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## Suppression of the Dual Scheme in the Spanish Personal Income Tax

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We study the effects a reform on Spanish personal income tax that withdraws its dual character, arising from the differential fiscal treatment of labour and capital income. On a first analysis, we tackle the static level impact, *i.e.*, assuming an absence of taxpayer response to the reform. On a second stage, we estimate and include the dynamic effect the introduced changes may induce on agents. By relying on micro-simulation techniques leveraging extensive tax micro-data, we quantify the extent to which the reform induces an increase on tax progressivity and on after tax income. This in turn implies a sizeable decrease on inequality. We provide some evidence of inter-base income shifting to account for bunching and kinks observed in the income distribution. This in turn redounds in the increase in progressivity and redistribution of the suggested policy.

**JEL Codes:** H24, H26, H31

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# Suppression of the Dual Scheme in the Spanish PIT: Progressivity, Redistribution and Dynamics

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October 20, 2025

## Abstract

We study the effects a reform on Spanish personal income tax that withdraws its dual character, arising from the differential fiscal treatment of labour and capital income. On a first analysis, we tackle the static level impact, *i.e.*, assuming an absence of taxpayer response to the reform. On a second stage, we estimate and include the dynamic effect the introduced changes may induce on agents. By relying on micro-simulation techniques leveraging extensive tax micro-data, we quantify the extent to which the reform induces an increase on tax progressivity and on after tax income. This in turn implies a sizeable decrease on inequality. We provide some evidence of inter-base income shifting to account for bunching and kinks observed in the income distribution. This in turn redounds in the increase in progressivity and redistribution of the suggested policy.

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## Resumen

Estudiamos los efectos redistributivos y en la progresividad de una reforma del impuesto sobre la renta en España que elimine su carácter dual, determinado por el tratamiento fiscal diferencial de las rentas del trabajo y las del capital. En un primer análisis, acometemos un análisis estático, esto es, asumiendo una ausencia de respuesta del contribuyente a la reforma. En una segunda etapa, estimamos los efectos dinámicos que los cambios introducidos pueden inducir en los contribuyentes. Explotando técnicas de micro simulación que emplean grandes bases de micro datos tributarios cuantificamos el grado en que la reforma conlleva un incremento de la progresividad y en la capacidad redistributiva del impuesto y, ulteriormente, en la desigualdad en la distribución de la renta. Proporcionamos evidencia

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de traslado renta entre bases imponibles lo cual, en último término, redundará en un mayor incremento de la progresividad y la redistribución de la reforma sugerida.

*Códigos JEL:* H24, H26, H31

*Palabras clave:* IRPF, Tarifa dual del impuesto de renta, tarifa sintética del impuesto de renta, progresividad, redistribución, traslado de rentas, elusión fiscal, microsimulación.

## 1 Introduction

Since January the 1st 2007, Spanish income taxation follows a dual scheme. Personal labour earnings, real estate, a small selection of equity, capital gains from less and a year and not linked to the transmission of wealth, and income imputations, are taxed according to a progressive schedule. The remainder of equity and capital gains are taxed according to a schedule that, although subject to tax brackets, is less progressive and sizeable than the general base. This system, pioneered by the Nordic economies in the early nineties (Denmark, 1987; Sweden, 1991; Norway, 1992; Finland, 1993), intended to solve several issues related to capital taxation that were discussed at the time. Namely, it was argued as a correction system against fiscal drag of inflation, specially acute on high progressivity systems such as the Nordic ones. In addition, supporters argued a violation of the principle of payment capacity from capital gains linked to wealth transmissions, as well as the double taxation of dividends and capital gains and corporate tax.

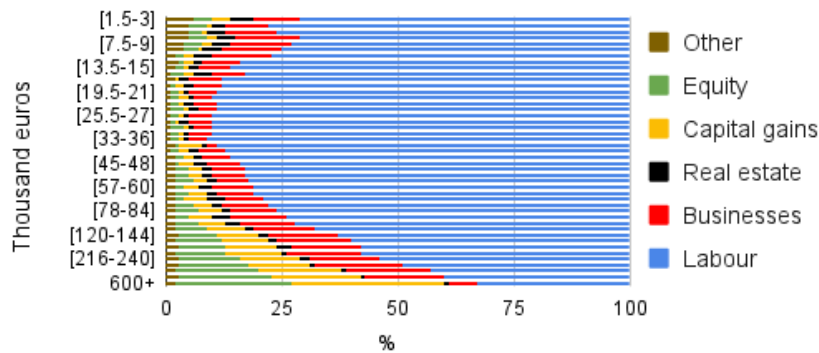
More generally, most arguments revolved around the inefficiency progressivity implies by distorting optimal saving and capital accumulation (*Christiansen, 2004*). Many of these considerations departed from previous research that advocated the neutrality of proportional taxation on capital income over investment (*Sinn, 1987*), or the optimality of zero capital income taxation in the long run (*Chamley, 1986; Judd, 2002*).

The conditions that motivated the implementation of this reform on income taxation may have lost certain pertinence at the current economic juncture. A sizeable number of authors have pointed at the limitations this scheme may imply, beyond its design. In particular, the tax avoidance dynamic responses to the incentives structure generated by the tax base duality has been argued and documented. Namely, with relation to income-shifting (whether inter-temporal (*Domínguez-Barrero and López-Laborda (2008)*), between brackets (*Saez, 2010; Chetty et al. 2011*) and between bases (*Sørensen, 2010; Alstadsæter and Thoresen, 2010*), the lock-in effect on dividends (*Chetty and Saez, 2005; Kari et al., 2008; Daunfeldt et al. 2010*), or in capital gains (*Poterba, 1987; Reese, 1998; Dai et al., 2008*), or the effects on the taxpayer portfolio composition. Other additional instruments are income shifting across spouses (*Stephens and Ward-Batts, 2004*), legal form arbitrages (*Gordon and MacKie-Mason, 1994*;

*Gordon and Slemrod, 2000; Domínguez-Barrero et al., 2005*), or the choice of remuneration for business owners (*Kari, 1999; Lindhe et al., 2004; Harju and Mattikka, 2016*). In addition, incentives to tax evasion are discussed.

On the other hand, a number of questions have been raised on the grounds of distribution: the incomes that do not belong to the saving tax base and, as a result, are levied at lower rates are not distributed in a homogeneous manner. Instead, they imply a greater percentage of the tax base as income increases, concentrating primarily on taxpayers with the highest tax bases (Fig. 1).

**Fig. 1.-** *Personal Income tax base composition. Spain, 2017*



*Source: Gral. Directorate of Taxation, Ministry of Finance, Spain (2021).*

In parallel, we have recently witnessed the consolidation of a great volume of micro-data, particularly tax/administrative information, which has made it possible to provide an empirical response to some queries related to the aforementioned debates. This is extensible to the advances on micro-simulation techniques, such as the ones used here.

Accordingly, this paper aims at a double target. On the one hand, to document the distributive effects the suppression of the PIT dual scheme may generate in terms of progressivity, redistributive capacity, tax revenues, or income distribution inequality. On the other hand, to assess the extent to which taxpayers display sufficient financial planning so as to dynamically respond to the tax, avoid it and, in turn, erode its intended progressivity.

A double methodological approach is consequently proposed. First off, the effects of the reform in the absence of behavioural responses from the taxpayers are addressed. This first analysis, which we carry out by means of the Spanish Institute of Fiscal Studies (IEF) micro-simulator and the PIT Taxpayer Sample database (*Muestra de Declarantes del IRPF*), is informative as a reference to the remainder of approaches that incorporate additional limitations to progressivity. For the second intended goal, non-parametric methods, such as the structural breaks test, are used to ascertain the presence of kinks in the distribution, and estimators to find the elasticities related with bunching across brackets and shifting income across tax bases.

The paper is structured as follows. On section 2, a literature review on the addressed topics is performed. On section 3, we perform the static analysis based on micro-simulation. On section 4, the dynamic analysis is proposed. The fifth section concludes.

## 2 Related Literature

In this section we will review the literature on dual PIT taxation, and the arguments provided in favour and against synthetic taxation. Two great distinctions may be made: efficiency and fairness<sup>1</sup>.

Due to contributions such as *Atkinson and Sandmo (1980)* or *King (1980)*, efficiency has become one of the most common arguments in favour of dual income taxation. Defenders refer to the inefficiency of taxing equivalently labour income and capital income (*Boadway, 2010; Picos-Sánchez and Gago-Rodríguez, 2004; Díaz-de-Sarralde et al., 2012; Sørensen, 1994*). Most of these authors argue that the elasticity of the capital earnings is greater than that of labour and, as a result, they require a distinct fiscal treatment. Some others suggest that taxing labour income is closer to taxing current consumption, which has traditionally been found more efficient than taxing income. The optimality of consumption taxation vs income has been challenged by raising some hard assumptions it was based on (*Domínguez-Martínez, 2009*).

It is also argued that welfare-maximising marginal labour income tax rates may be risen close to its maximum revenue level, an observation that may or may not be true for a synthetic schedule (*Kinderman and Krueger, 2022*). Conversely, the literature has provided little attention to empirically assessing this distinction on capital and labour income elasticities.

Concerning the ETI (elasticity of taxable income), *Kleven and Schultz (2014)* carry out an estimation on after a number of fiscal reforms in Denmark, and they observe that the elasticities of capital income are 2 to 3 times greater than those from labour. Besides, these authors obtain that the value of such labour elasticities is around 0.05 for wage-earners whereas it goes up to 0.1 for self-employed entrepreneurs. This last conclusion is also observed by *Sillamaa and Veall (2001)* for Canada, where the ETI for the self-employed entrepreneurs is estimated at 1.32, against 0.08 from wage-earners. For Spain, *Almunia and López-Rodríguez (2019)* estimate ETIs ranging from 0.3 to 0.47 for wage-earners against a 0.65 to 1.45 (depending on methodology) for the self-employed entrepreneurs. They also find that the elasticities differ according to the type of income. Labour income and financial capital income have elasticities from 0.18 to 0.38 and from 0.24 to 0.49, respectively. Concerning financial income, the response to fiscal changes

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<sup>1</sup>We hence use the term *fairness* to denote the principle of equity of treatment, whether vertical -across income levels- or horizontal -across income types. In other texts it may be denoted as *equity*. We prefer to use the latter term to denote capital.

in real estate income is slightly greater than in the latter: elasticities range from 0.35 to 0.49. Finally, income from entrepreneurial earnings is much greater: it ranges from 0.8 and 1.42.

In Sweden, *Selén (2002)* and *Hansson (2007)* estimate the ETI after the 1991 tax reform. The previous obtains labour income elasticities of 0.2 whereas the remainder of factors would reach 0.3. The latter also obtains elasticities from 0.36 to 0.39. An additional research concerning New Zealand estimates the ETI of the top 1% of the income distribution, quantifying it around .41. Many of these studies include comparisons between the elasticities from the high-income taxpayers and those from the remainder of households. All of them agree on the presence of the greater elasticities in the right part of the distribution.

These elasticities are calculated by means of distinct fiscal changes, at different moments in time, and with different methodologies, since the heterogeneity of the reforms may cause the different results. *Chetty et al. (2011)* and *Chetty (2012)* argue that elasticities estimated from small fiscal changes are affected by frictions, namely adjustment costs, whereas the great tax reforms overcome these frictions and, therefore, display the actual long term elasticity.

*Picos-Sánchez and Gago-Rodríguez (2004)* and *Boadway (2004)* remark in addition the administrative simplicity of a dual tax. The complexity of certain capital instruments makes it difficult to apply *e.g.*, income imputations in a synthetic tax, thus violating the horizontal fairness. In this sense, the dual tax is a compromise: accepting a lack of horizontal fairness *de iure* to avoid a greater loss of horizontal fairness *de facto*.

An alternative argument often used in the literature in favour of dual taxation in terms of efficiency is the disincentive a synthetic tax implies towards investing in physical and financial capital as opposed to human capital. Studies such as *Sørensen (1994)* claim that, although the optimal solution to address this issue would be to not levy capital income, this would imply a number of problems related with the progressivity and income redistribution. According to this, the author proposes a second-best, which would be a dual tax that levies capital income at a lower rate. Nevertheless, there are authors that disagree with this argument. *Uhlig and Yanagawa (1996)* show through a theoretical model that under certain conditions, to raise a tax that levies capital income may yield economic growth.

From certain positions, the presence of a dual tax is also justified on the grounds of the need to limit the jump in progressivity arising from taxing an income generated during a particular economic exercise on a different period. This is the case of the capital gains whose maturity is greater than one year. However, we claim this fact does not justify the need to maintain a dual tax base, a reduction may be sufficient.

On the other hand, fairness plays an important role in the introduction of dual PIT. Critics of the dual tax argue the lack of horizontal fairness when capital is levied at a lower rate, since

two individuals with the same income but different source (whether capital or labour) are subject to a different fiscal burden. *Bø et al. (2012)* assess the 2006 PIT reform in Norway, where the regulation to control the swap between capital and labour returns. They show, through a copula model, this increases horizontal fairness. The reform implied a strengthening of the PIT, in which some income were removed from the saving schedule to avoid income arbitrage.

Despite of the above, *Sørensen (1994)* remarks the lack of horizontal fairness on a synthetic tax from the time perspective. When capital returns are levied, two individuals with the same income but whose present consumption-saving decision conditioned the stream of tax payment in the future. Those who prioritize saving versus present consumption will pay more taxes in the future, derived from the returns on that saving. Thus, the principle of horizontal fairness is compromised. A synthetic tax might disincentive investment and incentive present consumption. Under those circumstances, not only there is a problem of horizontal fairness, but also it has effects on efficiency.

Horizontal fairness is hence invoked to support both dual and synthetic taxation. On a similar fashion, vertical fairness is one of the strongest arguments on defence of a synthetic personal income tax. *Kristjánsson and Lambert (2015)* claim that income taxation, due to its progressivity, has the capacity to reduce after tax labour income inequality. However, after the tax enforcement of the dual tax with proportional capital income taxation, no reduction in capital income inequality is present. Furthermore, according to the authors, the majority of capital incomes are concentrated on the right top of the income distribution. For Spain, we observe that capital and labour income follow a distinct distribution, where capital income is more unequal (see Fig. 6). There are numerous studies on the impact of the introduction of the dual tax on income redistribution. Most of them find vertical fairness loses (*Schwarz and Gustafsson, 1991; Björklund et al. 1995; Aaberge et al., 1995*). *Boadway (2010)* takes also into account the possibility of negative effects on vertical fairness derived from dual taxation; to address it, the author proposes an offset system through a tax on big fortunes.

There is a number of additional factors pointed in the literature in terms of dual personal income taxation. Among them, *Sørensen (1994)* remarks the issue of inflation when capital gains are levied, since such a gain may be result of a price increase and not a real earning. Against this, there is no consensus upon which is the optimal solution. For instance, some governments use reduced rates to account for this. However, there are alternative options to address the issue within a synthetic tax, such as applying amortization or reduction coefficients to certain kinds of incomes.

Some other discussed factors are the effect of inter-base income elasticity. Arbitrage arises

due to the presence of two separate income bases with distinct tax rates. There are authors that have assessed such effect once introduced on a dual tax. *Alstadsæter and Jacob (2016)* study the impact of a tax cut on dividends passed in 2011 in Sweden. They conclude that the owners and managers of the firm reclassify labour income as dividends without an increase on total revenues. This effect is more acute on those firms with a high share on ownership, which in addition have more fiscal incentives, and self-employed individuals (*Gordon and MacKie-Mason, 1995*). *Pirttilä and Selin (2011)* also find cross-base income shifting after the introduction of dual income taxation in Finland in 1993. They observe an insignificant response among wage-earners, whereas self-employed entrepreneurs did increase capital income tax returns. This is indicative of income shifting.

Generally, there are numerous studies that show the possibility of base arbitrage in the dual income tax. There are many that study the change in behaviour of agents after changes on PIT. *Jacob (2016)* performs an analysis on the sensitivity of the decision on whether to realise capital gains after a general base tax rate increase. In other words, how general base tax raises affect capital gains realization. The author shows that a labour income marginal tax rate increase enhances the probability of realising surpluses, and the amount of such realized surpluses. One of the consequences of this result is that labour income taxes present a lock-out effect. Similarly as how some empirical research studies the lock-in effect on surpluses (*Feldstein et al., (1980); Auten and Clotfelter 1982; Poterba 1987; Auerbach, 1988; Bergstresser and Poterba, 2002; Ivković et al., 2005; Chetty and Saez, 2005*) show that decision on whether to realize surpluses does not only depend on taxes over such surpluses but is also affected by labour income tax rates. *Fjærli and Lund (2001)* also finds that, in Norway in 1991, the way in which the payment delivered in a company -whether on salary or dividends- strongly -although not exclusively- depends on the reduction on capital income taxes.

In a word, even if accepting the argument that the comprehensive schedule generates a loss of efficiency due to a suboptimal allocation of capital, that effect may be offset against the increase of efficiency due to the lack of income shifting across tax bases a synthetic schedule provides (*Christiansen and Tuomala 2008*).

### 3 Data and Methodology

In this section we describe the data and methodology employed for the static and dynamic analysis.

The micro-simulation tool from the IEF has been utilized for the static analysis. The database referred for the conduction of the micro-simulation is the 2018 Sample of PIT Tax-payers (Muestra de Declarantes de IRPF), jointly elaborated by Spanish official tax office

(AEAT) and IEF (*Pérez et al., 2020*). The aim of the paper is to document the impact on progressivity of transitioning from dual to a synthetic PIT, by removing the saving base, and relocating all items into the general base.

Aiming at simulating the impact of the suppression of the saving tax base and taxing all income at the general schedule must address the following issue. PIT must levy income according to the economic capacity of the taxpayer; thus, when a capital gain derived from a wealth transmission is obtained, since it may have been generated over a long period, the tax amount the individual pays may not reflect his or her actual payment capacity. Accordingly, the proposal to remove the special base must include a solution to such a challenge. An optimal approach would be to calculate an individualized reduction according to the generation period of such transmission-related capital gains. However, the “model 100” –the administrative sheet to be filed in the PIT return- does not contain that information. In this paper we will introduce, therefore, three abatement coefficients according to this kind of capital gains: 70 %, 50% and 40%. We consequently provide a sensitivity analysis facing possible changes in the amortization coefficients within a synthetic PIT. The rationale of this approach is hence to avoid the jump in progressivity arising from taxing in one exercise an income that has been generated over a number of periods.

Once performed the micro-simulation, different indexes will be utilized, displaying the measurement of the inequality, progressivity, and redistribution. Inequality will be measured through the Gini Coefficient, which represents the difference in income between two random individuals of a society. The bigger the Gini index, the greater the inequality. In order to measure progressivity, the Kakwani index will be used (*Kakwani, 1977*). It consists of the difference between the index of concentration of the gross tax payable distribution and the Gini index in the after tax income distribution. Were the Kakwani index to be positive, the tax would be progressive, and the higher its value, the greater its progressivity. Concerning redistribution, the Reynolds-Smolensky index (*Reynolds and Smolensky, 1977*) will be used. It consists in the difference between before tax income Gini and after tax income Gini indexes. Were the Reynolds-Smolensky index to be positive, the reform would improve the disposable income distribution, and the higher its value, the more redistributive the tax is.

For the dynamic analysis we make use of the PIT Taxpayers Panel, *i.e.*, an administrative register database collected by IEF for the years 1999-2016. The sample, composed by 3.36 million observations, is representative of 1.1% of the total PIT tax returns filed in the period. We correct for high income household oversampling by means of the raising factors provided by the source.

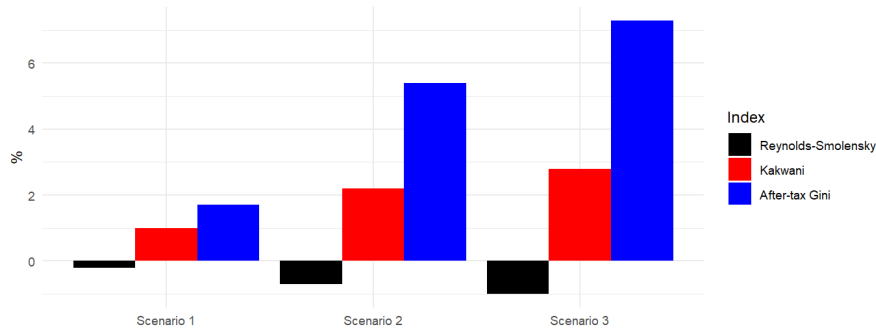
## 4 Static Analysis

In this first analysis we intend to ascertain the variations on progressivity and redistribution indexes, as well as the gross revenues and the winners and losers, by deciles. This study will be conducted thrice, in order to represent three scenarios. Each one will be given a distinct reduction or abatement coefficient attached to the capital gains related to wealth transmissions. At all scenarios, the fiscal treatment of capital and labour incomes is unified, collapsing all returns into the general tax base. On Scenario 1, a 70% reduction is applied; on scenario 2, a 50%, and on scenario 3, a 40%.

On the first scenario, the consolidation of the bases implies an increase in revenues of 0.6%, turning from a 78.8 billion euros to 79.2 billion. The difference lays around 471 million euros when a 70% reduction coefficient is applied. When we cut the reduction coefficient to 50%, revenues drop 2.66% (2 billions) and 3.72% (2.9 billions) if we cut it down to 40%. Base consolidation implies a great increase in revenues. Naturally, the lower the reduction, the greater the revenue.

PIT is a progressive tax: the higher the personal income, the greater the mean effective tax rate. However, this progressivity may vary when changes in regulation are introduced. All portrayed scenarios imply an increase on progressivity, although it is different according to the reduction coefficient applied to the transmissions-related capital gains. The range of the increase of  $K$  is from 0.98% in Scenario 1 to 2.7% in Scenario 3. This implies that the progressivity increases when the saving base is removed, and consolidated with the general income. Besides, this increase is greater the greater the cut in the reduction coefficient of transmissions-related capital gains. A similar behaviour is observed from  $RS$ : it augments in all three scenarios, although this increase ranges from 1.62% in Scenario 1 to 7.3% in Scenario 3. It is interpreted that the redistribution is greater after the reform is enforced and it grows with the reduction coefficient. As a consequence of the increases in progressivity and redistribution, inequality is reduced by 0.22% in Scenario 1, 0.7% in Scenario 2, and 1% in Scenario 3. This in turn may imply the Gini coefficient could change from 0.38 to 0.37, were the lower reduction coefficient be applied (see Fig. 2).

**Fig. 2.- Rates of Change of Progressivity, Redistribution and Inequality Indexes**



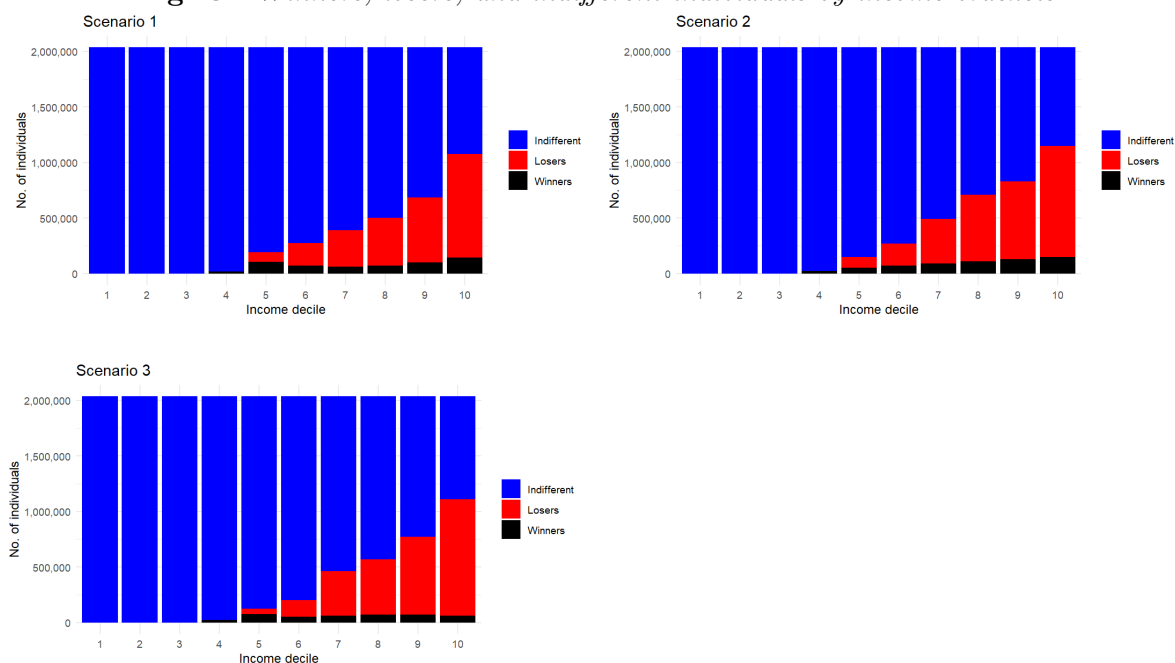
*Source: own elaboration from the 2018 Sample of Taxpayers, IEF.*

The value of the indexes may be found below. When we disaggregate the effect between winners and losers by the new structure, we observe that in Scenario 1 more than 83.34% of taxpayers are indifferent to the measure, a figure that increases slightly both in Scenario 2 (84.58%) and Scenario 3 (84.6%). The percentage of losers increases as the reduction coefficient decreases. However, in the case of the winners the opposite occurs: the lower the reduction percentage, the fewer the winners.

After assessing the winners and losers by deciles, we can reach the following conclusions. The percentage of indifferent individuals approaches 99% among the first 4 deciles of income, and a 90% at deciles 5 and 6. Most taxpayers up to the 60% of the distribution are indifferent to the measure. When it comes to the winners, they represent around 6% or 5% at the two last deciles. The behaviour of winners and indifferent individuals is quite similar in all three scenarios.

Lastly, 45.2% of the taxpayers from the last decile are losers in the context of Scenario 1, percentage that reaches 48.4% when a 50% reduction rate is applied (Scenario 2) and a 52% with a 40% reduction (Scenario 3)

**Fig. 3.-** *Winners, losers, and indifferent individuals by income brackets*



*Source: own elaboration from Taxpayer Sample from 2018*

Tax base consolidation leaves most taxpayers indifferent on every scenario. The majority of losers are concentrated in the right top of the distribution, and so are the winners. The latter group is nevertheless small.

**Table 1.-** *Inequality indices*

	Global indexes on progressivity, redistribution and inequality						
	2022 PIT Regulation	synthetic PIT			Rate of change		
		70% Reduction	50% Reduction	40% Reduction	70%-Ref	50%-Ref	40%-Ref
<b>Gini pre-tax</b>	.4358	.4358	.4358	.4358	.00%	.00%	.00%
<b>Gini post-tax</b>	.3837	.3829	.3809	.3799	-.22%	-.73%	-1.00%
<b>Reynolds-Smolensky</b>	.0521	.0529	.0549	.0559	1.62%	5.39%	7.33%
<b>Effective mean tax rate</b>	.1433	.1442	.1471	.1486	.60%	2.66%	3.72%
<b>Concentration pre-tax</b>	.7535	.7566	.7603	.7622	.41%	.91%	1.15%
<b>Concentration post-tax</b>	.3827	.3818	.3798	.3788	-.23%	-.74%	-1.00%
<b>Kakwani</b>	.3177	.3208	.3245	.3263	.98%	2.15%	2.73%
<b>Reordering effect</b>	.001	.0011	.0011	.0011	4,88%	2.58%	1.63%
<b>Revenue effect</b>	.1673	.1685	.1725	.1746	.70%	3.12%	4.38%
<b>Reynolds-Smolensky Decomposition</b>	.0521	.0529	.0549	.0559	1.62%	5.39%	7.33%

*Source: own elaboration.*

## 5 Dynamic Effects

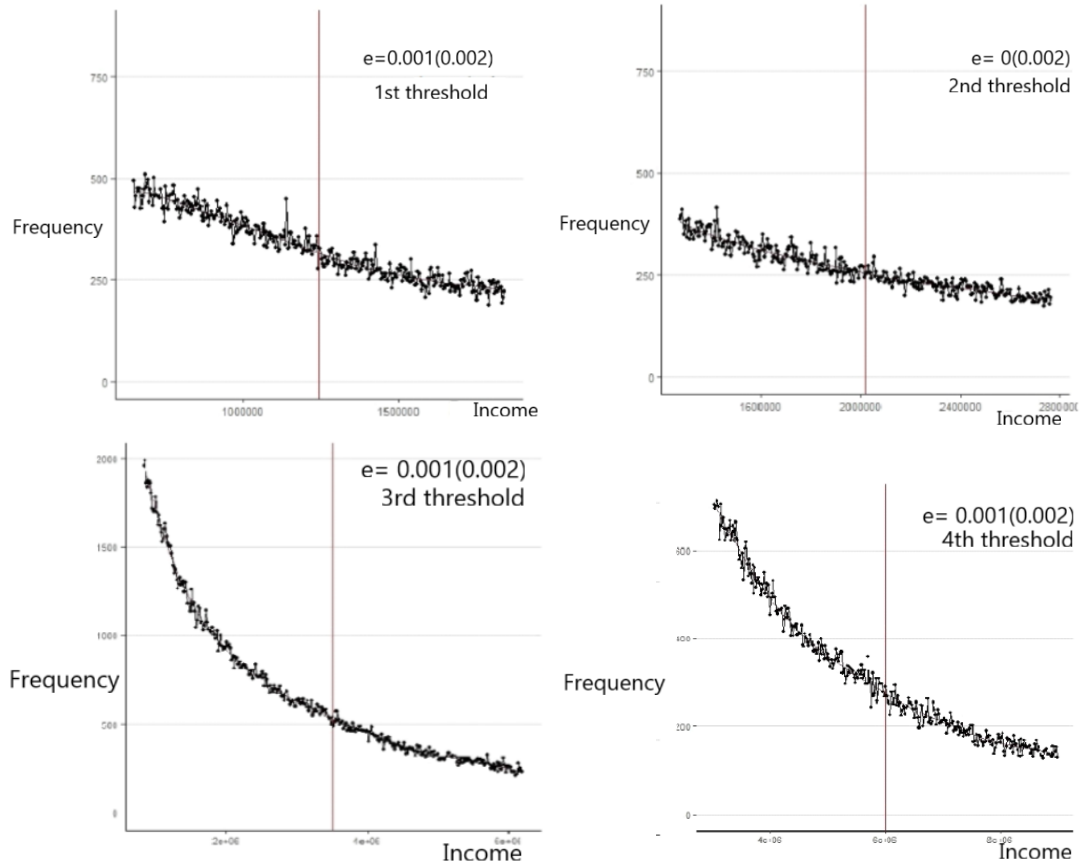
In this section we analyse the potential behavioural effect the dual scheme -or its lack thereof- may induce on the taxpayers and, consequently, affect the gross revenue, progressivity and redistributive capacity of the tax. The literature over behavioural responses to fiscal incentives in the income distribution has focused on the bunching of observations around bracket limits, the income shifting between tax bases, the lock-in effect of capital returns and, the effect on managerial structure or portfolio composition.

Preliminarily, we wish to ascertain the degree of sensitivity of the general income of PIT taxpayers to tax bracket jumps. Thus, we can assess whether behavioural responses take place facing fiscal incentives introduced by schedule design and, if so, to which extent.

In the spirit of the capital gains realizations arbitrage literature (*e.g.*, *Auten and Clotfelter (1982)*, *Auerbach and Siegel (2000)*), that discerns between tax avoidance based on tax rate differentials and based on the timing of the realizations, we identify three possible income shifting strategies: between brackets, *i.e.*, to withhold returns on the upper limit; between bases; or inter-temporally. Another noted possibility (*López-Laborda et al. 2018*) is to swift capital returns among returns on equity and capital gains, leveraging the better fiscal treatment of the latter.

Hence, the first studied element is a non-parametric analysis of the bunching of observations in the vicinity of the bracket limits (*Chetty et al., 2011; Jacob, 2016*). Specifically, we observe whether there are kinks in the income distribution and excess probability mass before the bracket jumps, followed by an insufficient mass immediately afterwards, as opposed to a theoretical random distribution adjusted to the observed data (*Bertanha et al., 2021*). We argue the theoretical distribution controls for the effect of the average rate, so the resulting elasticity accounts exclusively for the bunching. The presence of bunching may be indicative of certain fiscal planning from the taxpayer, who may be able to avoid the bracket jump and thus maximize after tax income.

**Fig. 4** .- *Pre-tax income distribution around tax thresholds. Taxpayers with business activities returns.*



*Source: own elaboration from PIT Taxpayers Panel*

First off, we perform the identification of the kinks, by means of a *Chow (1960)* test, *i.e.*, we compare whether the slope of the distribution is statistically different before and after the bracket threshold. As displayed on table 1, for the series of income of the general population. We do find kinks in the distribution according to the tax bracket, although we do not find significant deviations with respect to the reference in terms of bunching, at standard significance levels. This result is robust to the chosen granularity of the observation pockets, to the selection of central position measures around which they are constructed, to the presence of outliers, and to the use of variables in real or nominal terms. We suggest certain diffusion on the threshold, smoothed transitions between tax brackets, which might capture the uncertainty attached to the calculation of the taxable income, whether from the complexity of asset imputation or arbitrage between general and saving tax base. We do not find significant deviations from randomness either in this case.

For the formal assessment of the threshold, we make use of the *Mavrokonstantis and Seibold (2022)* estimator. This estimator consists on the adjustment of  $n$  polynomials for each pocket of observations:

$$\Upsilon_k = \sum_{k=1}^K y_k + RE + FE + \epsilon_k \quad (1)$$

Where  $\Upsilon_k$  is the median income of pocket  $k$ , and  $\epsilon_k$  is a random perturbation. The order of the polynomial until which data are adjusted is set to 9. We neglect the possibility of rounding errors (tax returns are accurate to the cent) and fixed effects.

This negative result may be dependent from the selection of the economic subject that performs the fiscal planning. It is reasonable to assume that taxpayers with returns from business activities display greater easiness to tax planning, for several reasons: On the one hand, they must arbitrate how much to allocate in terms of wage or capital payments. On the other hand, they must also discern whether to acquire financing through debt or own resources. Finally, they hold greater possibilities of developing revenue under-reporting strategies, through an increase on exploitation expenses. Accordingly, we hence focus on this group of taxpayers for the analysis.

**Table 2.- Kinks and inter-bracket elasticity**

Threshold	Income	General Population		Self-employed (direct evaluation)	
		Kink (Chow test)	Elasticity (Bunching)	Kink (Chow test)	Elasticity (Bunching)
1	12450	Yes*	5.94(***)	Yes**	1.41e-03
2	20200	Yes***	5.4e-03	Yes***	1.67e-03
3	35200	Yes***	3.4e-06	Yes***	1.1e-03
4	60000	Yes**	1.5e-04	Yes***	1-02e-03

*Source:* Own elaboration from PIT Taxpayers Panel, IEF. \* indicates 10% significance, \*\* 5% and \*\*\* 1%.

We find kinks in the pre-tax income distribution for all tax brackets, both for the general household and the taxpayers subject to business activities returns. These results are compatible with those observed in *Almunia et al. (2024)* on an analogous research. As we expected, the effect is smaller on lower income taxpayers, in accordance with their limited ability to perform fiscal planning. Concerning inter-bracket elasticity, we do not find significant values for any bracket nor taxpayer category, with exception of the low income group of general population. In other words, the distribution around the kinks is smooth. The exception is counter-intuitive: solely individuals with limited fiscal planning are the ones performing inter-bracket income shifting. We decide to neglect this result on the grounds that the observed kink is barely significant and the bunching may not be quantitatively relevant in terms of the overall distribution.

Up to this point, we interpret two aspects. i) there is evidence of dynamic effects in the tax schedule jumps and ii) these jumps may not be attached to income shifting between tax

brackets. It proceeds, as a result, an assessment of alternative arguments of income shifting that may eventually explain the observed evidence. Inter-base income shifting is a non-trivial candidate since, as analytically derived in *Saez and Stantcheva (2018)*, a synthetic schedule is optimal in the extreme case of perfect inter-base income elasticity, and preferable in terms of fairness and efficiency to a dual scheme for sufficiently high values of it. Thus, ascertaining the degree of arbitrage between bases is informative for the justification of a synthetic or dual tax schedule.

Such an exercise is not unprecedented. *López-Laborda et al. (2018)* do find evidence of income shifting between PIT bases in Spain for the period 1999-2009, especially for higher income and self-employed households, as previously had *Moreno-Cepas (2012)*. For Sweden, *Jacob (2016)* also provides a positive result on cross-base elasticity and negative on bunching. Quantitatively, these concerns are non-trivial: for Finland, *Harju and Matikka (2016)* find that cross-base tax elasticity accounts to up to two thirds of the elasticity of taxable income; although for Denmark, *Kleven and Schultz (2014)* find it to be small and, as in *Pirttila and Selin (2011)* for Finland, mostly concentrated among self-employed individuals. In a similar fashion, for the US, *Gordon and Slemrod (2000)* estimate the income shifting between personal and corporate bases to be around 0.2% GDP.

The final part of this section proceeds then to replicate these results.

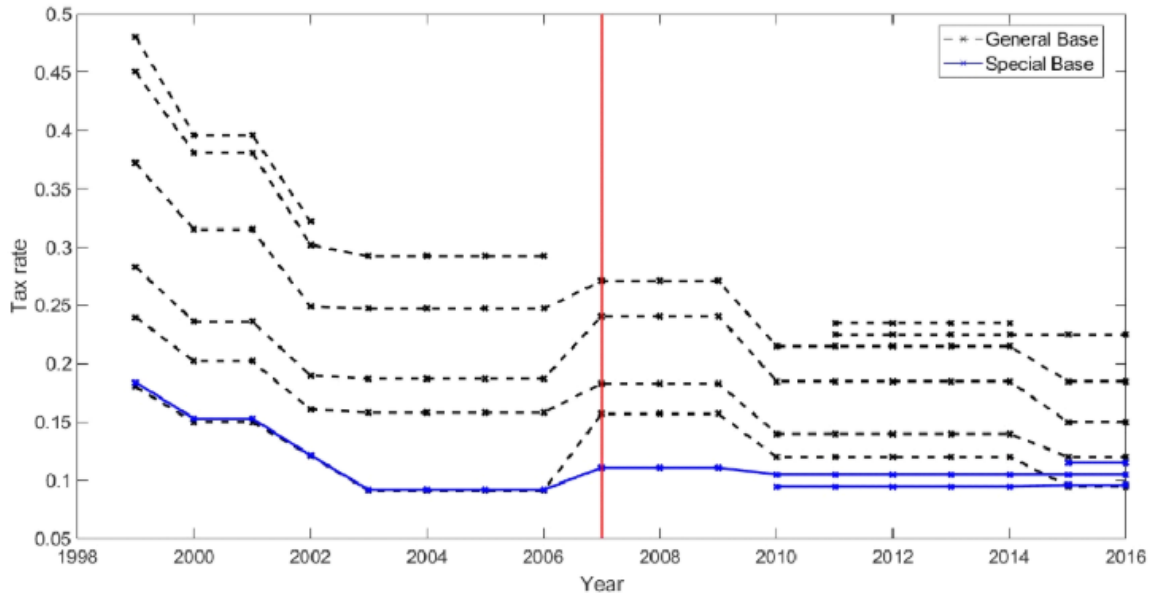
There are at least two channels to operate such income shifting. A direct approach is to provide capital retribution: income will be taxed further away in time, and at a lower rate. An indirect approach is to apply for external financing for general income-related investments, which has a more favourable tax treatment, and use own resources for saving.

As noted by *Jacob (2016)*, were the equity tax base to be proportional, as *e.g.* capital gains in the US, we would face endogeneity issues in the estimation: there would exist a co-dependence between labour and capital income. However, this does not apply to countries, such as Spain or Sweden, with dual income schemes, where capital gains and capital income are taxed in an independent manner. Similarly, since we are dealing with the elasticity of an object, capital income, that is independent to labour income, the estimation of the cross-base elasticity does not require an instrumental variable to circumvent this endogeneity, as it was usual in the capital gains tax elasticity literature. Naturally, these objects are correlated: income-rich households tend to display wider amounts of wealth, but in Spain, unlike other systems, the special base tax rate is fixed regardless of the general one.

Since all individuals within a region are subject to the same regional tax schedule, we can rule out this effect via a region-wise fixed-effects control. However, for sophistication, we extend this analysis to include regional tax rates as regressors. Also, in contrast to other countries

in which the savings base is sheerly proportional, the Spanish presents a slightly progressive schedule (Figs. 5 and A2). Due to this, tax rates differ across households and we cannot rule out the effect of changes of the latter via the time-wise fixed-effects control. On the contrary, we must include the special tax rates as regressors.

**Fig. 5.-** *Marginal income tax rates, statewide schedule.*

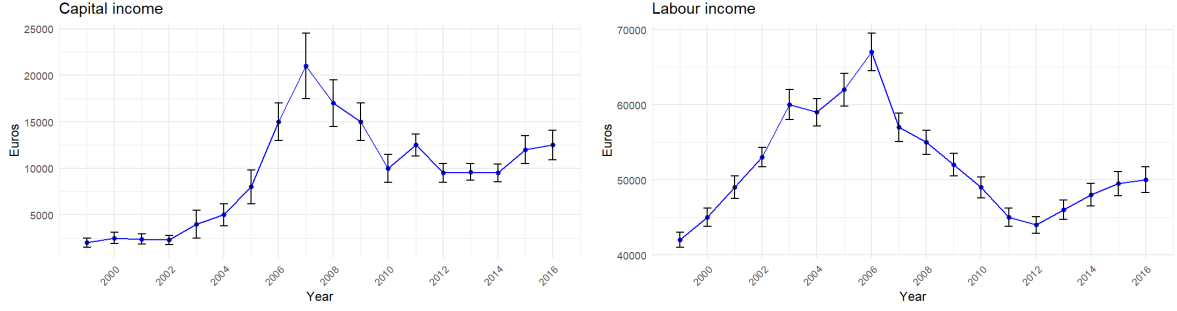


*Source:* Own elaboration from *AEAT (2000 through 2016)* and Official Bulletin.

Please note that we do include a time-wise fixed effect factor on the grounds of the observed annual heterogeneity on income as depicted on Fig. 6. Since we are performing linear regression on longitudinal data, its lack thereof (*e.g.* a pooled model) may induce an overestimation of the t-statistic (*Cameron and Trivedi, 2005*) due to time dependence within each household. An alternative, to capture the same effect via time or household specific dummies or through a stochastic intercept while keeping the parameters of the regressors constant, is disregarded since we predict endogeneity between such random intercept and the regressors over time. The same applies to a pure random effects model.

The structure of the panel also poses a challenge: the number of households is sizeable, but it is greatly unbalanced on the time dimension (cross section is mostly complete). Arguably, despite the large time-span, due to its great unbalancedness, it behaves as a short panel (big N, small T). As a result, it would be advisable to follow a set of fixed-effects one-way error component models (*Baltagi, 2005*), *i.e.*, to split the (unequicorrelated) error term into a component that varies across households, and another that varies across both households and time.

**Fig. 6.** Annual labour and capital income averages



Source: Own elaboration from Panel de Declarantes

We are interested in both the extensive and intensive margins, *i.e.*, on the one hand whether the inter-base shifting occurs at all and on the other hand, conditional of it occurring, its amount. Accordingly, the identified models in the intensive margin, conditional of existing, are:

$$\log y_{ijt} = \left[ \mathbb{1}\alpha_1\tau_{ijp}^h + \alpha_2 \left( \tau_{ijt}^h - \tau_{ijt-1}^h \right) + \alpha_3x_{ijt-s} + \alpha_4y_{ijt-r} + \alpha_5c_{ijt}\gamma + a_{ij} \right] \eta_{ijt} + u_{ijt} \quad (2)$$

with

$$u_{ijt} = \mu_{ij} + \nu_{ijt} \quad (3)$$

$$\mathbb{E}[c_{ij}|x_{ijt}] = f(x_{ijt}) \quad (4)$$

and 0 if it does not exist.  $y_{ijt}$  stands for reported income of household  $i \in \{1, 2, \dots, N\}$  at time  $t \in \{1, 2, \dots, T\}$  arising from capital income source  $j \in \{\text{movable capital, business income, capital gains}\}$ ;  $\mathbb{1}$  is an indicator that takes value 1 when  $j = \text{capital gains}$  and 0 otherwise;  $x_{ijt-s}$  is an array of explanatory variables, lagged  $s$  periods;  $\alpha_n$   $n \in \{1, 2, \dots, 6\}$  are vectors of parameters;  $\tau_{ijp}^h$  and  $\tau_{ijt}^h$  are the permanent and transitory marginal tax rates for household  $i$ , with income source  $j$  at administration level  $h \in \{\text{regional, statewide}\}$ .  $c_{ijt}$  is a set of exogenous controls,  $a_{ij}$  is a time-wise fixed effect factor,  $\eta_{ijt}$  is the sample weight factor provided by the data collecting authority, and  $u_{ijt}$  is the error term.  $\mu_{ij}$  can be interpreted as the unobservable idiosyncratic household effect on the dependent variable, whereas  $\nu_{ijt}$  is the true independent and identically distributed disturbance. We refer as unobservable idiosyncratic household effect to those variables excluded from the model that could potentially explain  $y$  such as income imputations from the tax authority or capital gains non related with transmissions, *e.g.*, gambling surplus.

The description of the explanatory variables, its lags, and the control variables may be consulted in Table 2, depicting the fixed effects ordinary least squares estimation results of the previous models. Following *Burman and Randolph (1994)*, some controls are selected in terms of their ability to predict portfolio composition, which is an important factor to explain capital

gains realizations. Some others, for its life-cycle relevance. For instance, with the municipality variable we aim to control for heterogeneous accessibility to financial products. However, the expectation of the fixed effect conditional to the explanatory variables being dependent on them derives from the short nature of the panel and implies that the absolute effect cannot be consistently estimated. As a result, we can only interpret the parameters in  $\alpha_3$  in terms of time-wise marginal effects. Furthermore, parameters in  $\alpha_4$  lack an economic interpretation since they are related to time-invariant variables such as the municipality, whether the tax returns are jointly or individually filed or whether the taxpayer has deceased.

Concerning capital gains, as observed in *Auerbach and Siegel (2000)*, the response of avoiders to changes on marginal tax rates at a given point in time may be obscured by the ability to inter-temporally allocate income, in other words, to have anticipatory behaviour. For that reason, when studying the effect on capital gains we make use of both a permanent tax rate  $\tau_{ijp}^h$  and a transitory one  $y_{ijt}^h$ , for household  $i$ , extracting income of capital source  $j$ , and at the level of administration  $h$ . A permanent tax rate is a theoretical artifact that comprises the tax rate an individual household has paid over a time span, independently of its allocation within it. A transitory tax rate is the one a household faces at a given point in time.

By including a first-difference term on the transitory tax rate we aim to capture a possible inter-temporal allocation. A category such as the permanent tax rate is unobservable and requires the use of instrumental variables. Especially so when loss carry-overs are available as in the Spanish PIT. For such estimation, we do not rely on the approach of *Auten and Clotfelter (1982)*, which accounts for the offsetting treatment of losses in the US' income tax, besides the fact that in that country, only around half of the generated income is taxable through the "adjusted gross income" tax base. Although both characteristics are present in the Spanish income tax system, we lack information about capital loss offsets. We do exploit the regional variability to proxy for permanent tax rates as in *Burman and Randolph (1994)*, even though it requires the ad-hoc assumption of no internal migration and to treat gains and losses symmetrically. We estimate by means of the following auxiliary regression.

$$\text{Statewide special rate} = \text{lag}(\text{statewide special rate}) + \text{statewide general rate} + \quad (5)$$

$$+ \text{regional general rate} + \text{lag}(\text{net labour income}) + \text{lag}(\text{net capital income}) + \quad (6)$$

$$+ \text{lag}(\text{net business income}) + \text{municipality} + \text{sex} + \text{decease} + \text{filing-type} + \varepsilon \quad (7)$$

Unlike in *Burman and Randolph (1994)* we decide not to pool regional and statewide tax rates to better exploit regional heterogeneity. The extensive margin had previously been

estimated through a tobit regression under the same specification as the intensive margin (Croissant, 2023). The reported results are the following:

**Table 3.** – *Estimation results*

		[1]	[2]	[3]	[4]	[5]	[6]
		i(Capital Gains) (Extensive Margin)	log Capital Gains (Intensive Margin)	i(Equity) (Extensive Margin)	log Equity (Intensive Margin)	i(Business Income) (Extensive Margin)	log Business Income (Intensive Margin)
Intercept	beta_0	-0.08***	9.78***	0.79***	3.61	0.01***	19.89
Permanent Tax Rate	tau_p	0.84***	-0.02	0.21***	-7.23***	0.58***	2.70
State General Base Tax Rate	tau's_l	0.12***	1.43***	0.3***	3.85***	-0.08***	8.79***
lag(State Special Base Tax Rate)	tau's_e	-	187.13	-	-	-	-
Regional General Base Tax Rate	tau'r_l	0.01***	0.09	-0.03***	0.72***	0.00**	0.00
State Special Base Tax Rate	tau's_e	-	129.92***	6.67***	69.96***	0.09	-1.69
-lag(State Special Base Tax Rate)	-l.tau's_e	-	-	-	-	-	-
lag(Net Business Income)	ly_b	0.00	0.00	0.00***	-0.00	0.00	0.00
lag(Net Equity Income)	ly_e	-0.00*	0.00*	0.00*	0.00	-0.00	-0.00
lag(Net Labor Income)	ly_l	-0.00***	0.00**	0.00***	0.00**	-0.00*	0.00
lag(Net Capital Gains)	lg	-	-0.00*	0.00***	-0.00	-0.00	-0.00
i(Net Capital Gains)	ig	-	330.48	-	-	-	-
i(Net Equity Income)	iy_e	-	-	-	0.35	-	-
i(Net Business Income)	iy_b	-	-	-	-	-	0.00
Municipality	m	0.00***	-0.00	-0.00***	-0.00***	-0.00***	-0.00
Sex main taxpayer	x	-0.00***	0.00	0.00***	0.00***	-0.00	-0.00
Decease	d	-0.00***	0.00*	-0.00***	0.00***	-0.00***	-0.00
Filing type	t	0.00***	-0.06**	0.01***	0.20***	-0.03***	0.04
Weights		yes	yes	yes	yes	yes	yes
FE		yes	yes	yes	yes	yes	yes
Obs		3,218,476	98,612	3,218,475	2,889,690	3,218,475	101,880

*Source: own elaboration from Panel de Declarantes de IRPF.*

From these results we highlight that the difference between a temporary tax rate and an imputed measure of *permanent tax* is positive and statistically significant to standard significance levels at the extensive margin for both capital gains, equity and business income, and in the intensive margin in the case of equity. In other words, once timing effects are accounted for, *i.e.*, once we capture the possibility to inter-temporally allocate income in order to avoid taxation, we observe that there is indeed a non-trivial response concerning capital gains realizations (model 1), and equity and business income extraction (models 3 and 5, respectively). Under the current specification this can be interpreted as preliminary evidence of certain elasticity of substitution among tax bases.

## 6 Conclusions and possible extensions

This research reaches the following conclusions.

On the one hand, the substitution of the dual scheme on Spanish PIT by a synthetic schedule enhances the progressivity and redistribution, and notably raises gross revenue. On the other hand, similarly to *Kristjánsson and Lambert (2015)*, the results from base consolidation show the most losers are concentrated at the right top of the income distribution (in the last deciles). This implies that the greatest beneficiaries of dual income taxes are the largest income annuitants and, as a result, the PIT design may introduce sizeable problems of vertical fairness.

In addition, kinks are observed in the pre-tax income distribution, compatible with fiscal planning strategies, which we find not directly attributable to movements between tax brackets nor inter-temporal allocation. This is confirmed via the construction of a synthetic *permanent tax rate* measure that accounts for intra-base income shifting. We do find significant differences between such estimates and observed temporary rates on different sources of income, which may be interpreted as non-trivial inter-base income elasticity of substitution to marginal tax rates. As a result of this arbitrage, observed inter-base income shifting may erode the redistributive effect of tax progressivity stated above.

Conversely, a tax schedule that minimizes differences in tax bases enhances progressivity and redistribution of the figure even further than the static effects depicted above, as a result of the mitigation of tax avoidance strategies. Note that although the effect of income progressivity on growth is contested (*Greber et al. 2018*), its implications on inequality are sizeable. Particularly for high income households -the contribution to inequality of low income household is more affected by public spending (*ibid.*) than by taxation.

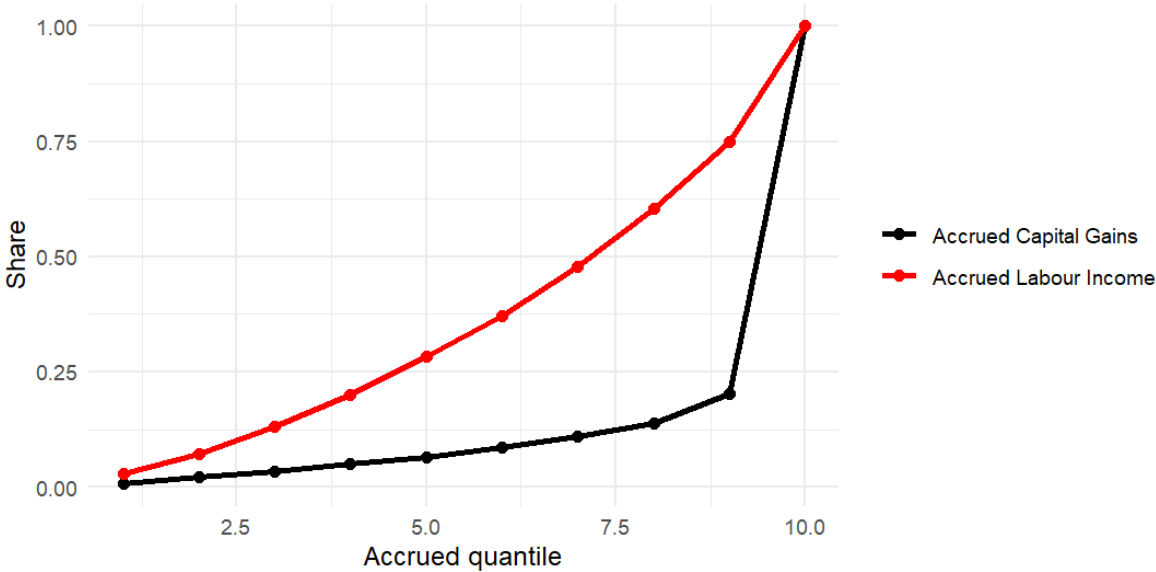
However, as noted in *Di Nola et al. (2023)*, due to the observed larger responsiveness of high income households to marginal tax rates, and the concentration of entrepreneurial activity at the right of the distribution, an increase on progressivity may induce a shift towards pass-through businesses for high income individuals, in order to avoid dividend and corporate taxation, and towards corporate firms for high wealth households, in order to leverage from smaller rates on capital. The degree to which this -negatively- affects the initial redistributive impact of enhanced progressivity is subject to empirical observation.

The empirical literature is mute on this particular effect. *Harju and Matikka (2016)* do estimate the distinct elasticities arising from inter-base tax avoidance and real economic responses to higher tax rates, concluding that accounting for income shifting dampens the negative impact of ETIs on welfare. However, further empirical work is required on the mapping between progressivity and redistribution in the presence of income shifting.

Alternative possible dynamic effects lay beyond the scope of this research. Namely, internal movements of capital returns, notably between income from real estate and capital gains, or other portfolio composition effects. In addition to income shifting, an eventual effect of the suppression of the dual schedule uncovered here is the lock-in of capital returns. Finally, an alternative avenue of research is the proposed reform on the legal form of the taxpayers subject to business activities returns.

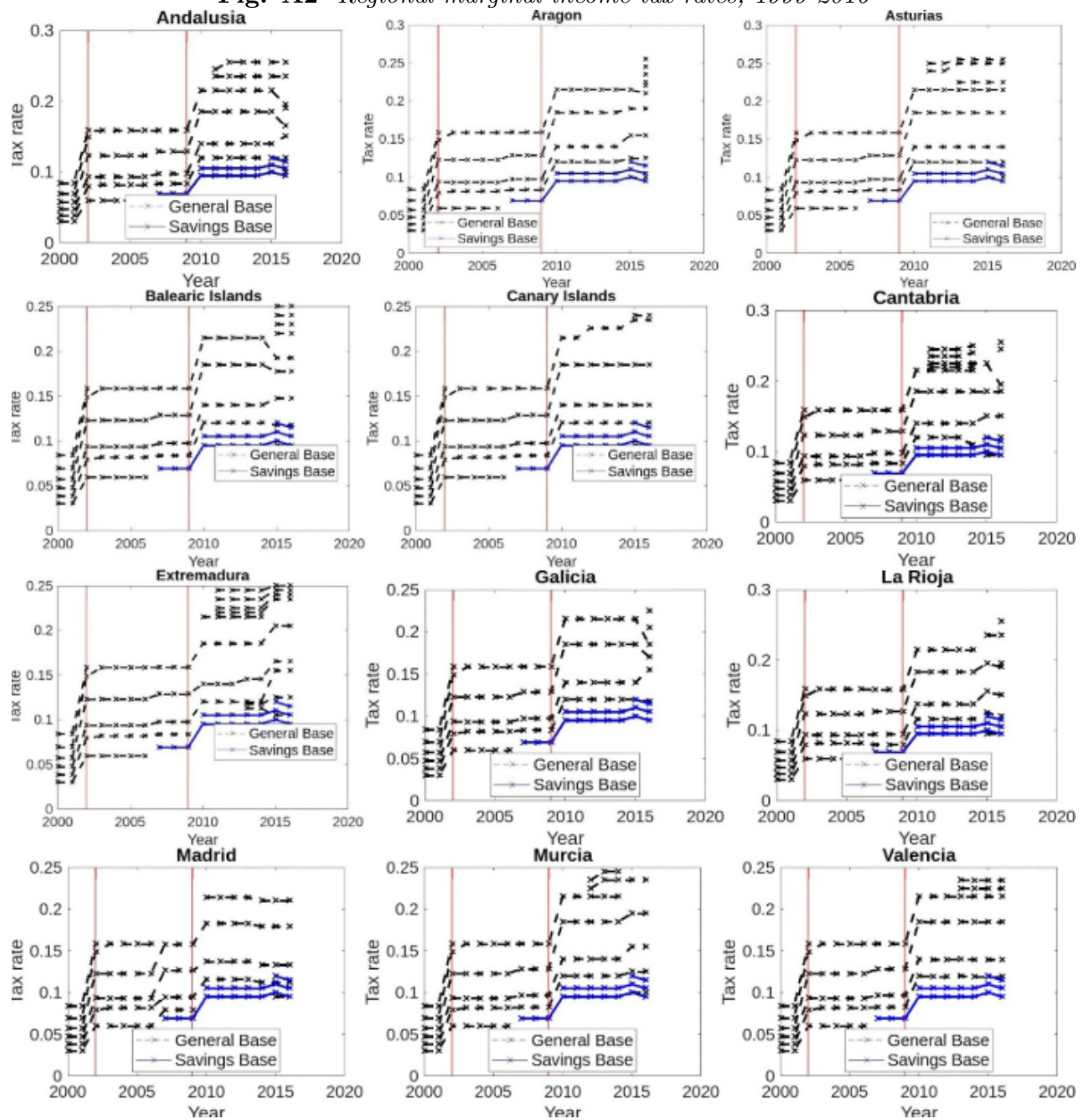
# 7 Appendix

Fig A1.- Lorenz curve of the labour income and capital gains



Source: own elaboration from the Spanish tax agency data.

Fig. A2- Regional marginal income tax rates, 1999-2016



Source: Own elaboration from Manual Práctico de Renta (2000 through 2016) and BOE.

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