity.

cal-distributional measure of tax progressivity. It relates shares of different groups of taxpayers in total tax liability with their shares in pre-tax income, so it can be referred to as relative tax share (*RTS*). For the i th group of taxpayers *RTS* is defined as the ratio of the i th group's share of total tax liability to its share of total pre-tax income, that is,

$$RTS_i = \frac{TL_i/TL}{Y_{BT_i}/Y_{BT}} = \frac{t_i}{t} \quad [6]$$

An RTS_i more (less) than 1 means the i th group pays a higher (lower) share of taxes than it would have paid under a proportional tax. An RTS_i equals 1 indicates that the tax is proportional for that i th group of population. Ascending RTS_i along the scale from low-income to high-income groups of taxpayers indicate that the tax is progressive.

RIS_i can also be expressed as

$$RIS_i = \frac{1 - (t \times RTS_i)}{1 - t}, \quad [7]$$

which means the redistributive effect can also be explained in terms of progressivity and average tax rate at the disaggregate level.

An advantage of these indexes is that they permit taxpayers to be organised in groups and allow us to compare the effect of the income tax or the alternative proposals in these groups, which cannot be observed with global measures.

4. DATA AND SIMULATIONS FOR THE ALTERNATIVE TAXES

The empirical analysis of both flat and dual taxes has been done for Spain, through a micro-simulation exercise. More precisely, I have used a systematic random sample of the taxpayers' panel of the *Instituto de Estudios Fiscales* (Institute for Fiscal Studies) that includes data for 6,243 taxpayers for 1994 tax year. Based on real taxpayer's returns, administrative data are more reliable and exhaustive than income information collected from surveys. It would also be possible to employ more recent information from administrative aggregate data, but this would mean losing individual information about taxpayers, which is particularly important since tax liability under dual taxation depends not only on the total amount of income, but also on its composition.

As a new personal income tax was introduced in 1999, comparisons between alternative models and the Spanish income tax are referred to 2000, so that the new tax is considered, although without taking into account any behavioural response to the reform. 1994 pesetas have been converted in 2000 pesetas by using

the consumer price index, which is often considered when allowances or tax rates are updated. Therefore, a new tax liability is obtained for each taxpayer according to the new legislation¹⁷.

Simulations of the dual income tax follow the Norwegian system of income separation. Personal and family allowances and deductions for pension plans are only deducted from the general part of the tax. Interests on mortgage debt are also deductible, to a certain extent, and an imputed rent on owner-occupied housing is also applied¹⁸. No allowance is applied to the personal base. Only tax credits introduced in the current income tax can be deducted first from the general gross tax liability and the remainder, if any, can be deducted from the personal one¹⁹. Business and professional income should be split into labour and capital components, so that only the former constitutes the personal base. However, there is no information about the value of business assets that should be considered in order to estimate capital income. Therefore the only solution is to use different criteria of imputation and to assess the sensitivity of the results to them. The criteria employed are the following: option A, income is divided into equal parts, but as most small and medium economic activities assess their taxable income according to an objective system, in such cases 80 % of total income is taxed as labour and the remaining 20 % as capital, since the smaller the activity, the less capital is employed in the activity; option B, all income is deemed labour income; option C, all is considered capital income; finally, option D, income is divided into equal parts regardless of the extent of the activity²⁰.

Several dual tax structures have been applied under the assumption that they raise the same revenue as the 2000 income tax and six different tariffs that represent a wide enough range of tax rates levied on capital income have been chosen (Table 1). The general base rates varies from 12 % to 30 %, the personal allowance from 3,306 € to 6,311 €, the width of the zero-rate bracket of the personal base depends basically on the revenue raised by the general part,

¹⁷ Several assumptions have to been made, which are explained in more detail in Durán (2002). They are common to other micro-simulation studies made for the Spanish income tax. See, for instance, Castañer, Onrubia y Paredes (1999).

¹⁸ According to the 1994 income tax regulation.

¹⁹ Mainly, for house purchase, donations and double taxation of dividends.

²⁰ To estimate average effective tax rates on capital and labour at an aggregate level for most OECD countries, Carey and Tchilinguirian (2000) assign part of self employed income to labour and part to capital by assuming that the self-employed "pay themselves" the same annual salary net of social security contribution as that earned by the average employee. The remaining income is deemed capital income. This option has been rejected for the simulations because, as noted in section 2, it goes against theoretical conclusions. Therefore, its application may introduce a bias in the assessment of progressivity of dual taxation.



and the top marginal rate levied on labour income is always 45 %²¹. As the tax revenue depends on the amount of business income considered as labour income, the six tariffs yield the same revenue as the 2000 income tax under option A, which seems the more realistic criterion. Revenue raised for the other options varies (Table 2), although the final variation depends to a great extent on the tariff adopted, since the wider the zero-rate bracket for the personal base, the fewer taxpayers pay personal tax liability and, therefore, the less sensitive the tax revenue to the split criterion.

When assessing inequality indexes a common definition of income before tax has been obtained in order to construct an appropriate indicator of ability to pay as wide and independent as possible from legal criteria. The definition is made of all net incomes, including an imputed rent from owner-occupied housing according to 1994 income tax.

5. RESULTS

A dual income tax according to any of the six tariffs considered would be progressive and redistributive, since after-tax income inequality is smaller (Table 3). Nonetheless, the overall effect depends considerably on the value of the parameters for each tariff, as well as, although to less extent, on the criterion followed to split business income. Compared to the Spanish income tax for 2000 only tariff six would be more progressive and redistributive, but the reduction suffered under the other five tariffs would vary from 4.5 % (tariff 1) to nearly 20 % (tariff 3) for option A. These results do not change under the other split criteria, although it can be observed that the greater (smaller) the share of labour income, the greater (the smaller) progressivity and redistributive effect of the dual tax. As far as redistribution is concerned variations may be slightly different because, as Table 2 shows, average tax rate also changes for options B, C and D.

Under the first three tariffs overall progressivity and redistributive effect decrease with the general tax rate, but for the other tariffs this trend is reversed and they increase with the general rate. This variation can be better explained by using Pfähler decomposition, which reveals the effect of both tax base and tax rates for the general and the personal parts of the tax (Table 4). Under the first two tariffs most redistributive impact is caused by the progressive tax schedule levied on the personal tax base, while under the other tariffs most redistributive effect is generated by allowances applied on the general base.

²¹ 3,306 € equals the current personal allowance and 45 % will be the top marginal rate of the income tax from 2003 (until 1998 was 56 % and from then until 2002 is 48 %). Other minor personal and familiar allowances equal the 2000 income tax.

Therefore, progressivity and redistribution can be obtained through either the general part or the personal one. In fact the two most progressive tariffs, 1 and 6, fix the most disparate tax rates on capital income, 12 % and 30 %, respectively. Under the equal-yield assumption a low general rate has to be combined with a more onerous personal rate schedule, with a narrower zero-rate bracket. A high general rate, despite more generous allowances, raises high revenues, so that the personal part of the dual tax plays a less important role. Similar conclusions can be drawn from the other criteria of business income separation.

As I said before, a dual tax characterised by a general base and a personal base could be seen as a sort of flat tax with a surtax on high labour income. The wider the zero-rate bracket of the personal schedule, the fewer taxpayers would be taxed under the personal part. For taxpayers arranged in income-level order and grouped in twenty equal brackets Table 5 shows that only a minority would be taxed on the personal part. The final number of taxpayers varies between 3 % and 28 % depending on the tariff. Logically, those affected by the personal part belong to the richest brackets of taxpayers. Therefore, under the equal-yield assumption, the great majority of taxpayers would only be taxed on the general part of the tax for any of the six dual-tax tariffs applied. Consequently, for all of them a dual tax would be equivalent to a flat tax. They would pay the same regardless the kind of income they earned, so they would not have any incentive to transform labour income into capital income. Equally, the regulation to separate business and professional income would only affect a minority of the self-employed, which is important because as the Nordic-country experiences suggest, the regulation is usually complicated and raises conflictive issues.

Table 4 shows that the tax-rate schedule for the personal part would increase the overall progressivity and redistributive effect of the dual tax and Table 5 indicates that only taxpayers with high labour income would be taxed at the personal base. From RTS values for the personal tax liability (Table 6), it can be observed that personal liability is progressive along the income scale because RTS values exceed unity only for the richest taxpayers taxed on the personal part. Consequently, although only high labour income earners pay personal liability, only the top rich taxpayers suffer a reduction in their RIS (Table 7), while all the other taxpayers experience an increase in their relative income share. Whenever RTS exceeds one, RIS is below unity, but the latter depends not only on RTS. High RTS values may slightly reduce RIS, because the average tax rate of the personal part is small. Therefore, the personal part seems to be quite progressive, but nonetheless it produces a small redistributive effect because personal tax rates have a slight impact on the overall average tax rate.



6. CONCLUDING REMARKS

Flat income tax and dual tax are two alternative models of the traditional global income taxes with progressive rates. These taxes differ, but depending on how the dual model is structured a dual tax can be considered as a flat tax with a surtax on high labour income. This can be confirmed by applying the system followed by Norway to separate labour and capital income: a general base where all income is taxed at a proportional rate, and a personal base only composed of labour income and taxed by a progressive schedule that includes a zero-rate first bracket (since all income is taxed on the general base).

A micro-simulation exercise shows that if Spain replaced the 2000 income tax, a theoretically comprehensive tax with progressive rates, by a dual tax, the results could be more or less progressive and redistributive depending on the parameters of the new levy. For any of the six tariffs considered, under an equal-yield assumption, only a minority of taxpayers, which varies between 3 % and 28 %, would be taxed on the personal base. Therefore, the great majority of taxpayers would only be taxed on the general part of the dual tax, in the same way as a flat income tax. This result is relevant because none of these taxpayers, including the self-employed, would benefit from converting earned income into capital income. Furthermore, as long as business income does not exceed the zero-rate step, the model to divide income according to the factor of production does not need to be applied. In addition, all taxpayers obtain the same benefit from any allowance, since they are only deductible from the general base.

Personal tax base would increase the overall progressivity and redistributive effect of the tax, since additional progressive rates only fall on high labour income earners, and they would even have a redistributive impact among richest taxpayers. Under dual taxation progressivity and redistribution proceed from either the base component of the general part of the tax (mainly the personal allowance) or the progressive schedule of the personal part. The relative weight of each component depends mostly on the tariff applied. Taxpayers' reaction to the alternative model and the impact on revenue yield by corporate tax under the new tax rate should also be considered in further research.

Table 1
DUAL INCOME TAX: TARIFFS

	TARIFF 1		TARIFF 2		TARIFF 3		TARIFF 4		TARIFF 5		TARIFF 6	
GENERAL TAX BASE												
– tax rate	12%		15%		18%		21%		25%		30%	
– personal allowance	3,306 €		3,606 €		3,786 €		4,207 €		5,048 €		6,311 €	
– descendent allowance	2000 IT		2000 IT		2000 IT		2,104 €		2,254 €		2,254 €	
– other allowances	2000 IT											
PERSONAL TAX BASE												
– 1 st bracket & rate	0 - 16,047 €	0%	0 - 18,571 €	0%	0 - 22,538 €	0%	0 - 25,002 €	0%	0 - 30,652 €	0%	0 - 39,066 €	0%
– 2 nd bracket & rate	16,047 - 66,111 €	28%	18,571 - 66,111 €	25%	22,538 - 66,712 €	20%	25,002 - 70,919 €	19%	30,652 - 72,722 €	15%	39,066 - 81,137 €	10%
– 3 rd bracket & rate	Over 66,111 €	33%	Over 66,111 €	30%	Over 66,712 €	30%	Over 70,919 €	24%	Over 72,722 €	20%	Over 81,137 €	15%

2000 IT = Spanish Income Tax for 2000.



Table 2
DUAL TAX/2000 IT: TAX REVENUE ACCORDING TO THE
CRITERIA FOR BUSINESS INCOME

	TARIFF 1	TARIFF 2	TARIFF 3	TARIFF 4	TARIFF 5	TARIFF 6
OPTION A	100,03%	100,06%	100,01%	100,08%	100,10%	99,87%
OPTION B	104,39%	103,31%	102,19%	101,82%	101,21%	100,46%
OPTION C	95,38%	96,31%	97,25%	97,82%	98,59%	99,07%
OPTION D	97,90%	98,24%	98,56%	98,87%	99,26%	99,41%

Table 3
DUAL TAX: PROGRESSIVITY AND REDISTRIBUTIVE EFFECT

INDEXES	TARIFF 1	TARIFF 2	TARIFF 3	TARIFF 4	TARIFF 5	TARIFF 6
OPTION A						
Kakwani	0.296074	0.278484	0.250844	0.268914	0.287079	0.321261
% Δ∇ to IRPF 2000	-4.56%	-10.23%	-19.14%	-13.32%	-7.46%	3.56%
Reynolds-Smolensky	-0.041256	-0.038843	-0.034914	-0.037336	-0.039690	-0.044111
% Δ∇ to IRPF 2000	-4.48%	-10.06%	-19.16%	-13.55%	-8.10%	2.13%
OPTION B						
Kakwani	0.303197	0.285854	0.257463	0.274098	0.290424	0.322933
% Δ∇ to IRPF 2000	-2.27%	-7.86%	-17.01%	-11.65%	-6.38%	4.10%
Reynolds-Smolensky	-0.044464	-0.041403	-0.036842	-0.038838	-0.040800	-0.044747
% Δ∇ to IRPF 2000	2.95%	-4.14%	-14.70%	-10.07%	-5.53%	3.61%
OPTION C						
Kakwani	0.281972	0.266217	0.240885	0.261142	0.282143	0.318881
% Δ∇ to IRPF 2000	-9.11%	-14.19%	-22.35%	-15.82%	-9.05%	2.79%
Reynolds-Smolensky	-0.037156	-0.035504	-0.032339	-0.035285	-0.038332	-0.043408
% Δ∇ to IRPF 2000	-13.97%	-17.80%	-25.12%	-18.30%	-11.25%	0.51%
OPTION D						
Kakwani	0.290021	0.272816	0.245745	0.264857	0.284367	0.319900
% Δ∇ to IRPF 2000	-6.51%	-12.06%	-20.79%	-14.62%	-8.34%	3.12%
Reynolds-Smolensky	-0.039389	-0.037233	-0.033570	-0.036246	-0.038970	-0.043737
% Δ∇ to IRPF 2000	-8.80%	-13.79%	-22.27%	-16.08%	-9.77%	1.27%

Table 4
DUAL TAX: PFÄHLER DECOMPOSITION. OPTION A

	TARIFF 1	TARIFF 2	TARIFF 3	TARIFF 4	TARIFF 5	TARIFF 6
GENERAL PART						
Tariff component	0,000195	0,000198	0,000212	0,000174	0,000133	0,000122
% TOTAL EFFECT	-0,47%	-0,50%	-0,60%	-0,46%	-0,33%	-0,27%
Base component	-0,012077	-0,016386	-0,020784	-0,026422	-0,033963	-0,042455
% TOTAL EFFECT	28,91%	41,68%	58,71%	69,55%	83,71%	93,72%
PERSONAL PART						
Tariff component	-0,028949	-0,022262	-0,014202	-0,011149	-0,006337	-0,002757
% TOTAL EFFECT	69,30%	56,62%	40,12%	29,35%	15,62%	6,09%
Base component	-0,000945	-0,000868	-0,000625	-0,000591	-0,000405	-0,000211
% TOTAL EFFECT	2,26%	2,21%	1,77%	1,56%	1,00%	0,47%
Reynolds-Smolensky	-0,041776	-0,039317	-0,035399	-0,037989	-0,040573	-0,045301

Table 5
DUAL TAX: TAXPAYERS TAXED ON THE PERSONAL PART

BRACKET	TARIFF 1	TARIFF 2	TARIFF 3	TARIFF 4	TARIFF 5	TARIFF 6
1	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
2	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
3	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
4	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
5	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
6	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
7	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
8	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
9	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
10	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
11	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
12	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
13	6,73%	0,00%	0,00%	0,00%	0,00%	0,00%
14	58,33%	0,00%	0,00%	0,00%	0,00%	0,00%
15	74,68%	40,06%	0,00%	0,00%	0,00%	0,00%
16	76,92%	70,83%	0,00%	0,00%	0,00%	0,00%
17	83,71%	79,23%	45,05%	1,60%	0,00%	0,00%
18	90,38%	87,50%	78,85%	62,18%	0,00%	0,00%
19	90,06%	87,50%	83,65%	79,49%	48,72%	0,00%
20	92,31%	91,35%	85,90%	83,65%	79,17%	64,42%
TOTAL	28,66%	22,83%	14,67%	11,34%	6,39%	3,22%



Table 6

DUAL TAX: PERSONAL LIABILITY RELATIVE TAX SHARE (RTS)

BRACKET	TARIFF 1	TARIFF 2	TARIFF 3	TARIFF 4	TARIFF 5	TARIFF 6
1	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
2	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
3	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
4	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
5	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
6	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
7	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
8	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
10	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
11	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
12	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
13	0,0046	0,0000	0,0000	0,0000	0,0000	0,0000
14	0,1487	0,0000	0,0000	0,0000	0,0000	0,0000
15	0,5004	0,0766	0,0000	0,0000	0,0000	0,0000
16	0,7836	0,4196	0,0000	0,0000	0,0000	0,0000
17	1,1430	0,8724	0,0009	0,1745	0,0000	0,0000
18	1,5723	1,4422	0,4142	0,8979	0,0000	0,0000
19	1,9806	2,0478	1,7036	1,8947	0,6729	0,0000
20	2,7065	3,1469	4,3331	3,9349	5,1021	5,4800

Table 7

DUAL TAX: PERSONAL LIABILITY RELATIVE INCOME SHARE (RIS)

BRACKET	TARIFF 1	TARIFF 2	TARIFF 3	TARIFF 4	TARIFF 5	TARIFF 6
1	1,0566	1,0397	1,0229	1,0174	1,0096	1,0043
2	1,0566	1,0397	1,0229	1,0174	1,0096	1,0043
3	1,0568	1,0398	1,0229	1,0175	1,0096	1,0043
4	1,0567	1,0398	1,0229	1,0175	1,0096	1,0043
5	1,0570	1,0400	1,0230	1,0175	1,0096	1,0042
6	1,0571	1,0400	1,0231	1,0176	1,0096	1,0042
7	1,0568	1,0399	1,0230	1,0175	1,0096	1,0043
8	1,0568	1,0398	1,0229	1,0175	1,0096	1,0043
9	1,0570	1,0400	1,0230	1,0175	1,0096	1,0042
10	1,0568	1,0398	1,0230	1,0175	1,0096	1,0043
11	1,0567	1,0398	1,0229	1,0175	1,0096	1,0043
12	1,0568	1,0398	1,0230	1,0175	1,0096	1,0043
13	1,0564	1,0398	1,0229	1,0175	1,0096	1,0043
14	1,0482	1,0398	1,0229	1,0175	1,0096	1,0043
15	1,0280	1,0367	1,0229	1,0175	1,0096	1,0043
16	1,0121	1,0232	1,0231	1,0176	1,0096	1,0041
17	0,9916	1,0050	1,0191	1,0176	1,0096	1,0041
18	0,9668	0,9819	1,0022	1,0102	1,0096	1,0042
19	0,9435	0,9576	0,9791	0,9875	1,0031	1,0041
20	0,9042	0,9151	0,9328	0,9417	0,9608	0,9811

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Junto al original del Papel de Trabajo se entregará también un resumen de un máximo de dos folios que contenga las principales implicaciones de política económica que se deriven de la investigación realizada.

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