

The (Re)Introduction of Net Wealth Tax: Do Individuals Respond? Evidence from Spain

José María Durán-Cabré*
Alejandro Esteller-Moré*
Mariona Mas-Montserrat*

Provisional version, please do not quote

January, 2017

Abstract

This paper studies how taxpayers reacted to the re-introduction of the Spanish Net Wealth Tax. Using a panel of tax return micro-data from Catalan taxpayers for the 2011-13 period, we examine whether they reorganize their wealth composition in order to benefit from the exemptions and reliefs contemplated in the Wealth Tax Law. We estimate short-term elasticities of taxable wealth that range from 1 to 1.6 and two-year difference elasticities of taxable wealth that range from 3 to 5. Results provide empirical evidence of the existence of an important taxpayers' reaction to the Wealth Tax. Estimations indicate that taxpayers responded to positive tax rates by adopting avoidance strategies which consist on moving assets from taxable to non-taxable wealth.

Keywords: Spanish wealth tax, behavioural responses to taxation, elasticity of taxable wealth

JEL Codes: H24, H26.

We would like to thank to Nadja Dwenger, David Seim and Dirk Foremny for useful comments and suggestions. Furthermore, we would like to thank the Catalan Tax Agency for providing the data used in this paper. We acknowledge funding from the Spanish Ministry of Economy and Competitiveness (ECO2015-63591-R), from the Spanish Ministry of Education, Culture and Sports and from the government of Catalonia (2014SGR420).

*Universitat de Barcelona & IEB.

1. Introduction

Tax avoidance and evasion are a global problem which causes important consequences for the society: such practices harm fiscal equity and have serious budgetary effects. Coordinated efforts among countries are made to fight these threats¹ but much remains to be done. In that sense, research on this field plays an important role in identifying individuals' tax strategies and responses to taxation, which are a key point in order to deter evasive behaviour and design more efficient tax systems.

During the last years, both theoretical and empirical taxation literature have dedicated especial attention to the elasticity of taxable income, firstly introduced by Feldstein (1995, 1999), and recently surveyed by Saez et al. (2012). This is a key parameter for tax policy analysis because, a priori, it captures all behavioural responses to income tax rate changes - real but also evasive responses-. This is why big effort has been devoted to identify its magnitude.

Some studies have also focused on behavioural responses related to corporate income taxation (e.g. Slemrod, 2004; Crocker and Slemrod, 2005; Hanlon et al. 2007; Loretz and Moore, 2013; Devereux et al., 2014). However, recent and convincing empirical evidence on behavioural elasticities associated to wealth taxation is significantly scarce (Seim, 2015; Kopczuk, 2016).

Wealth can be taxed during life (annual net wealth tax) and at the moment of death (inheritance tax). Although this kind of taxation does not raise as revenues as income taxation by far, inheritance tax is still present in 21 out of 34 OECD countries². On the contrary, annual net wealth tax is no longer extensively used. Among OECD countries, only in Spain, France, Norway and Switzerland³ there still exists a net wealth tax.

Nevertheless, the debate on the appropriateness of this kind of taxation is gaining importance when considering the increasing concentration of wealth (Piketty, 2014). Wealth taxation can be used as a redistributive instrument to prevent capital accumulation, and this has been, in fact, the principal justification of such taxes (Gale and Slemrod, 2000), besides revenue motives.

However, the effectiveness of wealth taxes as a redistributive tool has usually been questioned and discussed (e.g. Schmalbeck, 2001; Durán-Cabré and Esteller-Moré, 2007 and 2014; Boadway et al., 2010; Adam et al., 2011; Kopczuk, 2013; Seim, 2015). Differences in assets' valuation, business exemptions and other tax reliefs contemplated in most of the wealth tax structures lead to horizontal inequities and inefficiencies. Moreover, usually the richest individuals are those who benefit the more from such "loopholes" and this distorts the real incidence of the tax.

This is why it is important to study how individuals react to wealth taxes; such responses are necessary to identify and overcome the sources of inefficiencies and inequities present in the current tax structure and thus ensure a proper redistributive tool.

¹ For example, OECD/G20 BEPS Project, information exchange agreements among EU countries.

² OECD and <http://taxfoundation.org/article/estate-and-inheritance-taxes-around-world>

³ <http://www.ey.com/GL/en/Services/Tax/Worldwide-Personal-Tax-Guide---Country-list>

In that sense, this paper intends to study how taxpayers reacted to the re-introduction of the Spanish Net Wealth Tax in 2011. Spain provides a good setting to study such tax considering that is one of the few countries that still regulates it. Additionally, it is generally accepted that the presence of tax evasion is more spread than in other European countries, so the potential results might have relevant tax policy implications. Last reason is related to data availability and the lack of previous studies investigating such topics⁴.

Wealth tax is transferred to sub-central governments and they have legislative power to determine certain items of the tax structure, fact that complicates the comparability across regions. Taking this into account, together with data availability issues, this paper will focus on Catalonia, which is in fact one of the regions with higher fiscal pressure.

Using a panel of tax return micro-data from Catalan taxpayers for the 2011-13 period, we examine whether they reorganize their wealth composition in order to benefit from the exemptions and reliefs contemplated in the Wealth Tax Law. Comparing 2012 (and 2013) taxable wealth with the one reported in 2011, we estimate short-term elasticities of taxable wealth that range from 1 to 1.6 and two-year difference elasticities of taxable wealth that range from 3 to 5. Results provide empirical evidence of the existence of an important taxpayers' reaction to the Wealth Tax. Estimations indicate that taxpayers responded to positive tax rates by adopting avoidance strategies which consist on moving assets from taxable to non-taxable wealth.

The paper proceeds as follows. Section II provides a literature review of the relevant studies. Section III describes the Spanish Wealth Tax system and the re-introduction of the Tax in 2011. Section IV presents the data and methodology. Section V shows the results. Section VI concludes.

2. Literature review

The existing literature studying behavioural responses to wealth taxation is scarce. Seim (2015) uses Swedish administrative data and exploits the single threshold that separated the two brackets of the tax rate (0 below the threshold and 1.5% above it) to estimate the impact of the annual wealth tax on taxable net wealth. He finds elasticities with respect to net-of-tax-wealth that range from 0.1 to 0.3. The results suggest that behavioural effects of the wealth tax were small but primarily reflecting evasion.

Zoutman (2015) estimates the effect of taxation on household savings using a 2001 Dutch capital-income and wealth tax reform. Using an administrative household panel data from 1995-2004, the author applies a difference-in-difference framework comparing households that are similar in terms of income and wealth, but that were treated differently by the tax reform. Results indicate that a 1 percent increase in the Dutch wealth tax of 1.2 p.p., leads to a reduction in household savings of between 0.10-0.17 percent, depending on the specification and the sample.

Brühlhart et. al (2016) use Swiss data aggregated at canton level to study the effects of wealth taxation on reported wealth. They also use individual-level data for the canton of Bern. The estimates lead to behavioural elasticities that substantially exceed those of the taxable income

⁴ There is evidence on the elasticity of taxable income (Sanmartín, 2007; Sanz-Sanz et al., 2015; Esteller-Moré and Foremny, 2016) but not on behavioural responses to wealth taxation.

literature. A 0.1 p.p. increase in wealth taxes leads to 3.4% lower wealth holdings in the cross-section data. They also find that taxpayers bunch below the tax threshold, that observed responses are driven by changes in wealth holdings rather than mobility, and that financial wealth is somehow more responsive than non-financial wealth.

There exist other studies analysing wealth taxes (e.g. Alvaredo and Saez, 2009; Durán-Cabré and Esteller-Moré, 2010) but they mainly focused on studying wealth concentration. Alvaredo and Saez (2009) also study, at an aggregated level, the effects of the introduction of business exemption in the Spanish wealth tax.

Focusing on another type of wealth taxation, literature on inheritance taxes is much more abundant. Following the approach of Feldstein (1995, 1999) for income taxation, a number of papers have intended to relate estate taxation to wealth accumulation. In order to study such relation, Kopczuk and Slemrod (2001) use US estate tax returns covering selected years between 1916 and 1996 and pursue both aggregate and micro-based analysis. Although their findings suggest that measures of the estate tax rate structure are generally negatively correlated with the reported net worth of the top estates, the identification strategies used are not convincing, as posteriorly noted by one of the authors (Kopczuk, 2013 and 2016). Holtz-Eakin and Marples (2001) use US Health and Retirement Survey to estimate the effect of estate taxation on wealth of the living population. However, the HRS data does not contain the “super-rich” who are most highly affected by the estate tax, and cross-sectional variation may not deal adequately with location-based heterogeneity and endogeneity of location decisions. Joulfaian (2006) uses data on US federal tax revenues from the estate tax over the second half of the 20th century. The author explores the behavioural response of taxable bequests to estate taxation by employing an equivalent income tax rate measure.

The papers mentioned so far did not focused on the distinction between responses that involve “real behaviour” (i.e. wealth accumulation, lifetime transfers, etc.) and those that are intended to reduce tax liability with no real consequences, that is, tax avoidance responses. The most recent evidence of the impact of inheritance taxation on wealth accumulation is provided by Goupille-Lebret and Infante (2016), which are able to disentangle the different components of behavioural responses. Using French Assurance-vie accounts data, authors take advantage of age and time discontinuities contemplated in the inheritance tax scheme and implement a bunching approach to estimate inter-temporal shifting elasticity in short and medium term. Authors also use a difference-in-difference setting to estimate shifting among asset portfolio and real responses. Although the analysis does not allow to observe other types of assets, it convincingly indicates the presence of important but relatively small responses.

Focusing on tax avoidance and evasion responses, Wolff (1999) and Poterba (2000) proposed an approach that is based on comparing estate tax returns to wealth of the living population. This procedure, however, needs to make some assumptions on the appropriate mortality rates to use and cannot account for adjustments done shortly before death, which are found to be substantially significant (Kopczuk, 2007). Using US estate tax data for filers in 1977, Kopczuk (2007) is able to identify taxpayers who suffered (and for how long) a terminal illness before dying. He concludes that wealth accumulation for the very wealthy continues until the onset of a terminal illness and that tax avoidance is particularly pronounced shortly before death.

One of the main conclusions that can be extracted from the existing literature is that most of the studies analysing behavioural responses to inheritance taxation are focused on the US and use estimation strategies which are not particularly appealing by the post-“credibility revolution” standards of what constitutes a convincing empirical design (Kopczuk, 2016).

3. Spanish Wealth Tax: Evolution and particularities

The Spanish Wealth Tax was introduced in 1977 as a temporary measure. Nevertheless, such temporality disappeared with the Law 19/1991⁵, which is still in force today. The Law 22/1993 changed the regulation of the tax again, contemplating an exemption for business assets and close-held business under the fulfilment of certain conditions. From 1997 onwards this wealth exemption was extended to quoted shares.

Many experts have stressed the inefficiencies and inequities related to this tax derived from differences in assets’ valuation, business exemptions and other tax reliefs considered in the law (e.g. Durán-Cabré and Esteller-Moré, 2007 and 2014). The Spanish Wealth tax structure contemplates the aforementioned assets’ exemptions, but also deductions and limits on the tax liability that might induce the taxpayer to adopt the appropriate strategies to benefit from them.

The most relevant cases, mainly used by the richest taxpayers, are the close-held business exemption and the joint limit for income and wealth taxes that reduces the wealth tax liability⁶. Figures 1 and 2 provide some evidence on that. From the first graph one can see that the effective tax rate for richest taxpayers is much lower than the marginal tax rates. This huge difference is caused by the limit on the wealth tax liability. The difference is even higher when non-taxable wealth is included to compute the effective tax rate (*effective tax rate 2*). The second graph reflects the important role that exemptions play in the overall wealth of the richest taxpayers.

In 2008 the Central government decided to abolish the tax given the inefficiencies previously commented and it introduced a 100% tax credit to the wealth tax liability. However, in 2011 the same government decided to reintroduce it as an additional tool to reduce the significant budgetary deficits originated with the economic crisis. It was introduced in mid-September of 2011 as a transitory measure and, a priori, it would only be applicable in 2011 and 2012. However, the corresponding Budgetary Laws of the subsequent years have been prolonging such transitory measure and Spanish wealth tax is still in force. The only change with respect to the regulation applicable in 2007 was that the threshold which exempts from tax liability was raised up to 700,000 euros.

⁵ Ley 19/1991, de 6 de junio, del Impuesto sobre el Patrimonio.

⁶ The overall wealth and income tax liability cannot exceed the 60% of income taxable base, excluding the long-term capital gains and its corresponding tax liability. The excess, if any, will be reduced from the initial wealth tax liability. Such reduction cannot exceed the 80% of the initial wealth tax liability. If this is the case, only such amount will be deducted.

Figure 1

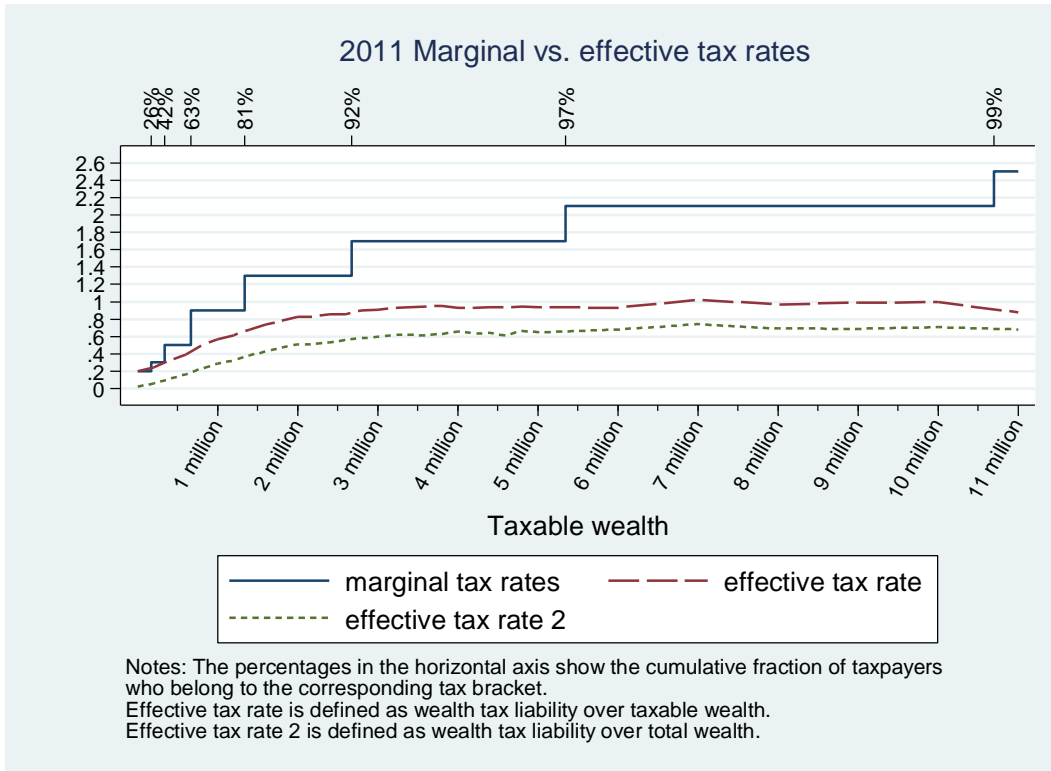
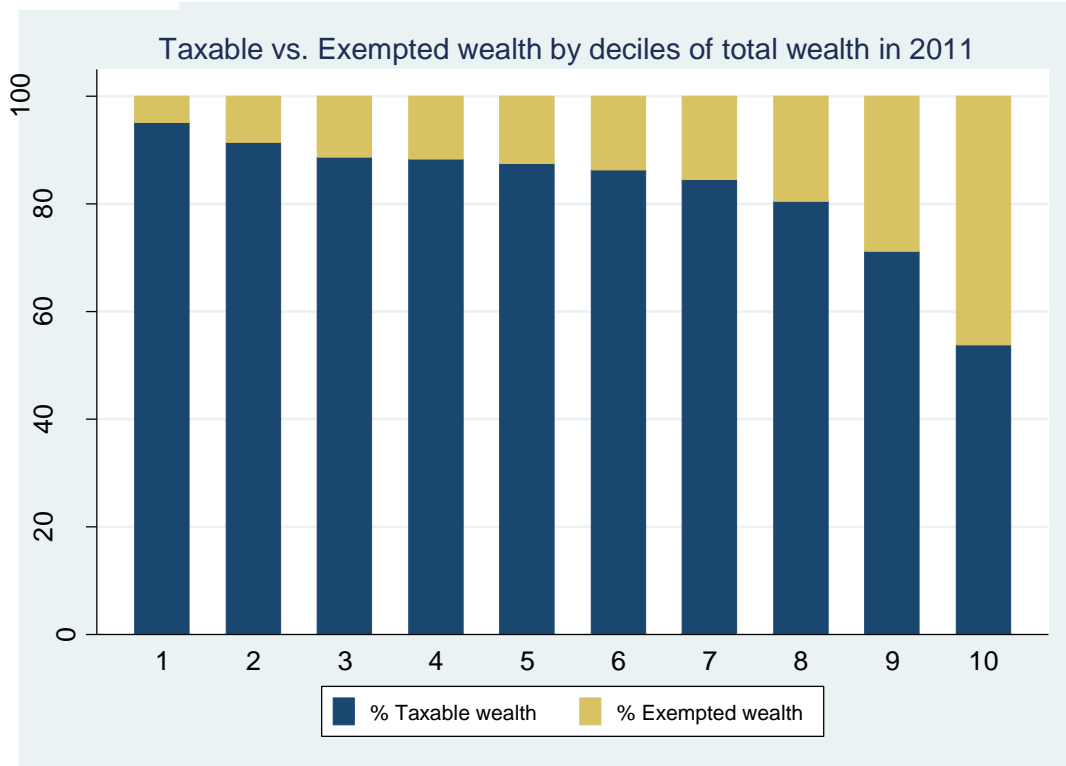


Figure 2



3.1. The reintroduction of the Spanish Wealth Tax

What makes the Spanish wealth tax reintroduction interesting is that it generated a lot of confusion until the very last moment. By July 2011, PSOE's candidate for the general elections to be held on November 20th contemplated as a proposal for their electoral programme the reintroduction of a Wealth Tax. However, this suggestion started to be criticized from different spheres, specially from the opposition party (PP) arguing that was PSOE at the beginning of its last mandate who abolished such tax. The proposal probably did not have a big impact on taxpayer's expectations provided that PSOE was significantly losing voters' support during the second term in office. According to voting intention surveys carried out by CIS⁷, PP became the most preferred political party to run the central government from mid-2010 onwards -it remained between 3.4 and 6.8 p.p. above PSOE during that period-. This party clearly positioned against the wealth tax.

Rumours about an imminent reintroduction of the Spanish Wealth Tax started on August 2011⁸, although members of the government discarded new tax reforms before the general elections⁹. This possibility was commented from different domains, even it appeared in some newspapers front-page by the end of August^{10,11}. However, the Central government did not provide a clear answer about this issue¹². The potential reintroduction of the Wealth Tax evolved with uncertainty until the 11th of September, when the PSOE's candidate for the general elections asked to the government an imminent Wealth Tax reinstatement. This request boosted the strong criticisms from political parties, organizations, groups of experts, etc. Right-wing parties appealed the inconsistency of the government about the Wealth Tax, left-wing parties and organizations considered it an insufficient and belated measure, and different groups of experts pointed the inefficiencies and limitations of such tax.

The government did not provide concrete details about the reintroduction of the Wealth Tax until one day before its approval. The Wealth Tax would be reintroduced only for 2011 and 2012 as a temporary measure, the exemption threshold would be raised up to 700,000 euros and the main residence exemption would be increased up to 300,000 euros. These were the only changes compared to how the Wealth Tax was previously regulated. On September 16th the Council of Ministers approved the reintroduction of the Spanish Wealth Tax, modifying its legislation accordingly¹³.

During all this process surrounded by huge criticism it was not only important to know how things evolved at the central government, but also at regional governments. Wealth Tax is transferred to Autonomous Communities and they have legislative power to decide whether to levy it or not. In that sense, even though the Central government approved the

⁷ Centro de Investigaciones Sociológicas - Sociological Research Centre

⁸ <http://www.europapress.es/economia/fiscal-00347/noticia-economia-gobierno-estudia-subir-irpf-antes-recuperara-patrimonio-consejo-general-economistas-20110819183751.html>

⁹ <http://www.europapress.es/economia/noticia-campa-descarta-nuevas-reformas-fiscales-20110811104212.html>

¹⁰ <http://www.europapress.es/nacional/noticia-primeras-paginas-diarios-llegados-noche-redaccion-20110823001848.html>

¹¹ <http://www.europapress.es/nacional/noticia-primeras-paginas-diarios-llegados-noche-redaccion-20110826002711.html>

¹² <http://www.europapress.es/economia/noticia-salgado-no-aclara-si-piensa-recuperar-patrimonio-20110823150753.html>

¹³ Real Decreto-ley 13/2011, de 16 de septiembre, por el que se restablece el Impuesto sobre el Patrimonio, con carácter temporal.

reintroduction of the tax, it was at the end a decision of each regional government to effectively implement it. To this respect, some of those governments showed their disagreement to the measure from the very beginning, as it was the case in Madrid Community and Catalonia.

Madrid government assured it would maintain the 100% tax credit which was already in force before the suppression of the tax. The Catalan government did not reveal its decision about the implementation of the tax until the end of November 2011, once the 20-N General Elections were held. In accordance with the reduction of the Catalan inheritance tax carried out on June 2011, the political party running the Catalan government at that time was contrary to the idea of reintroducing the Wealth Tax. Once the reform was approved, the Catalan government doubted about its durability provided that General Elections were close and all indicators pointed towards a victory of the opposition party, which had always positioned against the reintroduction of the Wealth Tax. This was the reason the Catalan government gave to postpone the decision about the Wealth Tax implementation until the new Central government was formed. By the end of November, the Catalan government announced that it would levy the Wealth Tax if the Central government finally kept it in force. It was not until mid-December when the Catalan government confirmed that it would reintroduce the tax in Catalonia with the same conditions foreseen in the state legislation, and it was not until March 2012 (with effects on December 31st, 2011) when it approved the corresponding legislative changes to carry out such implementation.

As it will be explained more deeply in the following section, due to data availability this study focuses on Catalan taxpayers. Considering how the Wealth Tax reintroduction process occurred for the case of Catalonia, we believe it is sensible to think that Catalan taxpayers did not have proper information to build real expectations about the implementation of the tax until the very end of 2011. This time constraint limited individuals to adopt the appropriate strategies in order to benefit from the exemptions and reliefs contemplated in the Law. Moreover, it is important to remember that the Wealth Tax was reintroduced only for fiscal years 2011 and 2012 at first. This temporality could initially discourage taxpayers' incentives to reorganize their wealth and income composition since this is also costly.

However, by the end of September 2012 the Central government announced the extension of the Wealth Tax to 2013¹⁴. Similarly, by the end of September 2013 the government prolonged the applicability of the tax up to 2014. Consequently, in those subsequent years taxpayers had much more time and better information to adopt the suitable responses to the tax.

Last, some other measures regarding the Wealth Tax took place during that time but only affected taxpayers living in Catalonia. On the 27th of December of 2012, just at the beginning of a new mandate, the Catalan government approved a reform of the Wealth Tax consisting on: (i) the reduction of the exemption threshold to 500,000 euros and (ii) a 5-10% increase of the tax rates. Those unexpected changes on the legislation were effective for the fiscal year 2012.

Taking all this into account, what we want to study is how taxpayers responded to the tax in 2012 and 2013, when they had the whole year in advance to take the appropriate actions.

¹⁴ <http://www.europapress.es/economia/macroeconomia-00338/noticia-economia-gobierno-crea-impuesto-loterias-prorroga-patrimonio-elimina-deducciones-sociedades-20120927175205.html>

Additionally, during 2012 they learned their tax liability from 2011 and the extension of the wealth tax to subsequent years.

4. Data and methodology

The paper uses a panel of wealth tax returns from Catalan tax residents for years 2011 to 2013 provided by the Catalan Tax Agency. This database contains all the information reported in the tax returns aggregated by types of assets (i.e. total wealth on real estate, bank accounts, business assets, bonds, investment funds, non-exempt quoted shares and close-held companies, exempt quoted shares and close-held companies, life assurances, vehicles, jewellery, artwork, etc.). Tax returns also include information on total taxable income and personal income tax liability corresponding to that fiscal year. However, personal characteristics such as age or gender are not provided; the only information available is province of residence.

Considering that we want to follow taxpayers over time we will focus on those individuals that submit the wealth tax return every year. Out of 44,851 taxpayers who submitted the 2011 wealth tax reform, 39,475 (88%) kept doing it for 2012 and 2013. We cannot disentangle those taxpayers who disappear due to tax avoidance motives from those that are driven by other reasons (wealth losses, death). Although mobility might seem a relevant factor to explain the disappearance of taxpayers, it is also important to note that many of the wealth taxpayers are old people that have been accumulating wealth during his life and therefore death could also be a key explanation. If mobility to other regions with lower tax rates was the main factor driving the reduction of the population of taxpayers, one would expect to be the richest taxpayers the ones “disappearing” from the data in a higher proportion. However, when looking at taxpayers’ distribution across the tax brackets, one cannot find a significant difference between the distribution including all the taxpayers and the one considering only those that disappear in 2012 or 2013 (see Table A1 in Appendix). This is especially true for the higher tax brackets, suggesting there is not a selected group of taxpayers who “disappear”.

In table A2 of the Appendix there are presented some descriptive statistics for the 39,475 individuals that submit the wealth tax return in 2011, 2012 and 2013. At the end of the Appendix one can also find a detail of the tax brackets and the corresponding tax rates. In the case that a taxpayer voluntarily presented a supplementary form to declare additional wealth, the last tax return submitted is the one considered. This was a usual fact for the 2011 tax returns due to the tax amnesty carried out by the Central government on November 2012: 14.6% of the taxpayers under consideration submitted a supplementary wealth tax declaration from that period onwards.

There are some cases in which individuals face the obligation to submit the wealth tax return even though they have zero tax liability. This is the case for those that have a gross wealth above 2 million euros, but the net taxable wealth is below the threshold. Since they are not real taxpayers of the wealth tax we exclude them from the empirical analysis.

Additionally, we also exclude from the empirical analysis those that face 0 marginal wealth tax rates. This is the case for those taxpayers that are subject to the joint limit for income and wealth taxes.

When excluding this two subgroups of individuals we end up with 35,335 observations per year. Tables 1 and 2 present some descriptive statistics for these taxpayers considered in the analysis. Such exclusion is made with the information of the fiscal year 2011 to ensure that the fact to belong to one of these two subgroups is not affected by the wealth tax (according to the assumption that in 2011 there is no response to the wealth tax).

Our aim is to see how taxable wealth evolves in 2012 and 2013, compared to 2011, when taxpayers have proper information to react to wealth tax rates. In other words, the purpose is to estimate the elasticity of taxable wealth with respect to the net-of-wealth tax rates.

Considering the evolution of the reintroduction of the tax exposed in section 3.1., we assume that the taxable wealth observed in the tax returns of 2011 is equivalent to the one that would have been observed without the existence of the tax, given that taxpayers did not have time to react to the reintroduction. Therefore, wealth tax rates did not influence the determination of taxable wealth in 2011. On the contrary, the wealth tax rates observed in the first months of 2012, when submitting the tax wealth return of 2011, did affect the observed taxable wealth of 2012.

Taking all this into consideration and using the definition of elasticity, the main specification to estimate is the following:

$$\log \left(\frac{\text{taxable_wealth}_{i,2011+s}}{\text{taxable_wealth}_{i,2011}} \right) = \varepsilon \cdot \log \left(\frac{1-\tau_{i,2011+s}}{1-\tau_{i,2011}} \right) + \delta X_{i,2011} + \varepsilon_i \quad (1)$$

Where ε is the parameter of interest and $\tau_{i,2011+s}$ is the tax rate observed by the taxpayer i during year 2011 + s to determine $\text{taxable_wealth}_{i,2011+s}$. According to what has been previously exposed, $\tau_{i,2011} = 0$. When $s = 1$, $\tau_{i,2012}$ corresponds to the tax rates derived from the tax returns of fiscal year 2011, submitted in 2012. Similarly, when $s = 2$, $\tau_{i,2013}$ corresponds to the tax rates derived from the tax returns of fiscal year 2012, submitted in 2013. Different measures of wealth tax rates (τ_i) will be used: (i) marginal tax rates, (ii) effective tax rates defined with respect to “net” taxable wealth¹⁵, (iii) effective tax rates defined with respect to taxable wealth and, (iv) effective tax rates defined with respect to total wealth. X_i is a vector of individual controls defined at 2011 level such as taxable wealth, total wealth, income-taxable wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. Additionally, when using marginal tax rates to compute log of net-of-tax rate, we also control for the relative position inside the tax bracket. This variable is not used when employing effective tax rates since they already incorporate this information.

We run the same specification (1) using exempted wealth and total wealth as alternative dependent variables in order to estimate the corresponding elasticities.

Additionally, we look at heterogeneous effects of the wealth taxes by comparing different taxpayers’ status (i.e. marital status, province of residence, tax amnesty implication). The specification estimated is the following:

$$\log \left(\frac{\text{taxable_wealth}_{i,2011+s}}{\text{taxable_wealth}_{i,2011}} \right) = \varepsilon \cdot \log \left(\frac{1-\tau_{i,2011+s}}{1-\tau_{i,2011}} \right) + \beta \cdot \log \left(\frac{1-\tau_{i,2011+s}}{1-\tau_{i,2011}} \right) * \text{dummy}_i + \delta X_{i,2011} + \varepsilon_i \quad (2)$$

¹⁵ “Net” taxable wealth = Taxable wealth – Exemption threshold, which was 700.000 € in 2011 and 500.000 € in 2012 and 2013.

Where the $dummy_i$ takes different definitions:

- a) Equals 1 if taxpayer i is married, 0 otherwise.
- b) Equals 1 if taxpayer i participated in the tax amnesty, 0 otherwise.
- c) Equals 1 if taxpayer i lives in a province different than Barcelona, 0 otherwise.

When $s=1$ (i.e. comparison between 2012 and 2011), both specifications (1) and (2) can be estimated by OLS given the exogeneity of the tax rates. This is the case because the tax rates that could determine $taxable_wealth_{i,2012}$ were those observed in the tax return of 2011, and as previously stated, these tax returns were not influenced by the tax rates.

On the contrary, when $s=2$ (i.e. comparison between 2013 and 2011), instrumental variables techniques must be employed to overcome the endogeneity of the tax rates. As explained at the end of section 3.1., by the end of December of 2012 the Catalan government approved a reform of the Wealth Tax consisting on: (i) the reduction of the exemption threshold to 500,000 euros and (ii) a 5-10% increase of the tax rates. This reform was effective for the fiscal year 2012. Consequently, taxpayers could not react to these legislative changes for the wealth tax return of 2012, but those could influence the taxable wealth of 2013.

Following Gruber and Saez (2002), we use the mechanical tax changes driven by changes in the tax law to construct an instrument for the tax rates. That is, we use the tax legislative changes exposed just above to calculate the wealth tax rates that taxpayers would face with 2011 taxable wealth (which is exogenous).

Table 1: Descriptive statistics for the taxpayers considered in the empirical analysis.

		2011	2012	2013
Total wealth	Mean	2,527,718	2,644,235	2,723,585
	Std. Dev.	7,225,719	10,353,902	8,642,033
Taxable Wealth	Mean	1,615,012	1,642,971	1,690,913
	Std. Dev.	3,272,453	3,489,574	3,728,167
Wealth tax liability	Mean	6,500	7,956	8,038
	Std. Dev.	38,822	38,238	30,659
Taxable income	Mean	107,262	90,929	90,537
	Std. Dev.	446,686	382,563	425,396
Marginal tax rate	Mean	0.00613	0.00710	0.00704
	Std. Dev.	0.00431	0.00423	0.00425
Effective tax rate (i)	Mean	0.00402	0.00477	0.00480
	Std. Dev.	0.00260	0.00252	0.00247
Effective tax rate (ii)	Mean	0.00212	0.00309	0.00312
	Std. Dev.	0.00250	0.00251	0.00246
Effective tax rate (iii)	Mean	0.00171	0.00250	0.00253
	Std. Dev.	0.00209	0.00215	0.00211
Obs		35,335	35,335	35,335

Notes: Different definitions of effective tax rate (ETR) are considered: (i) ETR defined w.r.t “net” taxable wealth, (ii) ETR defined w.r.t. taxable wealth and, (iii) ETR defined w.r.t. total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011.

Table 2: Descriptive statistics for some control variables at 2011.

Personal characteristics and wealth composition indicators			
Married taxpayers			0.6841
Tax amnesty participation			0.1460
Province of residence:			
Barcelona			0.8126
Girona			0.0923
Tarragona			0.0521
Lleida			0.0431
Share of Income	Mean		0.0645
over taxable wealth	<i>Std. Dev.</i>		<i>0.1063</i>
Real estate	Mean		0.4027
over taxable wealth	<i>Std. Dev.</i>		<i>0.3523</i>
Non-exempt business assets	Mean		0.0091
over taxable wealth	<i>Std. Dev.</i>		<i>0.0796</i>
Bank accounts	Mean		0.2174
over taxable wealth	<i>Std. Dev.</i>		<i>0.2303</i>
Bonds	Mean		0.0751
over taxable wealth	<i>Std. Dev.</i>		<i>0.1384</i>
Quoted investment funds	Mean		0.0779
over taxable wealth	<i>Std. Dev.</i>		<i>0.1652</i>
Non-exempt quoted shares	Mean		0.0747
over taxable wealth	<i>Std. Dev.</i>		<i>0.1712</i>
Unquoted investment funds	Mean		0.0264
over taxable wealth	<i>Std. Dev.</i>		<i>0.1039</i>
Non-exempt unquoted shares	Mean		0.0845
over taxable wealth	<i>Std. Dev.</i>		<i>0.2124</i>
Life assurances	Mean		0.0350
over taxable wealth	<i>Std. Dev.</i>		<i>0.0924</i>
Total Debt	Mean		0.0450
over taxable wealth	<i>Std. Dev.</i>		<i>0.2129</i>
Taxable wealth	Mean		0.8243
over total wealth	<i>Std. Dev.</i>		<i>0.2108</i>
Exempt close-held companies	Mean		0.0884
over total wealth	<i>Std. Dev.</i>		<i>0.2050</i>
Observations			35,335

Notes: The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011.

5. Results

Tables 3-5 show the estimations from specification (1) when $s=1$ (i.e. when comparing 2011 vs. 2012). Table 3 provides the elasticity of taxable wealth estimates, which range from approximately 1 to 1.6, depending on the definition of tax rate used (i-iv). It is not surprising that the estimate increases from specification (i) to (iv) provided that the effective tax rate becomes smaller when the denominator widens. In all the specifications the elasticity estimator is highly significant.

The elasticities obtained are very high compared to those obtained in previous literature (although it is scarce). For instance, Seim (2015) obtains elasticities with respect to net-of-tax-wealth that range from 0.1 to 0.3. However, the particularities associated to the context evaluated here make us to believe that comparisons with the previous literature have to be done with extreme caution. First, because we are studying the effects of the reintroduction of a tax. Usually elasticities try to study behavioural responses to relatively small changes to tax rates. In our case, taxpayers do not face a small change but a huge change which goes from 0 to positive tax rates, with marginal tax rates up to 2.5%.

Second, the Spanish wealth tax is structured in a way that is relatively easy to reduce taxable wealth, considering the existence of different exemptions (the most important is the close-held business' exemption commented in section 3).

And this is what exactly can be seen from tables 4 and 5. Interestingly, whereas elasticity of taxable wealth reaches values above 1, when looking at the elasticity of total wealth no significant effect is found in any of the specifications. This indicates that taxable wealth did react to tax rates, but not the overall wealth. Such conclusion is confirmed with table 5. If one compares the elasticity of exempted wealth with the elasticity of taxable wealth for each specification, one can see that they are almost the opposite. Therefore, results show that taxpayers quickly reacted to the reintroduction of the tax (just one year later) by moving taxable wealth to exempted wealth.

Table 3: Elasticity of taxable wealth, 2011 vs. 2012.

<i>Definitions of τ</i>	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t $1-\tau$	1.053*** (0.205)	1.392*** (0.343)	1.504*** (0.363)	1.591*** (0.430)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on OLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the annual growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t "net" taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. All the specifications include controls for taxable wealth, total wealth, income-taxable wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: Elasticity of total wealth, 2011 vs. 2012.

<i>Definitions of τ</i>	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t $1-\tau$	0.311 (0.194)	0.123 (0.327)	0.162 (0.347)	0.252 (0.421)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on OLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the annual growth rate in total wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. All the specifications include controls for taxable wealth, total wealth, income-total wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5: Elasticity of exempted wealth and elasticity of taxable wealth of those that report exempt wealth, 2011 vs. 2012.

<i>Definitions of τ</i>	Elasticity of exempted wealth				Elasticity of taxable wealth			
	(i)	(ii)	(iii)	(iv)	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t $1-\tau$	-1.216*** (0.458)	-2.064*** (0.782)	-2.114** (0.835)	-2.334** (1.029)	1.895*** (0.396)	2.551*** (0.652)	2.548*** (0.679)	2.236*** (0.730)
Observations	29,914	29,914	29,914	29,914	29,914	29,914	29,914	29,914

Notes: The table shows elasticity estimates based on OLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in columns 1-4 is the annual growth rate in exempted wealth. The dependent variable in columns 5-8 is the annual growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. All the specifications include controls for taxable wealth, total wealth, income-total wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth, composition of exempted wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011 and to individuals who declared exempted wealth in 2011. To avoid some outliers distorting the results, the top and bottom 1% of the first dependent variable distribution are not considered in the estimations.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Similarly, Tables 6-8 show the estimations from specification (1) when $s=2$ (i.e. when comparing 2011 vs. 2013). For these cases, 2sls estimations are employed. The first-stage regressions (not shown) are always very strong. Table 6 shows that when looking at two-year differences the elasticities are even higher, ranging from 3 to 5 depending on the definition of tax rate used (i-iv).

We have to take into account that the tax was initially re-introduced only for 2011 and 2012, and it was announced in 2012 that it would be extended to 2013. Additionally, when

preparing the wealth tax return of 2012 taxpayers observed the increase in tax rates due to the legislative changes approved at the end of 2012. Both factors could lead to a higher response of the taxpayers.

Table 7 provides the elasticities of total wealth. Now the estimates are statistically significant (although not at 1%) but much lower than the elasticities reported in table 6. We cannot disentangle whether these elasticities imply a real or an evasive response, provided that there exist ways of reducing taxable wealth that also have an impact on the total wealth declared in the tax return and do not come from real responses. These ways can be making donations or moving taxable wealth to exempted wealth that does not have to be reported in the tax returns (i.e. contributions to pension schemes, art treasures, etc.).

Table 8 shows again the elasticity of exempted wealth and the elasticity of taxable wealth for those taxpayers that declared exempted wealth on 2011. In accordance with the estimates of Table 6, the coefficients are very high. Similarly to what is reported in Table 5, exempted wealth and taxable wealth elasticities have opposite sign, showing that taxpayers change their wealth composition, moving taxable wealth to exempted assets.

When looking at heterogeneous effects, the marital status or the province of residence do not provide statistically significant differences. Results are provided in Tables A3-A6 of the Appendix.

However, when looking at Tax Amnesty participation, the coefficient is statistically significant in some specifications (see Tables 9 and 10). Although the estimates are not robust, the positive coefficients indicate higher elasticities for those that participated in the Tax Amnesty. This make sense considering that these taxpayers face a huge amount of “new” wealth that still needs to be “planned” in taxation terms.

Table 6: Elasticity of taxable wealth, 2011 vs. 2013.

<i>Definitions of τ</i>	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t $1-\tau$	3.042*** (0.482)	4.722*** (0.629)	4.675*** (0.631)	5.230*** (0.742)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on 2SLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the two-year growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. Instruments for the different tax rates' definitions are computed using the mechanical variation created by the 2012 wealth tax reform. All the specifications include controls for taxable wealth, total wealth, income-taxable wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 7: Elasticity of total wealth, 2011 vs. 2013.

<i>Definitions of τ</i>	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t $1-\tau$	0.876* (0.456)	1.183** (0.588)	1.136* (0.590)	1.479** (0.727)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on 2SLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the two-year growth rate in total wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. Instruments for the different tax rates’ definitions are computed using the mechanical variation created by the 2012 wealth tax reform. All the specifications include controls for taxable wealth, total wealth, income-total wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8: Elasticity of exempted wealth and elasticity of taxable wealth of those that report exempt wealth, 2011 vs. 2013.

<i>Definitions of τ</i>	Elasticity of exempted wealth				Elasticity of taxable wealth			
	(i)	(ii)	(iii)	(iv)	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t $1-\tau$	-3.852*** (1.290)	-4.588*** (1.668)	-4.732*** (1.674)	-4.624** (2.148)	5.493*** (0.913)	7.986*** (1.198)	7.873*** (1.200)	5.299*** (1.222)
Observations	29,914	29,914	29,914	29,914	29,914	29,914	29,914	29,914

Notes: The table shows elasticity estimates based on 2SLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in columns 1-4 is the two-year growth rate in exempted wealth. The dependent variable in columns 5-8 is the two-year growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. Instruments for the different tax rates’ definitions are computed using the mechanical variation created by the 2012 wealth tax reform. All the specifications include controls for taxable wealth, total wealth, income-total wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth, composition of exempted wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011 and to individuals who declared exempted wealth in 2011. To avoid some outliers distorting the results, the top and bottom 1% of the first dependent variable distribution are not considered in the estimations.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 9: Elasticity of taxable wealth, 2011 vs. 2012.

Heterogeneous effects: Tax amnesty participation				
Definitions of τ	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t $1-\tau$	0.904*** (0.228)	1.154*** (0.393)	1.253*** (0.419)	1.771*** (0.482)
Dummy*Elasticity w.r.t $1-\tau$	0.692 (0.483)	0.897 (0.760)	0.889 (0.780)	-0.695 (0.926)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on OLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the annual growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. The dummy equals 1 if the taxpayer participated in the tax amnesty, 0 otherwise. All the specifications include controls for taxable wealth, total wealth, income-taxable wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Elasticity of taxable wealth, 2011 vs. 2013.

Heterogeneous effects: Tax amnesty participation				
Definitions of τ	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t $1-\tau$	2.904*** (0.506)	4.041*** (0.692)	3.979*** (0.698)	5.167*** (0.803)
Dummy*Elasticity w.r.t $1-\tau$	0.817 (1.399)	2.961** (1.432)	2.885** (1.387)	0.281 (1.603)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on 2SLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the two-year growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. Instruments for the different tax rates' definitions are computed using the mechanical variation created by the 2012 wealth tax reform. The dummy equals 1 if the taxpayer participated in the tax amnesty, 0 otherwise. All the specifications include controls for taxable wealth, total wealth, income-taxable wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** p<0.01, ** p<0.05, * p<0.1

6. Conclusions

While both theoretical and empirical taxation literature have dedicated especial attention to the elasticity of taxable income, convincing empirical evidence on behavioural elasticities associated to wealth taxation is still significantly scarce. Nonetheless, the debate on the appropriateness of this kind of taxation is gaining importance when considering the increasing concentration of wealth (Piketty, 2014).

However, differences in assets' valuation, business exemptions and other tax reliefs which characterize wealth taxation lead to horizontal inequities and inefficiencies, fact that has led different countries to abolish such taxes. Moreover, usually the richest individuals are those who benefit the more from such “loopholes” and this distorts the real incidence of the tax. This reveals the importance of studying how individuals react to wealth taxes in order to properly ensure efficiency and redistribution.

In this context, this paper intends to study how taxpayers reacted to the re-introduction of the Spanish Net Wealth Tax in 2011. Using a panel of tax return micro-data from Catalan taxpayers for the 2011-13 period, we examine whether they reorganize their wealth composition in order to benefit from the exemptions and reliefs contemplated in the Wealth Tax Law. Comparing 2012 (and 2013) taxable wealth with the one reported in 2011, we estimate short-term elasticities of taxable wealth that range from 1 to 1.6 and two-year difference elasticities of taxable wealth that range from 3 to 5.

Results provide empirical evidence of the existence of an important taxpayers' reaction to the Wealth Tax. Estimations indicate that taxpayers responded to positive tax rates by adopting avoidance strategies which consist on moving assets from taxable to non-taxable wealth.

References

Adam S., Besley, T., Blundell R., Bond S., Chote R., Gammie M., Johnson P., Myles G., and Poterba J. (2011): “Taxes on Wealth Transfers.” In J. A. Mirrlees, S. Adam, T. Besley, R. Blundell, S. Bond, R. Chote, M. Gammie, P. Johnson, G. Myles and J. Poterba, eds., *Tax by Design*. The Mirrlees Review, 15:347-367. Oxford University Press.

Alvaredo, F. and Saez, E. (2009): “Income and Wealth Concentration in Spain from a Historical and Fiscal Perspective”, *Journal of the European Economic Association*, 7(5), 1140-1167.

Boadway, R., Chamberlain E. and Emmerson C. (2010): “Taxation of Wealth and Wealth Transfers”, In J. A. Mirrlees, S. Adam, T. Besley, R. Blundell, S. Bond, R. Chote, M. Gammie, P. Johnson, G. Myles and J. Poterba, eds., *Dimensions of Tax Design: the Mirrlees Review*, 8:737-836. Oxford University Press.

Brühlhart, M., Gruber, J., Krapf, M. and Schmidheiny, K. (2016): “Taxing Wealth: Evidence From Switzerland”, NBER working paper series.

Crocker, K. and Slemrod, J. (2005): “Corporate Tax Evasion with Agency Costs”, *Journal of Public Economics*, 89(9–10), 1593–1610.

Devereux, M.P., Liu, L. and Loretz, S. (2014): “The Elasticity of Corporate Taxable Income: New Evidence from UK Tax Records”, *American Economic Journal: Economic Policy*, 6(2), 19-53.

Durán-Cabré, J.M. and Esteller-Moré, A. (2007): “An empirical analysis of capital taxation: equity vs. tax compliance”, *Papeles de trabajo 4/07*, Instituto de Estudios Fiscales.

Durán-Cabré, J.M. and Esteller-Moré, A. (2010): “Tax Data for Wealth Concentration Analysis: an Application to Spanish Wealth Tax”, *Review of Income and Wealth*, 56, 620-631.

Durán-Cabré, J.M. and Esteller-Moré, A. (2014): “La imposición sobre la riqueza en España”, *Papeles de Economía Española*, 139, 70-85.

Esteller-Moré, A. and Foremny, D. (2016): “Elasticity of taxable income for Spanish top taxpayers”, *Papeles de trabajo 2/16*, Instituto de Estudios Fiscales.

Feldstein, M. S. (1995): “The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1986 Tax Reform Act”, *Journal of Political Economy*, 103(3), 551-572.

Feldstein, M. S. (1999): “Tax Avoidance and the Deadweight Loss of the Income Tax”, *Review of Economics and Statistics*, 81(4), 674-680.

Gale, W.G. and Slemrod, J. (2000): “Life and death questions about the estate and gift tax”, *National Tax Journal*, 53, 889-912.

Goupille-Lebret, J. and Infante, J (2016): “Behavioral responses to inheritance tax: Evidence from notches in France”, working paper.

Gruber, J. and Saez, E. (2002): “The elasticity of taxable income: evidence and implications”, *Journal of Public Economics*, 84, 1-32.

- Hanlon, M., Mills, L. and Slemrod, J. (2007): “An Empirical Examination of Corporate Tax Noncompliance.” In *Taxing Corporate Income in the 21st Century*, ed. Alan Auerbach, James R. Hines Jr., and Joel Slemrod. Cambridge: Cambridge University Press.
- Holtz-Eakin, D. and Marples, D. (2001): “Distortion Costs of Taxing Wealth Accumulation: Income versus Estate Taxes”, Working paper 8261, National Bureau of Economic Research.
- Joulfaian, D. (2006): “The Behavioral Response of Wealth Accumulation to Estate Taxation: Time Series Evidence”, *National Tax Journal*, 59(2), 253-268.
- Kopczuk, W. (2007): “Bequest and Tax Planning: Evidence from Estate Tax Returns”, *Quarterly Journal of Economics*, 122(4), 1801-1854.
- Kopczuk, W. (2013): “Taxation of Transfers and Wealth”, in *Handbook of Public Economics*, Vol. 5. Amsterdam: North-Holland.
- Kopczuk, W. (2016): “U.S. Capital gains and estate taxation: a status report and directions for a reform”, prepared for the Burch/Brookings/Wharton Economics of Tax Policy Conference and to be published in the conference volume.
- Kopczuk, W. and Slemrod, J. (2001): “The Impact of the Estate Tax on the Wealth Accumulation and Avoidance Behavior of Donors”, in William G. Gale, James R. Hines Jr., and Joel Slemrod, eds., *Rethinking Estate and Gift Taxation*, Brookings Institution Press, 2001, 299-343.
- Loretz, S. and Moore, P. (2013): “Corporate tax competition between firms”, *International Tax and Public Finance*, 20(5), 725-752.
- Piketty, T. (2014): “Capital in the Twenty-First Century”, Harvard University Press.
- Poterba, J.M (2000): “The Estate Tax and After-Tax Investment Returns”, in Joel Slemrod, ed., *Does Atlas Shrug? The Economic Consequences of Taxing the Rich*, New York: Harvard University Press and Russell Sage Foundation, 329-349.
- Saez, E., Slemrod, J. and Giertz, S.H. (2012): “The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review,” *Journal of Economic Literature*, 50 (1), 3–50.
- Sanmartín, J. (2007): “El efecto de los cambios en los tipos marginales sobre la base imponible del IRPF”, *Hacienda Pública Española / Revista de Economía Pública*, 182, 9-27.
- Sanz-Sanz, J.F., Arrazola-Vacas. M., Rueda-López, N. and Romero-Jordán, D. (2015): “Reported gross income and marginal tax rates: estimation of the behavioural reactions of Spanish taxpayers”, *Applied Economics*, 47, 466-484.
- Schmalbeck, R. (2001): “Avoiding Federal Wealth Transfer Taxes”, in William G. Gale, James R. Hines Jr., and Joel Slemrod, eds., *Rethinking Estate and Gift Taxation*, Brookings Institution Press.
- Seim, D. (2015): “Behavioral Responses to an Annual Wealth Tax: Evidence from Sweden”, working paper.
- Slemrod, J. (2004): “The Economics of Corporate Tax Selfishness”, *National Tax Journal*, 57(4), 877–899.

Wolff, E.N. (1996): “Discussant’s Comments on Douglas Holtz-Eakin, “The Uneasy Case for Abolishing the Estate Tax”, *Tax Law Review*, 51(3), 517-522.

Zoutman, F.T. (2015): “The Effect of Capital Taxation on Household Savings”, Working paper.

Appendix

Table A1: Distribution of taxpayers across tax brackets. Year 2011

Tax brackets	All 2011 taxpayers	Those disappearing on 2012 or 2013
From 0 to 167,129.45 €	25.54	36.25
From 167,129.45 to 334,252.88 €	16.33	15.81
From 334,252.88 to 668,499.75 €	20.76	17.17
From 668,499.75 to 1,336,999.75 €	18.04	14.19
From 1,336,999.76 to 2,673,999.02 €	10.95	8.87
From 2,673,999.02 to 5,347,998.04 €	5.08	4.61
From 5,347,998.04 to 10,695,996.07 €	2.14	1.99
Above 10,695,996.07 €	1.14	1.1

Table A2: Descriptive statistics for all the taxpayers submitting the wealth tax return in 2011, 2012 and 2013.

		2011	2012	2013
Total wealth	Mean	3,023,515	3,139,852	3,238,853
	<i>Std. Dev.</i>	<i>8,154,771</i>	<i>10,767,446</i>	<i>9,941,358</i>
Taxable Wealth	Mean	1,165,957	1,376,759	1,420,306
	<i>Std. Dev.</i>	<i>3,841,509</i>	<i>3,987,636</i>	<i>4,325,273</i>
Wealth tax liability	Mean	8,680	9,531	9,350
	<i>Std. Dev.</i>	<i>43,236</i>	<i>40,736</i>	<i>33,128</i>
Taxable income	Mean	114,021	94,626	98,460
	<i>Std. Dev.</i>	<i>652,910</i>	<i>373,353</i>	<i>757,275</i>
Marginal tax rate	Mean	0.00678	0.00847	0.00860
	<i>Std. Dev.</i>	<i>0.00523</i>	<i>0.00527</i>	<i>0.00529</i>
Effective tax rate	Mean	0.00401	0.00469	0.00470
	<i>Std. Dev.</i>	<i>0.00280</i>	<i>0.00266</i>	<i>0.00259</i>
	Obs	39,475	39,475	39,475

Table A3: Elasticity of taxable wealth, 2011 vs. 2012.
Heterogeneous effects: marital status

<i>Definitions of τ</i>	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t 1- τ	0.905*** (0.316)	1.307** (0.526)	1.439*** (0.551)	1.125* (0.650)
Dummy*Elasticity w.r.t 1- τ	0.219 (0.388)	0.124 (0.650)	0.0948 (0.679)	0.693 (0.794)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on OLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the annual growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. The dummy equals 1 if the taxpayer is married in 2011, 0 otherwise. All the specifications include controls for taxable wealth, total wealth, income-taxable wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** p<0.01, ** p<0.05, * p<0.1

Table A4: Elasticity of taxable wealth, 2011 vs. 2013.
Heterogeneous effects: marital status

<i>Definitions of τ</i>	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t 1- τ	2.373*** (0.800)	4.345*** (1.023)	4.324*** (1.024)	4.170*** (1.149)
Dummy*Elasticity w.r.t 1- τ	0.984 (0.959)	0.553 (1.204)	0.514 (1.195)	1.580 (1.351)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on 2SLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the two-year growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. Instruments for the different tax rates' definitions are computed using the mechanical variation created by the 2012 wealth tax reform. The dummy equals 1 if the taxpayer is married in 2011, 0 otherwise. All the specifications include controls for taxable wealth, total wealth, income-taxable wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** p<0.01, ** p<0.05, * p<0.1

Table A5: Elasticity of taxable wealth, 2011 vs. 2012.
Heterogeneous effects: Province of residence

<i>Definitions of τ</i>	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t 1- τ	1.029*** (0.220)	1.368*** (0.368)	1.459*** (0.388)	1.397*** (0.462)
Dummy*Elasticity w.r.t 1- τ	0.139 (0.511)	0.130 (0.887)	0.279 (0.943)	1.283 (1.102)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on OLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the annual growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. The dummy equals 1 if the taxpayer lives in a province different than Barcelona, 0 otherwise. All the specifications include controls for taxable wealth, total wealth, income-taxable wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** p<0.01, ** p<0.05, * p<0.1

Table A6: Elasticity of taxable wealth, 2011 vs. 2013.
Heterogeneous effects: Province of residence

<i>Definitions of τ</i>	(i)	(ii)	(iii)	(iv)
Elasticity w.r.t 1- τ	2.729*** (0.530)	4.342*** (0.677)	4.268*** (0.678)	4.784*** (0.792)
Dummy*Elasticity w.r.t 1- τ	1.765 (1.152)	2.456 (1.528)	2.682* (1.528)	2.905 (1.819)
Observations	34,628	34,628	34,628	34,628

Notes: The table shows elasticity estimates based on 2SLS regressions, where standard errors (shown in parentheses) are clustered by marriages. The dependent variable in all specifications is the two-year growth rate in taxable wealth. Columns (i) to (iv) show the results with different definitions of wealth tax rates (τ): (i) marginal tax rates, (ii) effective tax rates (ETR) defined w.r.t “net” taxable wealth, (iii) ETR defined w.r.t. taxable wealth and, (iv) ETR defined w.r.t. total wealth. Instruments for the different tax rates' definitions are computed using the mechanical variation created by the 2012 wealth tax reform. The dummy equals 1 if the taxpayer lives in a province different than Barcelona, 0 otherwise. All the specifications include controls for taxable wealth, total wealth, income-taxable wealth ratio, marital status, tax amnesty implication, province of residence, composition of taxable wealth and share of taxable wealth over total wealth. The sample is restricted to individuals who faced positive tax liability and positive marginal tax rates on 2011. To avoid some outliers distorting the results, the top and bottom 1% of the dependent variable distribution are not considered in the estimations.

*** p<0.01, ** p<0.05, * p<0.1

Escalas de gravamen aplicables en el ejercicio 2011.

Base liquidable hasta euros	Cuota íntegra euros	Resto base liquidable hasta euros	Tipo aplicable Porcentaje
0,00	0,00	167.129,45	0,2
167.129,45	334,26	167.123,43	0,3
334.252,88	835,63	334.246,87	0,5
668.499,75	2.506,86	668.499,76	0,9
1.336.999,51	8.523,36	1.336.999,50	1,3
2.673.999,01	25.904,35	2.673.999,02	1,7
5.347.998,03	71.362,33	5.347.998,03	2,1
10.695.996,06	183.670,29	En adelante	2,5

Escalas de gravamen aplicables en el ejercicio 2012

Comunidad Autónoma de
Cataluña
(Artículo único. 2 Decreto
Ley 7/2012)

Base liquidable hasta euros	Cuota íntegra euros	Resto base liquidable hasta euros	Tipo aplicable Porcentaje
0,00	0,00	167.129,45	0,2
167.129,45	334,26	167.123,43	0,3
334.252,88	835,63	334.246,87	0,5
668.499,75	2.506,86	668.499,76	0,9
1.336.999,51	8.523,36	1.336.999,50	1,3
2.673.999,01	25.904,35	2.673.999,02	1,7
5.347.998,03	71.362,33	5.347.998,03	2,1
10.695.996,06	183.670,29	En adelante	2,5