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Tax Systems Analysis

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THE LONG-RUN REDISTRIBUTIVE POWER OF THE NET WEALTH TAX [*]

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ABSTRACT: There is growing debate, both social and academic, about the possibility of levying an annual wealth tax. Until a few years ago, such a proposal appeared difficult to both implement and control, but recent technological innovations, which could greatly facilitate the periodic valuation of wealth, combined with improvements in international tax information sharing could make a "modern wealth tax" possible. Nonetheless, a number of challenges regarding its design still need to be addressed. In this paper, taking advantage of the Spanish experience – the only EU country to levy a wealth tax – we simulate the tax's redistributive impact in the long run. This impact could well be substantial if all wealth were to be valued at market prices and compliance were high. Our results show that the family business exemption and the common income and wealth tax ceilings are highly regressive. We develop a tax simulator (SIMPA) that helps assess the effectiveness of alternative reforms with more comprehensive tax bases.

JEL Codes: H24, H23, D31

Keywords: Wealth tax, wealth distribution, tax reform

Policy points

- *The possibility of levying an annual wealth tax is currently the subject of a growing debate, as the concentration of wealth increases and technological improvements could address some of the potential challenges of levying the tax.*
- *Taking advantage of the Spanish experience, the sole EU country to levy a wealth tax, we analyse the tax and assess that, in its current design, does not achieve the potential levels of long-run redistribution that could do.*
- *The existence of both tax avoidance and evasion as well as to the fiscal assessment criteria employed substantially reduce the redistribution effect of the tax.*
- *Exemptions, particularly the "family business", and the common ceiling for income and wealth taxes severely tames the redistributive power of the wealth tax.*

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"… the most pertinent measures of the distribution of material living standards are probably based on jointly considering the income, consumption and wealth position of households or individuals."
Stiglitz-Sen-Fitoussi Commission (2009)

I. Introduction

There is growing debate, both social and academic, concerning the possibility of levying an annual wealth tax (henceforth, WT) (Iara, 2015). This debate has been sparked as much by the large and increasing disparities in the concentration of wealth as by the technological improvements that could address some of the potential challenges of levying such a tax. In this paper, taking advantage of the Spanish experience – today the only EU country with a WT – we quantitatively analyse the redistributive effect of this tax, but also examine elements of its current design that might be undermining its potential redistributive impact[1].

Concerns about inequality and low social mobility have become accentuated in recent years as the distribution of income and wealth has become more unequal, especially in the wake of the Great Recession. Over the last three decades, income inequality has grown in most OECD countries resulting in concern about the impact that growing differences between rich and poor might have on social cohesion. Some voices have even stressed the negative impact that inequality can have not just on society's poorest but also on ensuring stable economic growth (OECD, 2015). It has been argued that this negative effect results, in large part, from the limitations faced by the poorest segments of the population for investing in their education and skills. Likewise, the IMF has underlined the important association between less inequality and greater macroeconomic stability and more sustainable growth (Lagarde, 2012). Although no empirical studies to date allow us to affirm that greater inequality is the cause of lower growth, the importance of inclusive economic growth as an objective of economic policy has been recognised (Fuest, Neumeier and Stöhlker, 2018).

Studies of inequality show that household wealth is much more unequally distributed than household income due to very high levels of wealth concentration at the top of the distribution (OECD, 2015, Ch. 6). As Table 1 shows, wealth concentration is high everywhere in the world, but that there are marked differences between countries. The most obvious case is that of the US, where the top 10% of households accumulate almost 80% of total household wealth. Yet, this high concentration has not always been the case (see, for example, Piketty, 2014, Ch. 10). After 1910, wealth concentration in Europe began to fall at a much faster rate than it did in the US, so that by the sixties, it was higher on the new continent. Moreover, an increasing trend in wealth concentration in the US has apparently been documented since the beginning of the eighties, although the actual outcomes depend crucially on the statistical technique

[1] While Saez and Zucman (2019b) have discussed in detail some of these shortcomings, including references for the Spanish case, here we offer precise quantifications of their impact.

employed to calculate concentration ratios (Kopczuk, 2015). In Spain, our case study here, wealth concentration is not especially high when compared to the ratios presented by most other OECD countries, but the Great Recession has had its impact: thus, between 2005 and 2014, a 7 percentage-point rise was recorded for the top 1% (11 p.p. for the top 10%) (Anghel et al., 2018). All in all, not only is wealth inequality high, but recent trends seem to point to even greater levels of inequality or, at least, to a gap that is not being closed. It is for this reason that "the extent to which the well-off are going to rely on work versus rely on the returns to their wealth in the future is clearly important for assessing the extent to which a society will view itself as in some way a meritocracy" (Kopczuk, 2015, p. 47).

To mitigate the negative impact of such a scenario, various authors have proposed the introduction of a WT. Piketty (2014, Ch. 15) proposed a "global capital tax", since tax base mobility is a key constraint for maximizing the effectiveness of this tax at the national level[2]. Atkinson (2015) identified a "re-examination of the case for an annual wealth tax and the prerequisites for its successful introduction" (p. 201) as an idea to pursue, although a few years earlier the Mirrlees Review had reported being contrary to such an option (Boadway, Chamberlain and Emmerson, 2010). More recently, Saez and Zucman (2019a, 2019b) have examined the case for the US, including the prerequisites cited by Atkinson, and estimated its impact. The aim of this paper is to complement this literature with a simulation analysis of the WT based on the Spanish experience, the sole EU country in which this is possible. This analysis focuses specifically on the long-run redistributive role of the tax. In Section II, we briefly discuss the respective advantages and disadvantages of the WT and review the main legal elements that need to be considered in its design in order to maximise the tax's positive impact. Traditional perspectives have to be reconsidered in the light of new technology advances, which usher in talk of a "modern wealth tax".

We are able to perform our simulation analysis thanks to the construction of a tax simulator (the so-called SIMPA) based on the Survey of Household Finances of the Bank of Spain (see, for example, Bover, Coronado and Velilla, 2014)[3]. This survey, conducted every three years since 2002, contains information about 6,120 households, with top households being overrepresented. We exploit the 2014 survey, which is the latest one available. These survey data allow us to consider all the details of the Spanish WT, enabling us to analyse the impact of the pertinent legal factors on redistribution. The Survey of Household Finances also allows us to compare the actual amount of tax revenue collected (external data) with the estimated amount that could potentially be collected. This should prove useful both for assessing the current role played by the tax and for guiding reforms in Spain and in other countries based on this experience.

According to our simulator, the current WT revenues collected account for just 39.2% of the estimated total that should be collected. In other words, potential revenues are 2.5 times greater than real revenues, which means the weight of the tax with respect to

[2] Note this is not necessarily the case for the US, as the personal tax system is not based on the residence principle, but on nationality.

[3] https://www.bde.es/bde/en/areas/estadis/estadisticas-por/encuestas-hogar/relacionados/Encuesta_Financi/

GDP could be raised from the current 0.18 to 0.46%. One reason for this sizable difference is that in the survey all assets are valued at market prices, but this is not always the case under the prevailing law for assets such as real property or closely-held businesses, two assets that alone account for 75% of overall household wealth in Spain. A further reason for this large shortfall could be tax evasion. Based on information contained in the 2014 universe of WT returns for Catalonia, Durán-Cabré, Esteller-Moré, Mas-Montserrat and Salvadori (2019) estimated a "tax gap" of 44.34% for that Spanish region[4].

From the survey data, we calculate that the top 1% (10%) hold 19.45% (51.63%) of total net wealth. And while the redistributive effect of the WT in the short run is low, when a long-run perspective is adopted the level of redistribution is notable, with concentration ratios falling to 18.14% (50.79%) after 25 years and to 15.19% (48.88%) after 85 years. Note, we show the impact over such long periods of time in order to illustrate how difficult it is to achieve reductions in wealth concentration.

The general threshold of the net WT in Spain is relatively modest, fixed at € 700,000. Such a threshold could create liquidity constraints for taxpayers, that is, when their wealth is high but their income low. To avoid this, there is a ceiling on WT liability, which along with personal income tax (PIT) liability cannot exceed a certain percentage of the taxpayer's annual inflow of income. Legally speaking, the ceiling on WT and PIT liabilities is derived from the Spanish Constitution, which holds that the tax system cannot become confiscatory. Under WT rules, first dwellings, up to a maximum value, and family business assets are also exempt. Leaving aside the impact of these two elements on tax avoidance (Durán-Cabré, Esteller-Moré and Mas-Montserrat, 2019) and evasion (Durán-Cabré, Esteller-Moré, Mas-Montserrat and Salvadori, 2019), the combination of both benefits severely tames the redistributive power of the tax (i.e., these benefits are regressive with respect to wealth). According to our calculations, the importance of the tax ceiling is twice that of the family business exemption, which in turn is considerably more important than the exemption on first dwellings. All in all, the negative impact of these elements needs to be taken seriously into account if the objective is to use this tax as a redistributive tool. We propose and simulate reforms with a comprehensive tax base in order to avoid such loopholes but, in general, we maintain the tax ceiling, given that the principle of non-confiscation is a legal requisite.

The rest of the paper is organised as follows. In Section II, we discuss the arguments forwarded in the literature in favour and against the wealth tax, and we also examine the Spanish experience. In Section III, we summarise the main legal elements of Spain's wealth tax and we present the tax simulator used to analyse the current operation of the Spanish tax. In Section IV, we analyse the redistributive effect of the current wealth tax and of some of its specific elements, and we also assess several alternative reforms. Section V concludes.

[4] It might be tempting to conclude that the difference in the two tax gaps (i.e. 60.8-44.3%) is attributable to the assessment criteria employed, which indeed have been shown to be quite important (Durán-Cabré and Esteller-Moré, 2007). However, although Kopczuk (2015, p. 50) claims that survey data may not be affected by evasion, we cannot be sure, particularly with regard to offshore accounts.

II. The wealth tax: a critical appraisal

1. General review

One of the advantages of a WT is its potential role as a "self-checking mechanism" (Kaldor, 1956); that is, the information contained in a WT return should be useful for controlling capital income compliance in the PIT and even in the inheritance and gift tax or, at least, it should serve as a "self-reinforcing penalty system of taxes" (Shoup, 1956). However, serious doubts have been raised about the effectiveness of this role. In fact, it may mean just the contrary: third-party reporting is key to ensuring WT compliance, as is already the case with current income taxes. For this reason, in the case of a "modern wealth tax", third-party information should cover the widest set of assets and debts as possible (see Saez and Zucman, 2019a, section 4). Otherwise, tax evasion not only reduces potential WT revenues but also its redistributive power, as we show in Section III.3 below.

Wealth gives its owners an additional economic capacity – including greater security, status or power – to that afforded by their income. This means that any tax on this wealth requires the periodic valuation of assets at their corresponding market value; however, this is far from straightforward because assets are being valued solely for tax purposes and not as part of a market transaction (Sandford, 1995). This difficulty affects, in particular, such assets as real property, closely-held businesses and works of art, and has traditionally been considered an important drawback for the levying of a WT. The accuracy of such valuations could only be achieved by incurring high administrative and compliance costs. In determining the choice of valuation methods, the Meade Committee (1978) identifies the two major considerations to be borne in mind: i) the need to keep administrative and compliance costs as low as possible and ii) the need to employ methods that minimize uncertainty. And it concludes that "these considerations should on occasion take precedence over the desire to obtain a genuine open-market valuation"[5]. This is particularly relevant in the case of real estates values, as cadastral values are typically not up-to-date with market prices, which undermines the tax's horizontal equity[6]. Yet, a "modern wealth tax" should be able to take advantage of the latest computer and information technology in devising a better approach to valuation (Gamage, 2019). Indeed, the technology for systematically obtaining reliable real property values exists and could be adopted by the tax administration (Saez and Zucman, 2019b).

[5] In 1974, a Labour Government came to power in the United Kingdom committed to introducing a WT. The idea, however, was criticised by scholars otherwise sympathetic to some kind of redistribution of wealth, including Atkinson and Sandford, because the administrative costs and the difficulty of assessing wealth annually for tax purposes made it impractical (Glennerster, 2012).

[6] In 1995, the German Constitutional Court declared the WT unconstitutional, because the law gave unequal treatment to different types of wealth: some assets were valued according to their market value; others were assessed using values that were well removed from their market price. For example, real property valuations dated from 1964 (Wendt, 1997).

Additionally, tax base mobility (in those cases where the WT is based on the residence principle) and the existence of tax havens might make it difficult to enforce tax compliance. This would require a "global capital tax" (Piketty, 2014) or some form of tax coordination (Piketty, Saez and Zucman, 2013). Indeed, recent advances in information sharing between countries (FATCA, the Directive 2011/16/EU on administrative cooperation in the field of taxation, or the OECD Global Forum) constitute what Iara (2015) refers to as a "new paradigm" insofar as it might facilitate tax compliance in a globalized world. Thus, there are reasons for the proponents of the wealth tax to be optimistic.

While the market-based valuation of assets and the availability of third-party information at both national and international levels are important, there are other issues that need to be considered in relation to the tax base. Exemptions on certain assets can undermine the redistributive power of the WT, as taxpayers (typically the super-wealthy) are likely to exploit them by building their wealth portfolios so as to minimise the tax bill[7]. It is for this reason that Saez and Zucman (2019a, 2019b) propose a comprehensive tax base that includes all asset classes and which avoids behavioural responses that might erode the tax.

Another key design element concerns the potential liquidity constraints resulting from taxing a stock variable. To address this issue, some countries introduced a tax ceiling, whereby the sum of the income and wealth tax liabilities is not allowed to exceed a certain percentage of an individual's income. However, as with exemptions, rich taxpayers are likely to devise ways of reducing their income to take advantage of this limit. A very large WT threshold would avoid this possibility, since *a priori* the very top taxpayers should not be affected by such liquidity constraints. Nevertheless, if taxpayers were to face this problem (e.g. a taxpayer whose wealth consists basically of assets from an early-stage business that is not yet profitable), Gamage (2019) proposes an alternative course of action: namely, offering the option of a limited deferral regime for certain kinds of assets in conjunction with deferral-interest charges[8].

Although the WT can have a real impact (just as the capital income tax does) – among others, on capital stock, entrepreneurial innovation, top talent migration, charitable giving and even family structure (as reviewed by Saez and Zucman, 2019a, section 3) – it is claimed that the WT might play a complementary role to a PIT. That is, the two taxes are not fully interchangeable[9]. This is because a capital income tax is not able to tax full income, basically due to the existence of unrealized capital gains[10]. This means the wealth portfolios of the super-rich are usually managed through a holding company (or

[7] In the French annual WT, eliminated in 2018, the tax base did not include certain financial assets and some business assets. In fact, the base represented just half of the wealth held by WT taxpayers (Boadway and Pestieau, 2018).

[8] In line with Glogower's (2016) proposal for taxing capital as an alternative to the realization rule.

[9] When rates of returns on capital across individuals differ, wealth taxation and capital income taxation are not equivalent and have different implications for both efficiency and equity. Guvenen et al. (2019) show that a WT leads to a more efficient allocation of capital than a capital income tax, as entrepreneurs that are more productive pay similar taxes regardless of their productivity, which shifts the tax burden toward unproductive entrepreneurs.

[10] See Appendix 1.

other legal entity) in such a way that they receive a sufficient annual income flow to cover their private consumption (Piketty, Saez and Zucman, 2013). And although they will eventually have to pay these taxes, deferral constitutes an advantage for them. Hence, a wealth tax should contribute to the principle of fair taxation. On top of that, the simple possession of wealth (independently of financial profitability) might confer utility on taxpayers, which would justify the taxation of these assets in the WT, or alternatively the imputation of an annual rent in the PIT. On the whole, for the very rich, capital is a better indicator than income of their 'contributive capacity' (Piketty, 2014). The recommendation made by the Stiglitz-Sen-Fitoussi Commission (2009) quoted at the beginning of this paper also goes in the direction of including wealth as a measure of living standards.

2. *Spanish review*

With the restoration of democracy in 1977, and the establishment of a modern tax system, Spain introduced an annual WT. At that time, it was intended as a transitory tax, but it continues in force today. The main reason for its adoption lays in its role as a "self-checking mechanism" (as described in the previous section), but it was also introduced due to its redistributive power and as a complement to the PIT.

Spain's WT was actually abolished by the socialist government in 2008, on the grounds that it had failed to achieve its redistributive goals; but, by the end of 2011, due to the crisis of the public finances, it was reintroduced. The surprising argument offered in justification by the left-wing central executive – surprising insofar as the 2011 tax had not been redesigned, and so the tax's drawbacks remained – was that those with more resources should be made to contribute more to the economic recovery, and by so doing this would reinforce equity and allow a better redistribution of income and wealth.

In Section III.1, we describe in some detail the main legal elements making up the Spanish tax. Suffice it here to say that it is a decentralised tax, which means that Spain's regions or Autonomous Communities (ACs) can modify such legal parameters as the minimum threshold and the tax schedule and enact tax credits; however, the definition of the tax base (including exemptions) and the definition of the tax ceiling are both fixed by national law.

As well as the obvious fraud risk associated with low rates of tax control (Durán-Cabré and Esteller-Moré, 2010), many experts highlight the inefficiencies and inequities resulting from the design of this tax (i.e. assessment rules that differ from market prices, tax exemptions, etc.). Apart from giving rise to horizontal inequities between taxpayers with similar levels of net wealth but with different asset portfolios, the specific characteristics of the WT significantly distort its incidence and redistributive role given that it is primarily the richest taxpayers who benefit from them (see, for example, Arcarons and Calonge, 2007; Alvaredo and Saez, 2009).

Recently, Durán-Cabré, Esteller-Moré, Mas-Montserrat and Salvadori (2019) have estimated a 44.34% "tax gap" for Catalonia, with underreporting constituting the main

source of the gap (97.3% of the total gap). Specifically, underreported offshore financial assets (58% of the total gap due to underreporting) and the inappropriate application of the family business exemption (37%) are the main underreporting mechanisms. Furthermore, the tax gap is mostly concentrated among the richest taxpayers: richest decile's gap accounts for almost 75% of the total gap.

Given the persuasive nature of these arguments, both Esteller-Moré (2013) and the White Report, the "Lagares Report" (2014, pp. 224-240) have advocated the definitive abolition of the tax. However, in this paper, taking the existence of such a tax as given, we evaluate its redistributive performance under its current legal design and propose and evaluate alternative reforms. An analysis of this kind should be useful for reforming the tax; otherwise, its abolition would appear to be the best solution. However, it is our contention that from a political economy perspective, the role the tax might play can be considered in terms of the visualisation of the efforts made by the public sector at reducing large wealth concentration disparities.

III. An analysis of the redistributive power of the Spanish net wealth tax using a tax simulator (SIMPA): a long-run perspective

1. How the tax is currently designed

Taxable wealth is net wealth, that is, the monetary value of all non-exempt assets minus debts. In Spain, net wealth is assessed every December 31st, but in order to mitigate any tax avoidance incentives (e.g., in the case of bank accounts, withdrawing money on December 30th) or to tame high valuation volatility (basically, that of publicly listed shares), the value of some assets is calculated as the average over the last quarter. The law provides specific valuation criteria for most assets, the values of which however can be quite distinct from their market price. This applies particularly to real estate, where for tax purposes the highest value between the acquisition price and the cadastral value is taken. In the case of the shares of entities that are not publicly traded, their value is usually calculated in accordance with the company's balance sheet, that is, applying accounting criteria. The unit of taxation is the individual (not firms or households), so family wealth has to be allocated among members of the family.

Apart from the standard exemptions, such as public and private pension plans and human capital, other assets are exempt: those belonging to Spain's historical heritage as well as works of art and antiques (as long as their value does not exceed a certain figure). However, the two main exemptions are that of the first dwelling – up to a maximum of € 300,000 per taxpayer – and that of equity affected by economic activities and participations in certain entities, that is, the exemption of family-owned or closely-held businesses. In this latter case, to be eligible for the exemption certain criteria must be met: namely, that there is an economic activity, conducted by the owner of the assets or by a close relative; that, as a consequence of this activity, the individual obtains income that constitutes his main source of revenue; and, in the case of incorporated activities, that the owner, individually or with a close group of family members, holds a minimum participation in the capital of the entity.

The Spanish WT is only levied on taxable wealth exceeding a minimum threshold – currently fixed at €700,000 – although this can vary across the ACs. WT returns have to be submitted in two circumstances: (i) when taxpayers have a positive tax liability, or (ii) when, although their tax liability is zero because their net taxable wealth is below the threshold, their gross wealth (including both taxable and non-taxable assets) is above 2 million euros. Tax liability is obtained by applying progressive tax rates to the net tax base, i.e. taxable wealth minus the minimum threshold. The WT rates set nationally range from 0.2 to 2.5%; though, again, they may differ across the ACs. Moreover, there is a limit on WT liability: the sum of PIT and WT liabilities cannot exceed 60% of the PIT base. If it does, the WT due is reduced, although this reduction cannot exceed 80% of the original tax liability; in other words, at least 20% of the original WT due must be paid[11]. Likewise, when applying the ceiling a number of specific criteria apply: for instance, long-term capital gains (i.e. greater than one year) are not taken into account, although they form part of the legal definition of taxable income.

The ACs can also apply tax credits, which are deducted from gross tax liability, as the AC of Madrid has done since 2011, where there is a 100% tax credit. In other words, its residents do not pay the tax. The ACs of the Basque Country and Navarre, which for historical reasons operate a different regional financing system, have full tax autonomy, although in broad terms the tax is similar in its application to the rest of Spain.

Overall, the current Spanish tax system is vulnerable to both tax avoidance, given the existence of various loopholes, and tax evasion, given the existence of these same loopholes but also a lax enforcement policy. While these two issues have been widely identified and discussed in the literature, no single quantitative analysis has examined their impact on redistribution and on the revenues collected. This is something we seek to do in the next section.

2. SIMPA: the tax simulator

In order to analyse both the real and potential role of Spain's wealth tax, we have developed a tax simulator: SIMPA (for details of its construction, see Durán-Cabré and Esteller-Moré, 2019). The basic data are taken from the Bank of Spain's Survey of Household Finances[12], providing information about household wealth and income. Recall income data are critical for applying – where necessary – the WT tax ceiling. Here, we outline the six basic steps we take in the simulator:

[11] The design of this ceiling cannot be modified by ACs.

[12] Alternatives are available, including the capitalisation of capital income from the PIT returns or the inheritance multiplier. However, they both have their drawbacks. In the case of the former, too many assumptions are made (e.g., profitability is assumed to be the same across the income distribution, while unrealized capital gains cannot be capitalised), while the latter is simply not available for all the ACs as the inheritance and gift tax is decentralised. In any case, according to the comparative analysis carried out by Martínez-Toledano (2017), the Survey of Household Finances is extremely useful for analysing inequality dynamics at the top (p. 28). See also Durán-Cabré and Esteller-Moré (2019) for further arguments in support of this choice.

1) We calculate net wealth and net income by household (i.e. the survey's unit of response).
2) We transform these magnitudes to the taxpayer level using the fiscal concept of "splitting", where the household comprises a married couple.
3) We apply, where the legal conditions hold, the exemptions in the WT return (first dwelling and family business) and, additionally, the deductions applicable to each tax base (contributions to private pension plans in the PIT; and the general threshold for the WT – amounting currently to 700,000 euros) to obtain the net taxable base.
4) We apply, in the case of the PIT, the general and savings tax schedules to the taxable bases and the personal and family minimum deductions to obtain the gross tax liability (before tax credits), which we need to determine for the PIT-WT ceiling; and we apply the progressive tax schedule to the taxable wealth.
5) We verify if the WT tax liability needs to be reduced by the application of the tax ceiling.
6) Finally, once we have the WT due at the taxpayer level, we transform it to the household level to calculate all the inequality indices.

3. The redistributive power of the tax: a long-run perspective

In the case of the WT, the tax due is a flow of income, while the tax base is a stock magnitude. This means effective tax rates calculated as a percentage of net wealth are low if we compare them, for example, with those of PIT. However, this is not a fair comparison because of the different nature of wealth versus that of income. In addition, as the accumulation of wealth is a process that occurs in the long term, we propose evaluating the redistributive capacity of the tax in the long term as well. Indeed, this is how we present the results of our simulations in relation to redistribution.

Specifically, for a given WT, we calculate the effective average tax rate to be paid in the first year. This we denominate as the "short-run" tax rate, ATR_s/r. From this, we calculate an effective long-run ATR as follows:

Net Wealth in year *t* without a WT (NW_w/o) = $NW_0 \times (1+g)^t$

Net Wealth in year *t* with a WT (NW_w) = $NW_0 \times (1+g)^t \times (1-ATR\_s/r)^t$

NW_0 is the net wealth in the base year, which in the absence of a WT, would increase annually according to the factor, *g*, over *t*-years until NW_w/o has been accumulated. The value of *g* depends on the capacity to generate annual savings, but it is also dependent on the evolution of asset values (e.g. stock indices or housing market)[13]. We assume *g* is constant across the wealth distribution and over time. In the presence of a WT, given a constant ATR over time, which coincides with the effective tax rate of the base year, net wealth in the long run will diminish. Given these two scenarios (with and without WT), we can calculate the implicit long-run effective average WT rate as follows:

[13] For the US, according to available empirical evidence, the increase in wealth accumulation at the top has been driven by a rise in asset prices rather than by capital accumulation (Saez and Zucman, 2019b).

$ATR\_l/r = 1 - (NW\_w/NW\_w/o) = 1 - (1-ATR\_s/r)^t$

Hence, in our simulations, we present the effective average tax rate in both the short and long runs. To measure the capacity to collect tax revenues, we use the short run; however, for redistribution purposes, we believe it much more appropriate to calculate the long-run effective tax rate. In fact, within such a dynamic context, in order to determine whether the tax is progressive or not, it is not sufficient to compare the average tax rates across the wealth distributions if the *g* factor is likely to evolve differently across groups of taxpayers[14]. Specifically, if we allow a different *g*, the progressivity condition becomes:

$$ATR\_s/r(1\%) \times (1+\gamma \times g_{1\%}) - ATR\_s/r(99\%)\ (1+ g_{99\%}) > (\gamma - 1) \times g_{99\%}$$

where, by way of example, we compare the ATR of the top 1% versus the rest of taxpayers (99%), but also the *g* for the top 1% versus the rest. The parameter γ indicates just how much larger the annual increase in the stock of wealth of the top 1% is versus that of the rest. Thus, if γ=1, there is no difference, and progressivity is guaranteed over time as long as ATR_s/r(1%)< ATR_s/r(99%). Therefore, if we are concerned with redistribution in the long run, the differences in average tax rates should take into account the potential divergence in wealth accumulation, so that ATR_s/r(1%)< ATR_s/r(99%) is no guarantee of long-run redistribution. In our simulations, we consider the case where γ=1.

IV. Analysis of the redistributive power of the wealth tax under current and alternative designs

1. The current tax

When applying the current WT rules (exemptions, threshold, tax rates and common ceiling) to the taxpayers' wealth value at market prices (Survey of Household Finances), our results, calculated with SIMPA, show that the potential tax revenue for the base year is 3,691,968.5 thousand €, that is, 39.21% of the real revenue (panel A Table 2)[15]. In other words, the potential revenue is 2.5 greater than the real revenue. Yet, despite these much higher revenues, the short-run effective tax rates are very low both before and after applying the tax ceiling, 0.058 and 0.0352%, respectively. However, there is a notable shift in effective tax rates if we adopt a long-run perspective (panels B and C

[14] The different composition of wealth portfolios across wealth groups (Durán-Cabré and Esteller-Moré, 2019) is a key element that might guide the future evolution of *g* (due to different asset prices variations) across wealth groups. The WT specifically seeks to reduce increases in the concentration of the net wealth of the top taxpayers (Saez and Zucman, 2019a, section 3.1).

[15] As Madrid has a 100% tax credit, in order to make a homogenous comparison, we add the money it would have collected had the AC applied the WT to the real revenue raised by the other ACs. We take the real revenue raised by Madrid in 2007, the last year the WT was applied before its transitional abolition between 2008–2010, and assume it would have evolved in line with the revenue collected in Catalonia up to 2014. The two are Spain's richest regions.

Table 2). The effective tax rates rise to 0.832% (5.70% for those with a positive tax due) after 25 years and to 2.49% (17.04%) after a very long period of time, in this case 85 years. Consequently, the redistributive effect, which although negligible in the short run, is in fact quite significant: the wealth concentration of the top 1% (10%) falls by 1.31 pp (0.84 pp) after 25 years.

Regardless of this temporal perspective, only 0.97% of the adult population – i.e. 2.01% of households – have to pay the tax. As Table 3 indicates, only households located at the very top of the wealth distribution are liable: that is, from the 94 percentile upwards. In fact, 92% of the total tax due should be paid by the top 1% of taxpayers. The huge disparity should also be noted within this 100% percentile, as the net wealth goes from € 2M to € 524M. Likewise, note that not everyone located in the top 1% of the wealth distribution becomes a taxpayer: 11.69% of households would not have to pay the tax. This highly surprising result is attributable to the exemptions, which across the common ceiling PIT-WT, undoubtedly reduce the redistributive power of the WT, as the figures described below show.

In GRAPH 1[16], we show the evolution of the short-run average tax rate over net wealth, before (blue) and after (diamond) the application of the ceiling, while in GRAPH 2, we show the difference between these two average tax rates. In general, it is evident that the impact of the limit is regressive, as the difference in tax rates is increasing with net wealth. A good example of regressivity – clearly visible in GRAPH 1 – is provided by a taxpayer whose net wealth is € 152M: here, the final tax rate falls from 2.43 to 0.49% when the ceiling is considered. This is as expected, given, as stressed in Section II.1, the flow of income of the very rich does not match their level of wealth. In other words, the two magnitudes do not move monotonically. Paradoxically, this means that the tax itself tames its redistributive power. This suggests the need to define the ceiling in a different fashion, either by implicitly raising the general threshold or by changing the formula used to calculate the ceiling[17]. Failure to do so represents a lack of coherence with the tax's original purpose[18].

GRAPH 1 also highlights a further peculiarity: the average tax rates of the richest taxpayers (with € 262M of net wealth) are extremely low, both before (0.24%) and after (0.1%) the application of the ceiling. Therefore, the low short-run final rate is attributable primarily to the application of specific exemptions (first dwelling and family business) and not to the ceiling. This is what

[16] In the graphs, each dot is a survey response. In SIMPA, each response is elevated to the factor provided by the survey for transforming individual data into the national aggregate.

[17] This negative assessment of the ceiling does not take into account the fact that it creates margins of avoidance response (by redesigning the wealth portfolio not to take into consideration general annual flows of income, but rather capital gains) as shown by Durán-Cabré, Esteller-Moré and Mas-Montserrat (2019).

[18] In the Spanish case recall that the Constitution, Art. 31.1, holds that the tax system should be progressive but without becoming confiscatory. Although the Constitutional Court in Spain has not ruled on the practical consequences of this non-confiscatory principle, the suggestion is that some kind of joint limit between PIT and WT needs to be considered.

GRAPH *3* illustrates: average tax rates over wealth without (blue) and with (green) the specific exemptions, while GRAPH 4 shows the percentage point reductions for each exemption: first dwelling (blue) and family business (green). As expected, the importance of the first dwelling exemption (for which there is an absolute ceiling) is lower than that of the family business exemption (for which there is no absolute limit).

Thus, the results obtained with SIMPA suggest that both the exemptions and the common ceiling are regressive and so reduce the potential redistributive effect of the WT. This conclusion is confirmed in two additional graphs that show the reduction in ATR per net wealth bracket; specifically, GRAPH 5 distinguishes the effect of the first dwelling and family business exemptions, while GRAPH 6 distinguishes the effect of both exemptions and the tax ceiling. In all graphs, the scale of the vertical axis is the same across brackets, clearly illustrating where absolute reductions in the average tax rates concentrate most. If, for example, we compare the vertical axis of GRAPH 4 with that of GRAPH 2, it is evident that the percentage reductions for the specific exemptions are half those attributable to the ceiling.

In short, the exemptions and common ceiling reduce the tax's progressivity, this reduction being most marked in the case of the ceiling, while of the two exemptions, the family business exemption is considerably more important than that of the first dwelling.

2. Some alternative designs

In line with the conclusion that key elements of the current Spanish WT are regressive and undermine its redistributive effect[19], it is logical that we consider alternative designs that ensure the regulation is more coherent with its redistributive goal. Our tax simulator, SIMPA, enables us to test the outcomes for a variety of reforms, some of which are shown in Appendix 2. In this section, we concentrate on three potential designs under the revenue equivalence assumption: i.e. that the total amount of revenue collected is equal to the potential amount of revenue collected under the current tax. The exact nature of the three reforms is shown in Table 4. In Simulations 1 and 2, we do not consider any specific exemptions, while in Simulation 3 we consider solely the first dwelling exemption in line with its current legal configuration. Thus, based on redistributive grounds but also on the avoidance opportunities that it confers, we disregard the family business exemption in all three simulations. In Simulation 1 we do not contemplate any common PIT-WT ceiling; this, however, is included in the other two. The marginal tax rate remains constant in all cases at 1%, while the universal threshold is allowed to vary. As such, we propose a flat tax with a much higher general threshold, which introduces progressivity and, at least to a certain degree, avoids liquidity constraints, and a comprehensive tax base, which enhances the redistributive goal and reduces loopholes and behavioural responses.

[19] Furthermore, although not specifically examined here, there is fairly strong evidence that these elements enhance the avoidance responses that effectively erode the tax (Alvaredo and Saez, 2009; Durán-Cabré, Esteller-Moré and Mas-Montserrat, 2019).

As can be seen in Table 5, there are no great differences across the three simulations. Effective tax rates in the short run are quite low: in those with a positive tax due, it stands between just 0.031 and 0.042%. The tax would be paid by between just 0.234 and 0.7% of adult individuals, that is, between 0.47 and 1.47% of households. GRAPH 7 shows the evolution of the concentration ratio for the top 1%. Again, although there are no great differences across simulations, Simulation 1 achieves slightly greater levels of redistribution, which highlights once more the need to rethink the design of the limit. For example, after 25 years, the wealth concentration of the top 1% would be 18, 18.2 and 18.2% for Simulations 1, 2 and 3, respectively, where 19.45% is the starting point. Hence, in all cases, the reduction would be 1.25-1.45 p.p., which is slightly above the redistributive capacity of the current potential WT, as shown above in Table 2.

V. Conclusions

Society is subject to constant change and nowhere is this more apparent than in the field of taxation. Technological innovations (e.g., as with respect to the valuation of assets) and advances in information sharing – specially at the international level – could well open the door to a "modern wealth tax", which would be good news if wealth inequality continues to record such high levels and to pose a potential threat to social cohesion. However, as WT design has still to overcome a number of challenges, in this paper, taking advantage of the Spanish experience, we have undertaken a quantitative analysis of various key legal elements of this tax (specifically, exemptions and the tax ceiling) and we have analysed its redistributive power in the long run. To do so, we have designed a tax simulator (the SIMPA).

In its current design, our simulator suggests that the Spanish tax should achieve reasonable levels of long-run redistribution. Those outcomes, however, are merely potential, given that reality falls well short of this situation. For example, according to our simulator, under current legislation, the weight of the WT over GDP should be 0.46%, that is, 2.6 times its current weight. This discrepancy, we argue herein, is due to the existence of both tax avoidance and evasion as well as to the fiscal assessment criteria employed, which do not necessarily coincide with market values. If these sources of discrepancy were to be rectified, in 25 years' time, for example, the current tax could reduce the wealth concentration of the top 1% by 1.31 p.p.

To address the sources of this discrepancy, the tax administration needs to take advantage of developing technologies to improve its valuation methods, while at the same time investing greater efforts in the fight against tax avoidance. In this latter instance, what is needed, as various authors have already stressed, is the elimination of existing loopholes. In this paper, we have specifically illustrated the regressive effects of the "family business" exemption, but also those of the common PIT-WT ceiling. While some kind of ceiling has to be left in place – to avoid the confiscatory tax system prohibited under the Spanish Constitution – its design needs to be rethought to avoid regressivity and its use as an avoidance tool (Durán-Cabré, Esteller-Moré and Mas-Montserrat, 2019).

In short, the time is ripe to give serious consideration to the role a wealth tax might play in the tax system. While the current setting seems to welcome a "new paradigm", recent experiences, such as that documented here for Spain, point to the fact that any flaws in its design can seriously undermine its redistributive role. If these flaws are not addressed, the tax will fail to achieve its basic goal: namely that of complementing the PIT by taxing the contributive capacity of the very wealthy.

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TABLE 1. Concentration of Net Wealth (%). Selected OECD countries.

		Australia	Denmark	France	Germany	Italy	Spain	USA	UK
Top 1%		15.00	23.62	18.65	23.66	11.69	16.32	42.48	20.05
Top 10%		46.47	63.98	50.59	59.76	42.78	45.58	79.47	52.50

Source: OECD Wealth Distribution Database; 2014 for all countries, except for Denmark (2015), Spain (2012) and the US (2016).

TABLE 2. SIMPA: Inequality before and after the current tax

	BEFORE WT	**AFTER POTENTIAL WT**
A: SHORT RUN IMPACT		
Tax Revenue (thousand €)	n.a.	3,691,968.5
% (Real Tax Revenue / Potential)	n.a.	39.21
Short run ATR (before/after tax ceiling)(%)	n.a.	0.058/0.0352
% individuals/households with tax due>0	n.a.	0.9659/2.015
B: LONG RUN IMPACT (25 YEARS)		
Gini index	0.6609	0.6569
Top 1%	19.45%	18.14%
Top 10%	51.63%	50.79%
Long run ATR (all/if tax due>0)(%)	n.a.	0.832/ 5.701
C: VERY LONG IMPACT (85 YEARS)		
Gini index	0.6609	0.6394
Top 1%	19.45%	15.19%
Top 10%	51.63%	48.88%
Long run ATR (all/if tax due>0)(%)	n.a.	2.49/17.04

n.a.: not applicable

TABLE 3. SIMPA: Potential distribution of household taxpayers

Percentile	Average Net Wealth (€)	Minimum Net Wealth (€)	Maximum Net Wealth (€)	% Taxpayers within the Percentile	% of Total Tax Due
94	712,937	674,492	755,044	0.04	0.00009
95	803,292	755,063	855,800	8.81	0.00533
96	917,907	857,000	986,023	1.11	0.00692
97	1,094,068	986,525	1,195,506	28.27	0.41
98	1,323,794	1,195,860	1.488.011	17.05	0.74
99	1,644,263	1,488,055	2,108,324	62.57	6.831
100	5,053,378	2,110,405	524,000,000	88.31	91.99

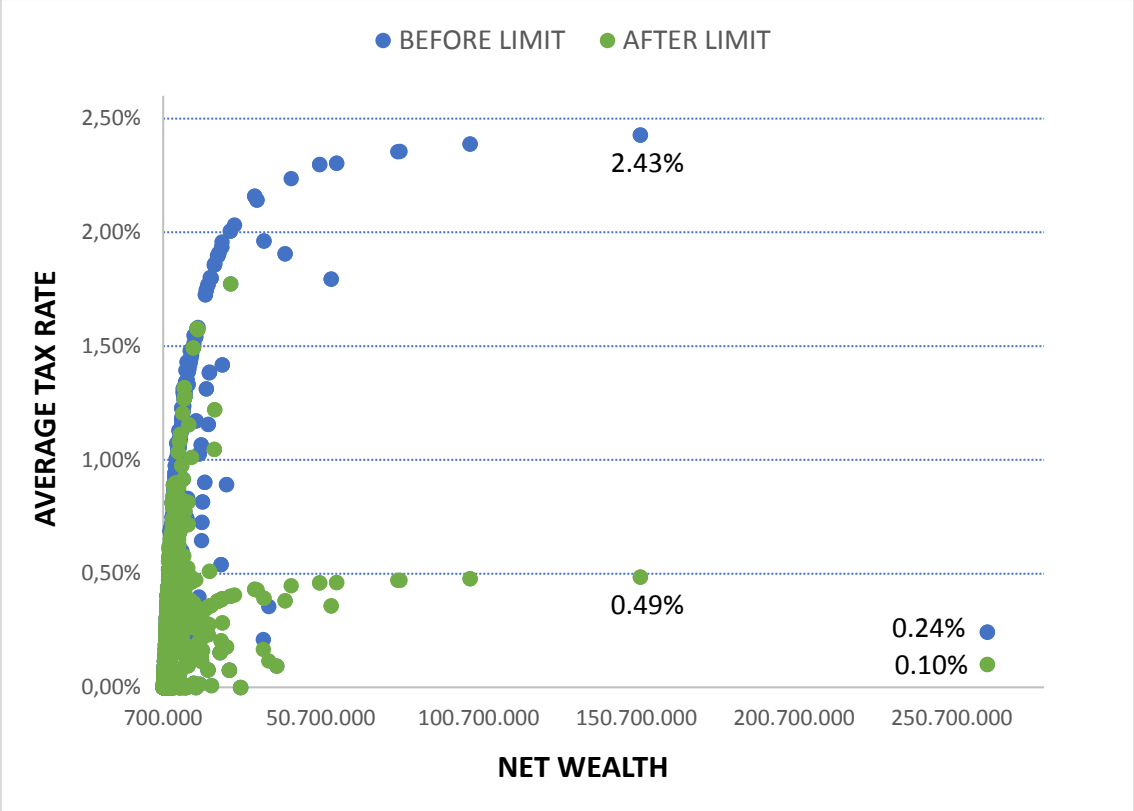
TABLE 4. SIMPA: Alternative simulations under equal-revenue collected constraint

	SIMULATION 1	SIMULATION 2	SIMULATION 3
Exemptions	None	None	First dwelling
Tax ceiling	NO	YES	YES
Threshold (€)	2,280,641	1,198,808.7	1,096,170
Tax rate (%)	1	1	1

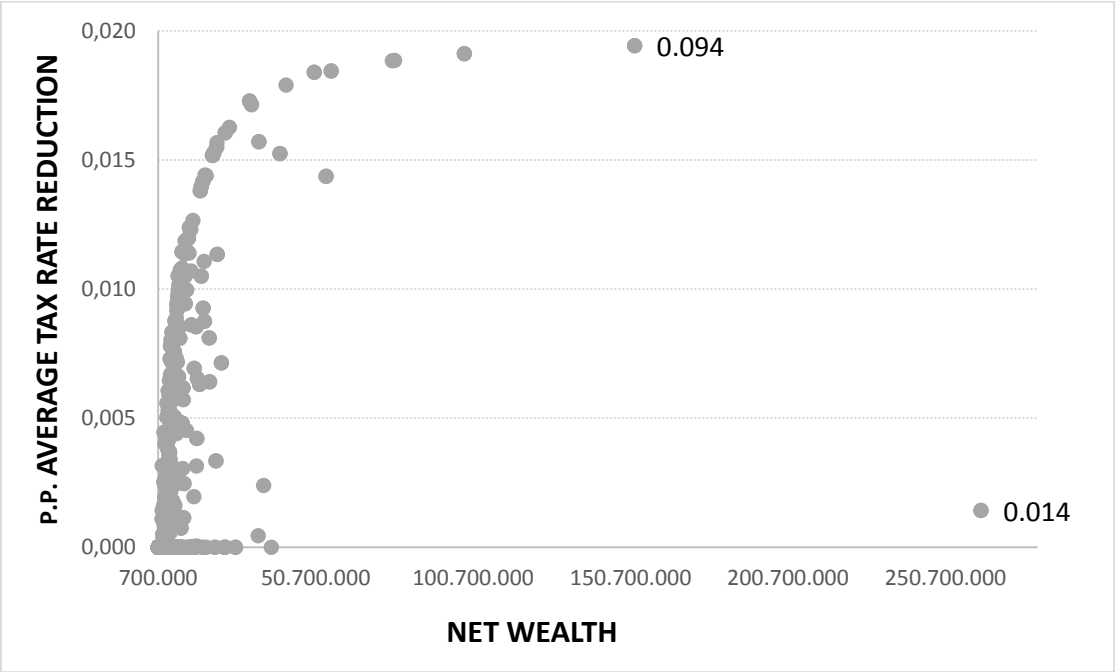
TABLE 5. SIMPA: Redistributive power of alternative simulations in the very long run (85 years)

	POTENTIAL CURRENT WT	SIMULATION 1	SIMULATION 2	SIMULATION 3
Gini Index	0.6394	0.6392	0.6380	0.6380
Top 1%	15.19%	15.02%	15.52%	15.57%
Top 10%	48.88%	48.89%	48.66%	48.66%
% revenue collected over potential revenue under current tax	n.a.	100.00	100.00	100.00
Short run ATR (before/after tax ceiling)(%)	0.058/0.035	0.031/0.031	0.06/0.042	0.06/0.042
Very long run ATR (total/ tax due>0)(%)	2.49/17.04	2.03/31.73	3.00/24.69	2.96/23.78
% individuals/households with tax due>0	0.967/2.02	0.234/0.47	0.70/1.47	0.775/1.59

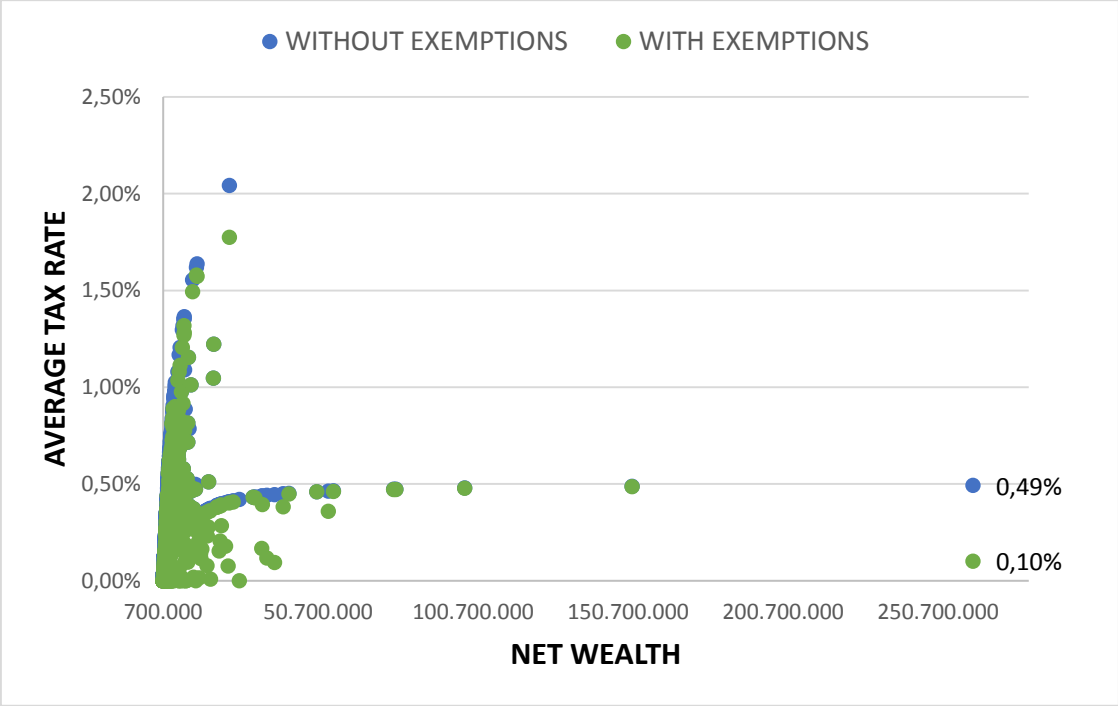
GRAPH 1. SIMPA: WT effective tax rate before and after the tax limit



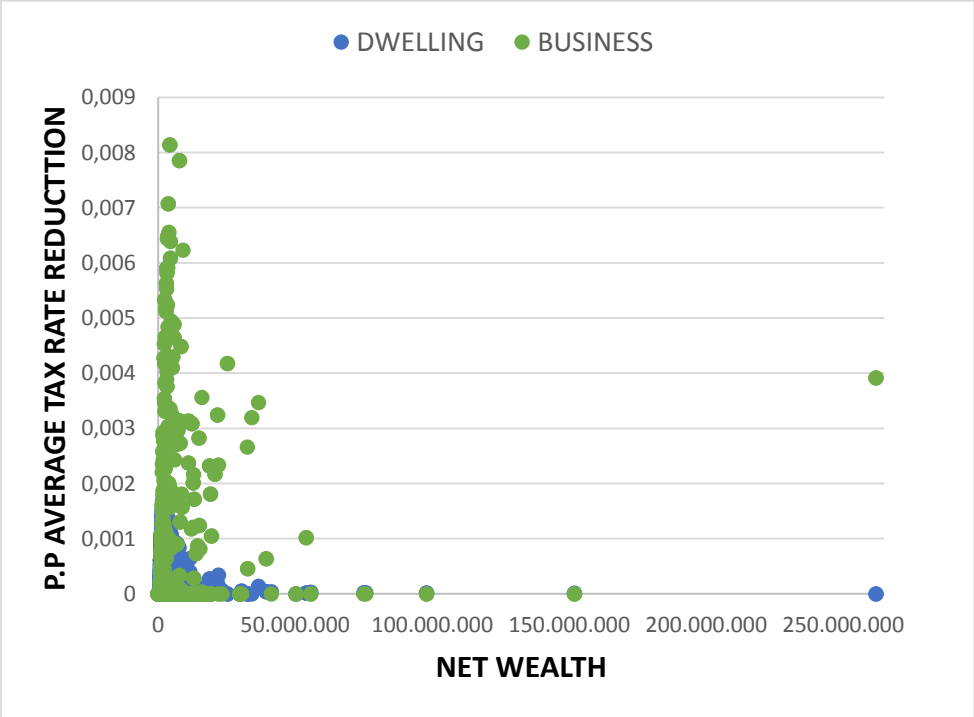
GRAPH 2. SIMPA: Reduction in the ATR attributable to the tax limit



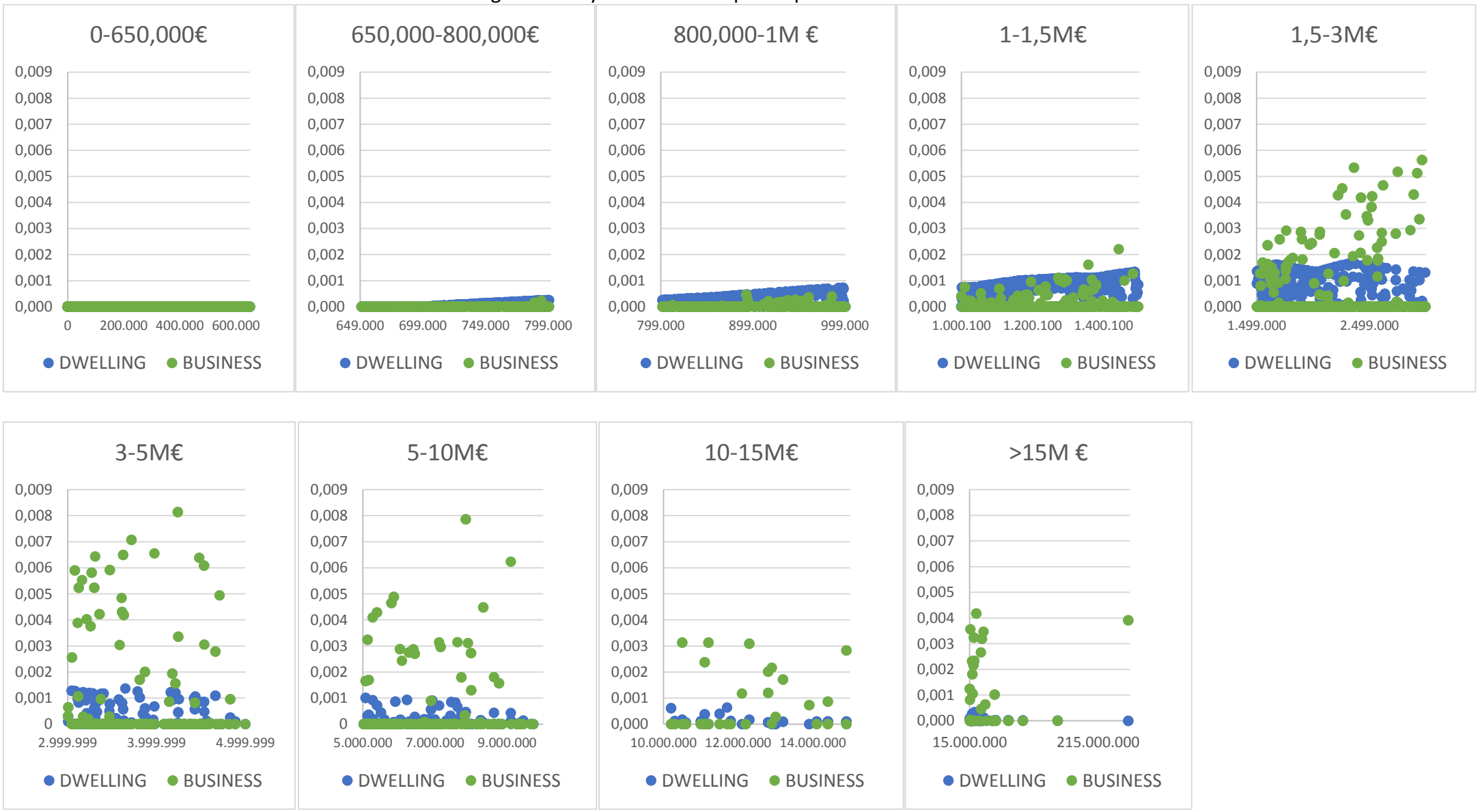
GRAPH 3. SIMPA: WT effective tax rate before and after the first dwelling and family business exemptions (in all cases, after the limit)



GRAPH 4. SIMPA: Reduction in the ATR for first dwelling and family business exemptions

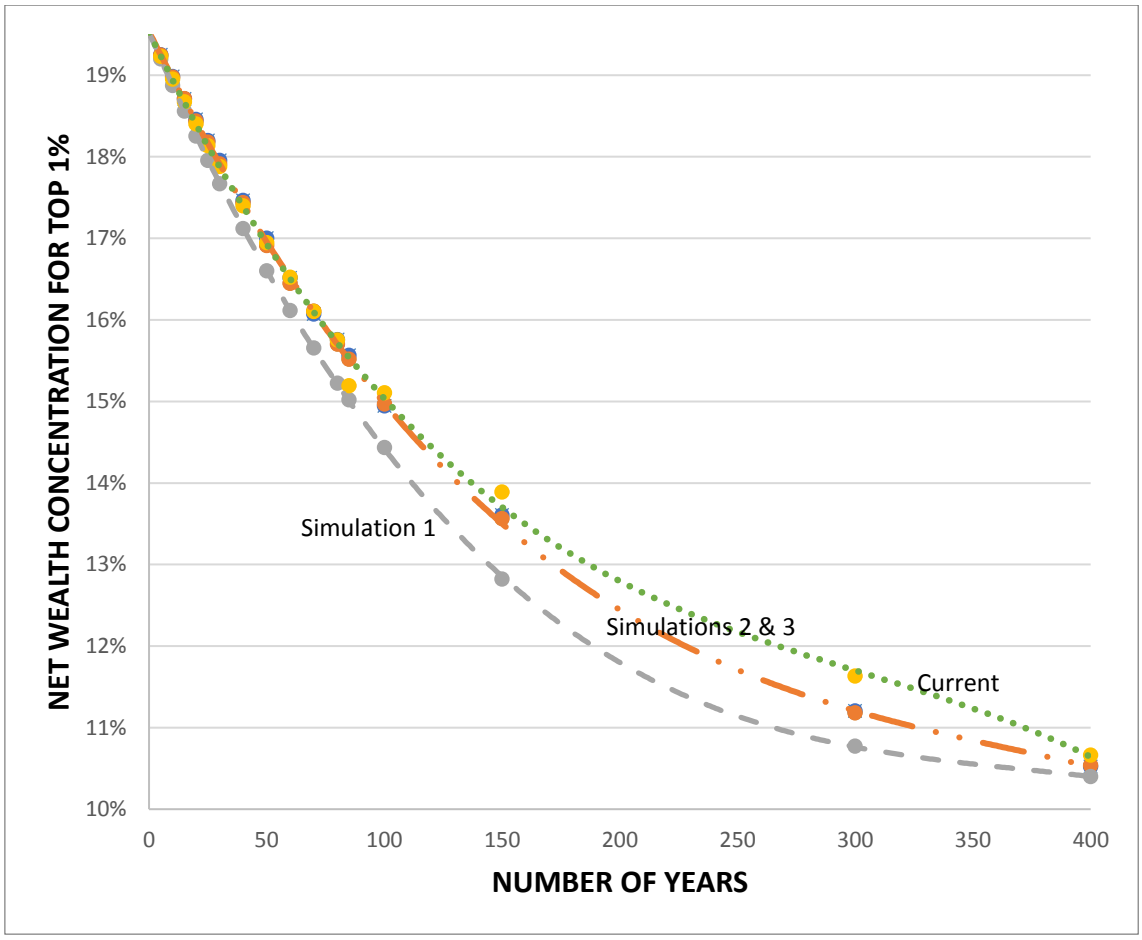


GRAPH 5. SIMPA: Reduction of the ATR for first dwelling and family business exemptions per net wealth bracket



GRAPH 6. SIMPA: Reduction of the ATR for specific exemptions and tax limit per net wealth bracket

GRAPH 7. SIMPA: Evolution of the redistributive power of the WT over time: top 1% net wealth concentration



Appendix 1: How the WT can play the role of an unrealized capital gains tax

In order to gain an idea of what reasonable WT rates might be if the aim is to mimic the potential role played by a non-existent unrealized capital gains tax (see Saez and Zucman, 2019b, Section 3.2), let's consider an individual living in two periods. In the first period, his budget constraint is:

$$Y_1 \times (1 - t_R) = S_1 \times (1 - t_W) + C_1 \quad [A.1]$$

where Y_1 is labour income in period 1, t_R is the effective tax rate on labour income, S_1 are private savings taxed at a WT rate, t_W, and C_1 is private consumption. In the second period, his constraint is:

$$S_1 + S_1 \times r \times (1 - t_R) \times \theta + S_1 \times R \times (1 - t_G) \times (1 - \theta) = C_2 + B \quad [A.2]$$

where r is the interest rate (which coincides with the intertemporal discount rate), θ is the share of private savings that just generates financial returns, while the rest of assets only generate increases (i.e. capital gains), $R>0$, or decreases (capital losses), $R<0$, in the initial value of the assets. t_G is the effective tax rate on capital gains and B is the value of bequests at the end of period 2. First, in order to focus just on the interaction between the capital gains tax and the WT, we do not consider the taxation of bequests. Second, we assume capital gains (as long as $R>0$) are not realized, and so in the absence of accrual taxation, they are not taxed. Hence, the role of B is making evident the existence of unrealized capital gains. The WT might then complement PIT.

The WT rate that could play the role of an unrealized capital gains tax, given the existence of a capital income tax, would be:

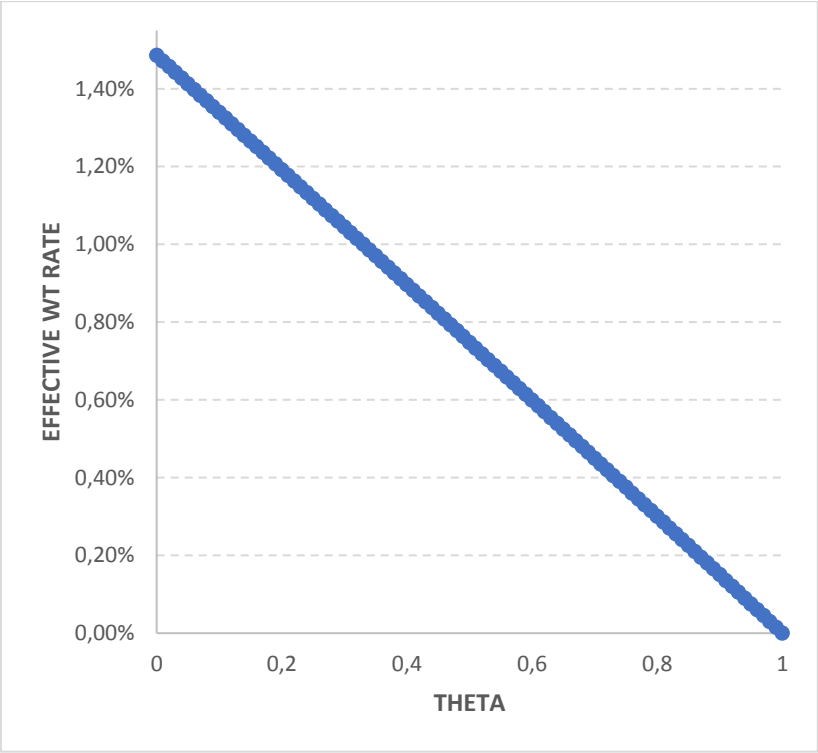
$$t_W = (1 - \theta) \times \left\{ \frac{R \times t_G}{1 + r \times \theta \times (1 - t_R) + R \times (1 - \theta) \times (1 - t_G)} \right\} \quad [A.3]$$

Given the explicit objective we have established, there is no role for a WT, $t_W=0$, as long as $\theta = 1$, and the optimal capital income tax rate formula might then be guided by the rules set by Saez and Stantcheva (2018). Or, the other way around, the value of t_W is decreasing in θ.

Let's take Piketty's (2014) Table 12.1, where the top 1%'s real growth rate of wealth per year is 6.8%. Then, if we take the Spanish capital income and the realized capital gains tax rate for top taxpayers (i.e. there is a progressive tax schedule), so that $t_R=t_G=23\%$, and assume $r=1.5\%$, GRAPH 8 shows the value of t_W for different values of θ. There is a negative linear relationship such that the maximum effective WT rate is 1.49%, and the minimum tax rate is 0%; for instance, for $\theta=0.5$, $t_W=0.75\%$. The values of t_W hardly change if we vary the value of r. Similar results are obtained if all assets generate annual financial returns, and only some of them also general capital gains. In any case, this simple exercise was carried out to provide an idea of what would be reasonable values of t_W as long as this tax seeks to complement the PIT returns to capital on the accrual

basis.

GRAPH 8. Reasonable effective WT rates



Appendix 2: Basic outcomes of further reforms using SIMPA

1) No exemptions (neither first dwelling nor family business) and no tax ceiling
g = 1% & years = 85

Tax rate: 1%

	M = 0	M = 500,000	M = 1,000,000	M = 5,000,000	M = 10,000,000
Gini index	0.6609	0.6025	0.6236	0.6477	0.6533
Top 1%	19.45%	11.29%	12.70%	17.05%	18.38%
Top 10%	51.63%	43.10%	46.56%	50.11%	50.91%
Tax Revenue (thousand €)	46,051,368	10,692,829	6,700,053	1,985,507	886,218
Short run ATR (%)	0.194	0.1397	0.07466	0.01205	0.0045
Long run ATR (total/tax due>0) (%)	55.2 (57.4)	9.05 (35.6)	4.91 (32.52)	0.814 (27.84)	0.305 (28.26)

Tax rate: 1.5%

	M = 0	M = 500,000	M = 1,000,000	M = 5,000,000	M = 10,000,000
Gini index	0.6638	0.5818	0.6114	0.6442	0.6519
Top 1%	19.48%	8.49%	10.7%	16.2%	18.1%
Top 10%	51.72%	39.95%	44.8%	49.7%	50.8%
Tax Revenue (thousand €)	69,077,056	16,039,244	10,057,080	2,978,260	1,329,326
Short run ATR (%)	1.44	0.21	0.31	0.02	0.0067
Long run ATR (total / tax due>0) (%)	69.5 (72.3)	12.0 (47.2)	6.5 (43.4)	1.1 (37.6)	0.41 (38.2)

2) No exemptions (neither first dwelling nor family business), but tax ceiling applies
g = 1% % & years = 85

Tax rate: 1%

	M = 0	M = 500,000	M = 1,000,000	M = 5,000,000	M = 10,000,000
Gini index	0.6869	0.6163	0.6340	0.6514	0.6558
Top 1%	25.27%	14.34%	15.11%	17.91%	18.97%
Top 10%	55.57%	45.10%	48.05%	50.63%	51.26%
Tax Revenue (thousand €)	41,704,720	7,929,810	4,445,104	1,151,836	321,179
Short run ATR (%)	0.896/0.961	0.112/0.14	0.055/0.075	0.0065/0.012	0.002/0.005
Long run ATR (total / tax due>0) (%)	52.07 (54.18)	7.64 (30.04)	3.85 (25.53)	0.489 (16.74)	0.1497 (13.88)

Tax rate: 1.5%

	M = 0	M = 500,000	M = 1,000,000	M = 5,000,000	M = 10,000,000
Gini index	0.7278	0.6052	0.6282	0.65	0.65
Top 1%	30.68%	13.19%	14.35%	17.59%	18.82%
Top 10%	61.41%	43.32%	47.16%	50.44%	51.18%
Tax Revenue (thousand €)	58,804,508	10,690,946	5,857,819	1,462,847	437,235
Short run ATR (%)	1.29/1.44	0.15/0.21	0.071/0.112	0.0483/0.0181	0.002/0.007
Long run ATR (total / tax due>0) (%)	63.95 (66.54)	9.48 (37.26)	4.75 (31.49)	6 (20.51)	0.183 (16.93)

3) First-dwelling exempted, and tax ceiling does not apply
g = 1% & years = 85

Tax rate: 1.5%

	M = 0	M = 500,000	M = 1,000,000	M = 5,000,000	M = 10,000,000
Gini index	0.6745	0.5875	0.6151	0.6446	0.6520
Top 1%	20.65%	8.97%	11.13%	16.32%	18.07%
Top 10%	53.36%	40.89%	45.32%	49.67%	50.73%
Tax Revenue (thousand €)	67,546,568	14,804,589	9,259,821	2,878,785	1,291,838
Short run ATR (%)	1.415	0.18879	0.09902	0.01632	0.00635
Long run ATR (total / tax due>0) (%)	68.72 (71.54)	11.02 (44.64)	5.87 (41.84)	0.998 (37.01)	0.388 (38.95)

4) First-dwelling exempted, and tax ceiling does apply

Tax rate: 1.5%

	M = 0	M = 500,000	M = 1,000,000	M = 5,000,000	M = 10,000,000
Gini index	0.7301	0.6084	0.6303	0.6502	0.6553
Top 1%	30.72%	13.63%	14.51%	17.63%	18.84%
Top 10%	61.75%	43.92%	47.50%	50.46%	51.19%
Tax Revenue (thousand €)	58,181,932	9,989,605	5,445,091	1,436,330	423,500
Short run ATR (%)	1.28/1.42	0.137/0.188	0.063/0.099	0.0074/0.016	0.0023/0.0064
Long run ATR (total/tax due>0) (%)	63.59 (66.20)	8.80 (35.65)	4.26 (30.36)	0.54 (20)	0.17 (17.11)

5) First-dwelling exempted, and tax ceiling does not apply
g = 1% & years = 85

Threshold: 500,000€

	t = 0.5%	t = 1%	t = 1.5%	t = 2%	t = 2.5%
Gini index	0.6301	0.6067	0.5875	0.5724	0.5609
Top 1%	15.19%	11.75%	8.97%	7.52%	6.53%
Top 10%	47.40%	43.85%	40.89%	38.33%	37.16%
Tax Revenue (thousand €)	4,934,863	9,869,726	14,804,589	19,739,452	24,674,314
Short run ATR (%)	0.0629	0.13	0.19	0.25	0.31
Long run ATR (total / tax due>0) (%)	4.681 (18.96)	8.26 (0.33)	11.02 (44.6)	13.17 (53.4)	14.86 (60.2)

6) First-dwelling exempted, and tax ceiling does apply
g = 1% & years = 85

Threshold: 500,000€

	t = 0.5%	t = 1%	t = 1.5%	t = 2%	t = 2.5%
Gini index	0.6341	0.6190	0.6084	0.6016	0.5966
Top 1%	16.10%	14.51%	13.63%	13.2%	12.92%
Top 10%	47.97%	45.61%	43.92%	42.92%	42.22%
Tax Revenue (thousand €)	4,226,970	7,384,567	9,989,605	11,743,463	13,111,218
Short run ATR (%)	0.058/0.063	0.10/0,13	0.14/0.19	0.16/0.25	0.185/0.315
Long run ATR (total / tax due>0) (%)	4.33 (17.53)	7.03 (28.47)	8.80 (35.65)	10.02 (40.59)	10.93 (44.27)

7) First-dwelling exempted, and tax ceiling does apply
g = 1%

Threshold: 500,000
Tax rate: 1.5%

	Years=5	Years=10	Years =20	Years =50	Years =75	Years =100
Gini index	0.6636	0.6592	0.6508	0.6289	0.6137	0.6010
Top 1%	19.11%	18.69%	17.88%	15.49%	14.01%	12.79%
Top 10%	51.25%	50.61%	49.54%	46.80 %	44.63%	42.90%
Tax Revenue (thousand €)	9,989,605	9,989,605	9,989,605	9.989.605	9.989.605	9,989,605
Short run ATR (%)	0.14/0.19	0.14/0.19	0.14/0.19	0.14/0.19	0.14/0.19	0.14/0.19
Long run ATR (total/tax due>0) (%)	0.68 (2.73)	1.33 (5.37)	2.56 (10.36)	5.78 (23.43)	8.01 (32.44)	9.90 (40.08)

2013

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