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Avoidance Responses to the Wealth Tax☆,☆☆

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ABSTRACT

As a consequence of the Great Recession, the Spanish government reintroduced the Wealth Tax in 2011. We exploit the variation in wealth tax exposure to analyse taxpayers' responses to this reintroduction. While facing higher wealth taxes did not discourage savings, results indicate that a 0.1 percentage point increase in the average tax rate leads to a reduction in taxable wealth of 3.21% over 4 years. In particular, the reduction in taxable wealth comes from taking advantage of exemptions, mostly business-related. Thus, the reintroduction induced avoidance. Taxpayers also take advantage of the limit on tax liability through a change in their asset and income composition. By far, this latter source of avoidance accounts for the greatest impact on tax revenues (92.6%). The impact of these avoidance strategies on revenue collected was far from negligible, since according to our estimates they represent a 2012-2015 revenue loss of 2.75 times the 2011 estimated wealth tax revenues. These findings should be useful to policymakers and administrations considering the implementation of a wealth tax, as they illustrate the pitfalls to be circumvented.

1. Introduction

In the mid-eighties, about half the OECD countries imposed an annual net wealth tax, but today it is maintained solely by Spain, Norway and Switzerland (OECD, 2018).[1] However, rising wealth inequality (Piketty, 2014; Zucman, 2019) has revived the debate about the desirability of wealth taxes. To date, though, the empirical evidence about the behavioural responses associated with wealth taxation is still limited.

The aim of this paper, therefore, is to contribute to this nascent literature by studying how taxpayers reacted to the reintroduction of the Spanish Net Wealth Tax in 2011. We examine taxpayers' responses in terms not only of wealth accumulation, but also of the potential avoidance strategies adopted. For questions of data availability, in this study we focus on one sub-central government, that of Catalonia, which is in fact the region that collects the highest share of Spain's overall wealth tax revenues (about 52% in 2011 and 46% in 2015, the period covered by our empirical analysis, according to the statistics provided by the Spanish Tax Administration).

Using a panel of tax return micro-data from the universe of Catalan wealth taxpayers between 2011 and 2015, we analyse whether the wealth tax affects taxable wealth and wealth accumulation. While taxable wealth might be influenced by various responses (avoidance, evasion, and real responses), changes in declared accumulated wealth can only arise from real responses or evasion. Our estimates suggest that the reintroduction of the tax influences taxable wealth but not overall wealth accumulation. Therefore, we conclude that avoidance is the main mechanism behind the estimated responses. Specifically,

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[1] Also note that since 2001 the Netherlands have a de-facto net wealth tax, since capital income is taxed using an imputed return. As a consequence of a recent court ruling declaring it unconstitutional, it is expected to be transformed into a capital gains tax in 2026.

[2] The law sets a ceiling on the wealth tax liability when taxable income is relatively low compared to taxable wealth. See online Appendix A for further explanation.

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taxpayers reduce taxable wealth by restructuring their wealth composition to exploit exemptions. While this form of avoidance is significant, the most prominent tax minimization strategy does not directly affect taxable wealth. Instead, it works by altering the timing and typology of income realization in order to exploit a limit on tax liability.[2] Mobility-based avoidance could also represent another margin of response. That is why, we also aim to examine whether there is a positive relationship between tax rates and the probability of a taxpayer not filing wealth tax returns in subsequent years.

As there are no wealth-related administrative data for the period when the wealth tax was not being imposed, we take advantage of its unexpected reintroduction by the Catalan Government at the end of 2011. By mid September, the central government temporarily reinstated the tax for 2011 and 2012. However, the ultimate decision to actually implement the tax corresponded to the regional governments. In this regard, although the Catalan government had publicly opposed this measure, it ultimately chose not to reverse the reinstatement and proceeded to collect the tax at the end of November 2011. As a result, Catalan taxpayers did not learn they would have to pay the 2011 wealth tax until late in the year, which limited their ability to employ avoidance strategies, as it was too late to meet the requirements set by law.[3] For this reason, 2011 serves as our baseline year. We use the variation in treatment exposure, measured through the average tax rates for 2011, to identify the effects of the wealth tax. This variation, driven mainly by different ratios of taxable wealth over total reported wealth and different shares of realized long-term capital gains over taxable income, occurs not only across different levels of wealth, but also within similar levels. Hence, we control non-parametrically for taxpayers' 2011 wealth, income, asset portfolio, age and other relevant characteristics. Two placebo exercises validate the empirical strategy employed. One uses data from wealth tax filers in the Community of Madrid, not liable to the wealth tax. The other merges personal income and wealth tax micro-data and finds no significant relation between treatment exposure and income prior to the wealth tax re-introduction, when the tax was not enforced.

When focusing on a balanced panel of the top 50% richest taxpayers, our results show that the taxpayers' response to the reintroduction of the wealth tax was significant. A 0.1 percentage point increase in the average tax rate leads to a reduction in taxable wealth of 3.21% over 4 years. While facing higher tax rates does not have a negative effect on savings, it does encourage taxpayers to reorganize their wealth composition to take advantage of exemptions (mostly business-related), and to rearrange their income realization behaviour to qualify for the limit on wealth tax liability. These margins of response reflect avoidance rather than real responses. The intensity of the responses varies depending on the initial importance of taxpayers' business shares, favouring the use of business exemptions over the limit on tax liability if initial business shares are high, and vice versa. These avoidance responses imply a 4-year revenue loss of 2.75 times the 2011 estimated wealth tax revenues (i.e. 51,134 euros per taxpayer considered in the estimation sample). The limit has by far the greatest impact on revenue losses, as it accounts for 92.6% of the total revenue foregone. However, in spite of these avoidance responses, we estimate a 5-year revenue gain from the wealth tax reintroduction of 77,728 euros per taxpayer considered in the estimation sample.

As such, this paper provides new empirical evidence to the nascent literature studying behavioural responses to wealth taxation (see Scheuer and Slemrod, 2021 for a review). According to the specific methodology applied, the existing literature can be divided into two main groups: one employs bunching strategies (Seim, 2017; Londoño-Vélez and Ávila-Mahecha, 2024)[4] while the other undertakes difference-in-differences and cross-sectional analyses (Zoutman, 2018; Jakobsen et al., 2020; Brülhart et al., 2022; Ring, 2024). The former report much smaller taxable wealth responses to wealth taxes than the latter, primarily reflecting tax evasion.[5] The mechanisms driving such large responses in the latter studies are unclear.

Seim (2017) uses Swedish administrative data and exploits the variation across tax brackets, while Brülhart et al. (2022) exploit the variation in tax rates across the Swiss Cantons and municipalities. Jakobsen et al. (2020) employ Danish administrative data and consider two different sources of variation: first, changes in the exemption threshold for couples and, second, changes in marginal tax rates for taxpayers unbound by a tax ceiling. Zoutman (2018) uses a Dutch capital-income and wealth tax reform that created variation in the rate-of-return after taxation at each level of income and wealth; Londoño-Vélez and Ávila-Mahecha (2024) draw on Colombian administrative data and exploit the time variation derived from several tax reforms and discontinuities in the tax schedule; and, finally, Ring (2024) uses geographic discontinuities in the Norwegian annual net-wealth tax and third-party reported data on savings.

In comparison with these studies, our estimated response locates in the mid-range of the estimates obtained by the literature (see, for example, Table 2, Brülhart et al. (2022)). All studies report a decrease in taxable wealth derived from higher taxes; the exception is Ring (2024) who finds an increase in taxable wealth and justifies it arguing that in the Norwegian case there are limited evasion and avoidance opportunities. Differences across estimates might be due to the institutional and social context, the level of tax enforcement or the design of the tax, but also to the empirical methodology and the time horizon employed in each analysis. We discuss more in detail the comparison across estimates when we present our estimated responses (see Section 5.1.1).

The main contribution of our paper – which by methodology belongs to the second group of studies identified above – is that it provides both an assessment of the effect of wealth taxes on taxable wealth and an analysis of other types of response, focused above all on tax avoidance strategies, which allows us to provide evidence of the mechanisms driving the results. Thus, the paper also contributes to the literature on capital taxation and portfolio choice.[6] While most earlier studies have sought to analyse the effect of personal income taxes on investment in financial assets, this paper provides evidence on asset portfolio responses to wealth taxation, not only in terms of financial assets, but also that of housing and businesses. On the one hand, the paper shows that higher tax rates lead taxpayers to increase the importance of their exempt assets – in the main their company holdings – although we also find a statistically significant (albeit small) effect on their main dwelling exemption. This finding is in accordance with the empirically documented use of closely-held businesses as tax shelters (Alstadsæ ter et al., 2014; Bjørneby et al., 2023). On the other hand, facing higher tax rates leads taxpayers to increase the importance they attach to listed equity and investment funds, which enables them to exploit the tax liability limit.

Likewise, in relation to the application of this limit, our paper documents that facing higher tax rates results in taxpayers reducing their taxable income and increasing the importance of their long-term capital gains within realized income. In this regard, our study contributes to the literature on the responses of taxable income to personal income taxes (see Saez et al. (2012) for a general review and Neisser (2021) for an empirical review) and to the literature studying the effect of

[3] Appendix A.1 describes in detail the circumstances surrounding the reintroduction of the tax in 2011.

[4] Note, however, that Seim (2017) and Londoño-Vélez and Ávila-Mahecha (2024) complement their main findings with a difference-in-differences strategy.

[5] The specific magnitudes reported in the individual studies are detailed below in the Section 5.

[6] See Schalck (2017), Bergstresser and Pontiff (2013), Desai and Dharmapala (2011), Alan et al. (2010) and Poterba and Samwick (2002). For a review of the earlier literature, see Poterba (2002).

taxes on capital gains realizations.[7] Finally, we provide evidence of gift responses to wealth taxes, which in turn can be related to the literature studying the effect of gifts and estate taxation on inter-vivos transfers (see Kopczuk, 2016, for a review).[8] Unlike the former responses, the increase in reported gifts does not persist over time, only being documented during the first two years after the reintroduction of the tax.

The rest of the paper proceeds as follows. Section 2 describes potential avoidance strategies associated with the wealth tax. Section 3 presents the data and descriptive statistics. Section 4 outlines the methodology employed. Section 5 shows the estimation results; and Section 6 concludes.

2. How to avoid the Wealth Tax

The Spanish Wealth Tax is levied annually on December 31 and applies to all forms of wealth exceeding a exemption threshold. Nonetheless, the legislation foresees the exemptions of certain goods, such as business assets and closely-held companies whenever certain conditions are satisfied, or main residences, up to a limit. The tax liability is obtained by applying progressive tax rates to the net tax base, i.e. taxable wealth minus the exemption threshold (700,000 euros in 2011). Moreover, the law sets a ceiling on the wealth tax liability when taxable income is relatively low compared to taxable wealth. Further information on the wealth tax is provided in the online Appendix A, which describes in detail its regulation and institutional setting, as well as the circumstances surrounding its reintroduction in 2011 (Appendix A.1).

An obvious way to overcome the tax burden attributable to the progressivity of the tax is by decreasing wealth. This can be achieved by making gifts, although they are subject to the gift tax and eventually to the personal income tax of the donor. However, the characteristics of the wealth tax in Spain allow taxpayers to adopt other strategies to reduce, or even eliminate, their tax liability without decreasing their stock of wealth.

These strategies are related to reducing taxable wealth in favour of exempt assets, making use of the limit on tax liability or even changing tax residence to another region where the wealth tax is not levied (e.g. Madrid). We next explain these mechanisms to avoid the tax, as this helps understand the outcomes we present in our empirical analysis.

The options to reduce taxable wealth in favour of exempt assets include increasing business exemptions or changing fiscal residence to that of the dwelling with the highest assessment so as to take advantage of the main-residence exemption.[9] Taxpayers can achieve the former by arranging their closely-held businesses/shares in such a way that they satisfy the exemption requirements foreseen in the Law (see Appendix A.2 for more details), which does not prevent the tax administration from verifying that all conditions hold. The exemption value can be increased by capitalizing the company, for instance.

The alternatives for exploiting the limit on tax liability are also diverse. They simply require the taxpayer to reduce realized income other than long-term capital gains. Long-term capital gains (that is when the sale occurs at least one year after the purchase date) are excluded from the computation of the limit on wealth tax liability. This strategy can be achieved by investing in investment funds, since these assets do not generate regular income – such as dividends or interest – but only capital gains (or losses) when sold. Shares are another type of asset that can help the taxpayer benefit from the limit on tax liability. Therefore, the cost of using the limit as an avoidance mechanism is generally much lower than the expected cost from using the business exemption. Furthermore, in terms of tax savings, using the limit for avoidance purposes is more profitable, as it effectively acts as a tax credit, in contrast to exemptions, whose profitability depends on the marginal wealth tax rate.[10] Table 1 summarizes these avoidance strategies and the main legal requirements.

Finally, the most radical strategy would be to move to Madrid. However, if a tax audit were to be conducted, the taxpayer would have to demonstrate that this change of fiscal residence was not fictitious.

The most convenient strategy depends on the income-wealth ratio and the asset portfolio of each taxpayer. For instance, for those who already own a business it might be easier and less costly to take advantage of the business exemption. Nonetheless, the scope of the exemption does not necessarily include all business assets, as they must be related to the development of the economic activity.[11] Alternatively, those who have lower incomes and significant investments in financial assets might find it easier to benefit from the limit on tax liability. But they probably want to obtain a sufficient annual income flow to cover their private consumption, which could be partly solved by realizing long-term capital gains. Taxpayers with high income and high job mobility might consider relocating to Madrid. Therefore, the most convenient strategy might be a combination of different responses depending on their relative implementation costs and the tax savings implied.

3. The data: Sources and descriptive statistics

The main data source used in this paper is the universe of anonymized wealth tax returns filed by Catalan tax residents between 2011 and 2015. We have complemented this database with an indicator of the taxpayer's age and information from inheritance and gift tax returns.[12] All the data have been provided by the Catalan Tax Agency.

The main database contains, at the micro level, all the information reported in the wealth tax returns aggregated by types of asset. That is, the total stock of wealth classified into real estate and main residence exemption, bank accounts, business assets, bonds, investment funds, non-exempted quoted shares and unlisted companies, exempted quoted shares and unlisted companies, life insurance, vehicles, jewellery, artwork, intellectual or industrial property rights and "other",

[7] Some recent empirical studies include Jacob (2018, 2016, 2013), Díaz-Caro and Crespo-Cebada (2016) and Daunfeldt et al. (2010). In general, they study the effect of capital gains taxation on their realization (also known as the lock-in effect) with the exception of Jacob (2016), who studies the effect of labour income taxes on capital gains realizations. For a broad review of capital gains responses to taxes, see Hanlon and Heitzman (2010). With a particular focus on the wealthiest individuals, Auerbach et al. (2000) show that it is in fact the high-income, high-wealth and more sophisticated taxpayers that are most likely to avoid capital gains taxation.

[8] In addition to studying the effect of estate and gift taxation on transfers, Joulfaian (2005) also considers the impact of capital gains taxation.

[9] This can only be done if the taxpayer owns several housing properties. According to the Spanish Survey of Household Finances (wave 2011), 89% of individuals in the last decile of the wealth distribution – that is, those most comparable to the population under study – own other real estate properties besides their main dwelling (Banco de España, 2014). Note that the main residence exemption is limited up to 300,000 euros.

[10] Note that a one-euro increase in exempt assets reduces the tax liability according to the corresponding marginal wealth tax rate. In contrast, the impact of the limit on tax liability requires further explanation. In Appendix A, we explain the legal definition of the limit. Once the limit becomes binding, to further reduce the wealth tax liability, the taxpayer may convert current financial taxable income into long-term capital gains. This implies that the tax savings per euro converted into long-term capital gains equal 0.60 euros, minus the savings in personal income tax liability due to the deferral of the long-term capital gain.

[11] Non-essential goods for the development of the economic activity are not exempted, but in practice, this is a rather controversial and subjective concept which can raise conflicts with the tax administration.

[12] We are able to know whether a taxpayer dies after 2011 or has declared a gift from 2008 onwards.

Table 1
Wealth tax avoidance strategies and main legal requirements.

Avoidance strategy	Main legal requirements
Exemptions	
Using the exemption for business assets (natural persons)	- The taxpayer runs the business. - At least 50% of the taxpayer's total income comes from the business activity.
Using the exemption for closely-held companies (both listed and unlisted legal entities)	- The company has to develop an economic activity (at least 9 months within the fiscal year). - The taxpayer owns at least 5% of the shares individually or 20% within the family. - One of the family members is engaged in the management of the company and the corresponding remuneration represents the main source of income.
Using the exemption for main residence	- To reside in the property for at least 3 years unless there is a necessary change of residence. - Exemption limited to 300,000 euro.
Limit on the wealth tax liability	
Reducing realized income to benefit from the limit on the tax liability	- If wealth and income tax liabilities >60% taxable income, the excess is deducted from the initial wealth tax liability. - The reduction in the tax liability cannot exceed 80% of the initial wealth tax liability.
Realizing income through long-term capital gains	Long-term capital gains (i.e. the sale occurs at least one year after the purchase) are exempt from the computations of the limit on the tax liability.

including all taxable wealth not previously categorized.[13] Apart from wealth portfolio, wealth tax returns also include information on total taxable income and personal income tax liability. Regarding personal characteristics, little information is reported: just marital status and place of residence. As previously mentioned, though, we are also able to consider age.

Data show there were 42,294 tax filers facing a positive tax liability and 1942 tax filers with zero tax liability but with the obligation to file the wealth tax return (as their gross wealth exceeded 2 million euros). Putting the total number of tax filers – 44,236 – in perspective, they represent about 1.27% of personal income tax filers and about 0.59% of individuals residing in Catalonia in 2011.[14] Of the taxpayers who disappeared from the sample in the subsequent years (17.78%), 6.42% died and the remaining 11.36% disappeared for other reasons (wealth losses, mobility, evasion, etc.). In our empirical analysis we only include those taxpayers that submitted wealth tax returns consecutively between 2011 and 2015. In fact, most of our estimations use a balanced panel of tax filers from the top 50% of the observed wealth distribution,[15] according to the stock of wealth reported in 2011. When a taxpayer voluntarily submits a supplementary return to declare additional wealth, we consider this last return in our analysis. This was a quite common occurrence among 2011 tax returns due to a tax amnesty issued by the Central government in November 2012.[16]

Statistics from 2011 wealth tax returns provide certain features that should be stressed[17]: (i) wealth tax revenues decreased by 19.23% between 2011 and 2015; (ii) as total reported wealth increases, the difference between taxable wealth and total wealth also increases; and (iii) there is significant variation in the average tax rate within the same wealth decile. We return to this last point in the following section. Regarding the asset portfolio, the importance of unlisted companies increases with wealth, while the reverse occurs with real estate properties and bank accounts or bonds.[18]

Table 2 provides some descriptive figures for the evolution of reported wealth and tax avoidance strategies described in Section 2. All figures refer to taxpayers placed at the top 50% of the observed wealth distribution who filed wealth tax returns every year between 2011 and 2015. Contrary to the evolution of tax revenues shown in row [3] of Table A2, overall reported wealth increased during this period. This suggests there might be other factors, other than a fall in the stock of wealth (such as the adoption of avoidance strategies), that are driving the reduction in tax revenues. Indeed, a comparison of the 2011–2015 figures in Table 2 shows that the relevance of wealth exemptions, assets that allow an investor to obtain long-term capital gains and the application of the limit on tax liability have increased substantially over time.

In the case of the strategy of changing tax residence to another region, the only information available to us is that 11.36% of 2011 tax filers disappeared from the sample in subsequent years for reasons other than death and that they had a different wealth composition than taxpayers filing every year, with a greater importance of business assets and unlisted companies (Table A5 in Appendix C). If we focus on the 50% richest, the share of tax filers who disappeared is similar, 10.15%. When looking at gifts reported to the Catalan Tax Agency, 5.92% of 2011 wealth taxpayers (7.70% for those in the top 50%) made a gift between 2008 and 2011, when the wealth tax was not in force. This share rose to 9.98% (14.26% for top 50%) for gifts made between 2012 and 2015.

These are, nevertheless, merely descriptive facts. In the following sections we consider the tax planning strategies explained above and examine the effect of the wealth tax on wealth accumulation, on asset portfolio, on the probability of making a gift, on taxable income and on other relevant outcomes.

4. Methodology

4.1. Measuring the impact of the reintroduction of the Wealth Tax

As discussed, the objective of this paper is to study how taxpayers responded to the reintroduction of the wealth tax in terms of wealth accumulation, wealth composition and other outcomes we describe below. The ideal setting to carry out this study would be that in which it is possible to compare – before and after the reform – wealth taxpayers to similar individuals not subject to the tax. However, this ideal control

[13] Some exempt assets such as historical heritage, art treasures and pension plans do not have to be reported, which might underestimate the overall stock of taxpayers' wealth. Nevertheless, according to the Spanish Survey of Household Finances (SHF) – wave 2011 – conducted by the Bank of Spain, assets of this type represent a small fraction (around 4%) of households' net wealth for the last wealth decile.

[14] Using the Spanish Survey of Household Finances, Durán-Cabré and Esteller-Moré (2021) show that Spanish wealth taxpayers are located at the very top of the wealth distribution (percentile 94 and above). Unfortunately, this survey information is not disaggregated at the regional level.

[15] We focus on the top 50% of the wealth distribution derived from the population under study (i.e. tax filers) not from the entire population.

[16] The tax amnesty offered the possibility to regularize evaded income by paying a 10% tax rate on the gross revenues generated during the last 4 years. Regularization of income implied the declaration of wealth generating such income, and this is why many taxpayers presented a supplementary wealth tax return. Indeed, 15.21% of 2011 tax filers submitted a supplementary 2011 wealth tax return around November 2012.

[17] See Table A2, Table A3 and Table A4 in the online Appendix.

[18] See Figure A1 in the online Appendix.

Table 2
Evolution of variables of interest, 2011–2015.

	2011	2012	2013	2014	2015	Increase 11–15 %
Total reported wealth *(in million €)*	91,919	91,695	93,757	95,520	97,729	6.32
Exempt wealth						
Total reported *(in million €)*	41,315	42,073	44,063	44,609	46,321	12.12
Weight over taxable wealth *(%)*	81.65	84.79	88.67	87.62	90.11	
Taxpayers reporting exempt assets *(%)*	92.26	92.79	92.90	92.95	92.97	
Quoted shares and investment funds						
Total reported *(in million €)*	13,871	14,861	17,476	20,030	20,870	50.46
Weight over taxable wealth *(%)*	27.41	29.95	35.17	39.34	40.60	
Taxpayers reporting these assets *(%)*	79.83	82.12	83.28	84.83	86.06	
Limit on tax liability						
Revenue loss *(in million €)*	190	256	282	306	294	54.78
Weight over collected wealth tax revenues *(%)*	62.89	83.70	96.71	105.13	93.39	
Taxpayers facing the limit *(%)*	14.25	20.87	22.43	25.31	23.73	

Notes: Monetary values are expressed in 2011 prices. Figures provided in this table consider only those taxpayers in the top 50% of the observed wealth distribution who filed wealth tax returns every year between 2011 and 2015. "Quoted shares and investment funds" include taxable assets only.

group does not exist. Instead, we use as our identification strategy the variation in treatment exposure (i.e. the reintroduction of the tax).

Fig. 1 shows the 2011 average tax rates, defined as the wealth tax liability over total reported wealth, for different levels of wealth. Additionally, it shows the highest average tax rate a taxpayer would face for a given level of wealth, assuming all reported wealth is taxed (i.e. there are no exemptions other than the exemption threshold of 700,000 euros that applies to everyone) and the limit on tax liability is not operative.

Note that for a given level of wealth, some taxpayers face an average tax rate close (or equal) to the maximum, whereas others face a much lower (or even zero) average tax rate. In other words, taxpayers with similar levels of wealth were differently affected by the reintroduction of the wealth tax. This dispersion in tax rates originates from different sources: differences in taxable wealth due to main residence and business exemptions and differences in the tax liability when the limit applies.[19] Using the average tax rate as a measure of exposure to the treatment allows us to compile all these factors into a single indicator.[20]

Part of the literature uses marginal tax rates to analyse responses to tax rate variations,[21] usually in the last tax bracket. However, the aim of this paper is to study responses to a tax reintroduction, which implies tax changes to all tax bases exceeding the exemption threshold. In this context, marginal tax rates are a less precise measure of treatment intensity than average tax rates, especially for the wealthiest. This is the case because tax brackets are wide[22] and, thus, taxpayers with different tax liabilities may face the same marginal tax rate. Also note that the margin of responses are not only intensive but also extensive (exploiting or not the limit on tax liability or starting benefiting from an exemption).[23] Moreover, the limit does not depend on the marginal rate, as we explain in footnote (10). For these different reasons, we believe the average tax rate is a more appropriate indicator.

Returning to Fig. 1, it is evident that the variation in tax rates increases with wealth and that it is quite low for the bottom 50% of the observed wealth distribution. Precisely because our identification strategy relies on the variation in treatment exposure, henceforth we focus our analysis on the top 50% of the observed wealth distribution. According to the figures provided in Table A2, the bottom 50% only accounts for a small part of the 2011 collected wealth tax revenues, so the potential responses we fail to estimate should have little impact in terms of revenues.

Using the 2011 average tax rates as our explanatory variable has, therefore, the advantage of providing an accurate indicator of the treatment exposure, but it also has a drawback: it depends on taxpayers' 2011 wealth, income and asset portfolio. To deal with this issue, we control non-parametrically for taxpayers' 2011 wealth, income, asset portfolio, age and other characteristics that might influence our dependent variables (see the following section for further details).

4.2. Measuring responses to the reintroduction of the Wealth Tax

Unfortunately, we have no information on taxpayers' wealth for the period when the wealth tax was not in force, as it was simply not being collected. However, taking into account the largely unexpected and belated reintroduction of the tax in Catalonia (see Appendix A.1), we argue that 2011 can serve as a baseline year.

This assumption is further reinforced by the fact that wealth is a stock, which is not easily adjusted instantaneously, and in any case, such adjustments are costly. The initial short-term duration of the reintroduction (just 2 years) increased these adjustment costs. The assessment rules do not always coincide with the market value, but depend on specific criteria, a situation that complicates the asset valuation adjustment.[24]

The central tax administration automatically receives third-party information on real estate and financial assets held in Spanish entities. In this sense, it is difficult for taxpayers to hide wealth of this kind. The situation is obviously different for "unproductive" assets, such as antiques or jewellery. In any case, according to survey evidence, this wealth represents a very small fraction of taxpayers' total worth (Banco de España, 2014).

[19] At the end of 2012, the Catalan government slightly increased the tax rates and lowered the exemption threshold to 500,000 euros from 2012 onward (see Appendix A.1 for further information). That is why, Figure A2 in Appendix B shows an estimation of the average tax rates that taxpayers would have faced in 2011 if the wealth tax changes approved in 2012 had been applied in the previous year. The picture does not change greatly from Fig. 1. This is the case because, again, tax changes would differently affect taxpayers with similar levels of wealth due to the existence of exemptions and the limit on tax liability. Therefore, both indicators (real and estimated average tax rates) provide very similar measures of taxpayers' exposure to the wealth tax.

[20] Figure A3 in Appendix B shows 2011 average tax rates for different types of taxpayer.

[21] See, for instance, Saez et al. (2012) for a review on the elasticity of taxable income.

[22] Table A1 in Appendix C shows the statutory tax rates in Catalonia for 2011.

[23] We do not find graphical evidence of taxpayers' bunching at marginal wealth tax thresholds, see Figure A6 in Appendix B. The lack of evidence holds when considering different histogram bandwidths.

[24] See Appendix A for further information on assessment rules.



Fig. 1. Average tax rates, 2011.
Notes: Average tax rates are expressed in percentage points and computed over the total reported wealth for 2011. The maximum average tax rate (atr) is computed applying the 2011 statutory tax rates to the overall stock of reported wealth exceeding the exemption threshold (700,000€), assuming there are no wealth exemptions and the limit on tax liability does not apply. The percentages next to the vertical dashed lines show the cumulative distribution of 2011 Catalan wealth taxpayers along total reported wealth.

While we cannot directly test the assumption that taxpayers were largely unable to react to the reintroduction of the wealth tax in 2011, we can inspect related indicators such as gifts. This is a rapid and effective manner of reducing wealth, as we said in Section 2. Thus, if taxpayers had made a concerted effort to rapidly reduce their wealth at the end of 2011, we should observe a spike in the number of gifts declared during that period. However, gifts data suggest this not to be the case.[25]

In any case, we do not need a complete lack of response in 2011 for our identification strategy. What we, in fact, require is that, after controlling for 2011 reported wealth, income, asset portfolio, age and other personal characteristics (see below), taxpayers are comparable and would behave alike in the absence of the wealth tax. This assumption requires a similar reporting (and under-reporting) behaviour among similar taxpayers based on their 2011 tax returns.[26] The assumption can be validated with wealth tax filers from the Community of Madrid and with a subsample of Catalan wealth taxpayers that has been merged with personal income tax return data. In 2011, the Community of Madrid established a 100% tax credit to the tax liability, which is still in place. However, as tax filers had to submit a wealth tax return if their gross wealth exceeded 2 million euros, for those residents we can observe the wealth tax liability they would have faced if the 100% tax credit would have not been in place.[27] Therefore, for the residents in that community, the evolution of reported wealth and its composition, once time and tax filer characteristics are taken into account, should be irrelevant. We will test this hypothesis in our empirical analysis. On the other hand, the merged subsample of Catalan wealth taxpayers with personal income tax return data allows to test income parallel trends prior to the wealth tax re-introduction, when the tax was not enforced.

The empirical specification we implement is the following:

$$Dep.var_{i,t} = \sum_{y\neq 2011} \alpha_y \cdot Y_{y=t} \cdot atr_i^{11} + \gamma_t + \delta_i + \sum_{y\neq 2011} \lambda_y \cdot Y_{y=t} \cdot X_i^{11} + \nu_{i,t} \quad (1)$$

where $Dep.var_{i,t}$ is one of the dependent variables that we explain below, $Y_{y=t}$ is a year dummy that takes a value of 1 when the year equals t, atr_i^{11} is 2011 average tax rates, α_y is our parameter of interest,[28] γ_t captures year fixed effects, δ_i is an individual fixed effect and X_i^{11} is a set of non-parametric controls detailed below and based on the reference year, 2011. In the case of atr_i^{11}, we use both the real and the "estimated" 2011 average tax rates shown in Fig. 1 and Figure A2, respectively.[29] Regarding the estimations for Madrid, some data limitations require some deviations from the main empirical exercise. First, the base year is 2012 instead of 2011, as the latter is not available. Second, 43.18% of the tax filers do not report information on income and, consequently, we disregard income-related variables as dependent variables. In addition, as the data we use for this robustness exercise comes from a representative population sample (see footnote 27), in the estimations we use the corresponding sampling weights.

The dependent variables we examine are: log of taxable wealth, log of total reported wealth, log of taxable income, the probability of making (and declaring) a gift,[30] the probability of facing the limit on tax liability,[31] the share of long-term capital gains over taxable income, the share of exempt assets over total reported assets and different components of taxpayers' asset portfolio; specifically, the share of (i) real estate; (ii) business assets and unlisted companies; and (iii) listed equity and investment funds, distinguishing between exempt and taxable assets. Indeed, we are interested in the evolution of these variables with respect to the base year; hence, the estimates are normalized with respect to 2011. Given that the type and magnitude of the responses might vary depending on the initial wealth composition, we examine heterogeneous effects according to the relative importance of unlisted companies and business assets over total reported assets in 2011.

As we cannot fully test for parallel trends prior to the re-introduction of the wealth tax (more information on robustness exercises is provided at the end of this Section and in Appendices D, E and G, in addition to individual and year fixed effects we control non-parametrically for multiple variables likely correlated with 2011 average tax rates, which we define below.[32]

To capture non-tax trends driven by changes in asset prices and asset-specific returns,[33] we create ranges of the following asset shares: (i) housing; (ii) listed equity and investment funds; (iii) unlisted companies and business assets; and (iv) bank accounts and bonds. Since we

[25] Figure A4 in Appendix B shows the frequency of gifts declared in Catalonia during the last 8 weeks of every year between 2009 and 2014. Gifts declared during the last 8 weeks of year 2011 are no higher than in previous years, when the wealth tax was not in force.

[26] In the case of significant under-reporting behaviour in 2011 due to the reintroduction of the wealth tax (which we consider implausible for the reasons outlined above), the estimated responses would be a lower bound. Still, we should think of the results as a lower bound on the overall effect of the tax re-introduction because it does not contain the responses from individuals that stopped filing the wealth tax (either by moving or by under-reporting wealth to the extent that the wealth threshold is no longer binding).

[27] This information is available in the "Wealth Tax Filers Statistics" microdata published by the Spanish Tax Administration covering the period 2012 to 2016.

[28] Thus, our parameter of interest is an uncompensated semi-elasticity corresponding to a one percentage point change in the effective average wealth tax rate, and can be compared with the previous estimates of the literature. As effective wealth tax rates are very small (see Table A3), the estimate can also be interpreted as a net-of-tax rate elasticity, with the opposite sign.

[29] Figure A2 in Appendix B shows an estimation of the average tax rates ("estimated" tax rates) that taxpayers would have faced in 2011 if the wealth tax changes approved in 2012 had been applied in the previous year.

[30] We define a dummy which takes a value of 1 if a taxpayer makes a gift in year t (and it is reported to the Catalan tax authorities), and 0 otherwise.

[31] We define a dummy which takes a value of 1 if a taxpayer faces the limit on tax liability in year t, and 0 otherwise.

[32] Results derived from less restrictive non-parametric controls are available upon request, both from the main estimations and from the robustness test using Madrid tax-filers.

[33] Considering the specific assessment rules provided in the wealth tax Law, changes in asset prices might not necessarily be reflected in tax returns (for instance, those related to real estate). However, changes in asset returns might affect taxpayers' investment and saving behaviour.

only have information on overall taxable income, but not on capital income specifically, we control both for taxable income[34] and wealth percentiles to further address differences in returns, given that there is evidence of a positive correlation between returns and the level of wealth (Fagereng et al., 2020). Additionally, controlling for income and wealth levels avoids mean reversion issues. We define these non-parametric controls as narrowly as possible to reduce the correlation between 2011 average tax rates and 2011 taxpayers' wealth, income and asset portfolio (see Table A6). In particular, wealth and income are ranked every 5 and 4 percentiles, respectively. Asset shares are ranked every 2.5 percentage points, with the exception of housing shares, which are ranked every 2 percentage points.[35] To deal with differences in saving rates and attitudes towards the inheritance and gift tax we control for age groups with the following cut-offs: 45, 65 and 75 years.[36,37,38] To further control for differences in saving rates we also include deciles of the share of debt over total assets. All these control variables are defined according to the information reported in 2011 wealth tax returns and interacted with year dummies $Y_{y=t}$.[39] Finally, as the tax amnesty mentioned in Section 3 took place during the period under study, this might have affected the reporting behaviour from 2012 onwards. Thus, we also include a dummy indicating tax amnesty participation interacted with year dummies.[40]

We would like to make clear where the variation in average tax rates comes from, after including the set of non-parametric controls. The answer is from the exemptions and the limit on tax liability. Thus, while we control for the overall housing, listed equities and unlisted companies shares, the specific importance of the exemptions within these shares varies across taxpayers. Similarly, while we control for income levels, the specific importance of long-term capital gains – which are excluded when computing the limit on tax liability – varies across taxpayers.

The underlying assumption behind the specification employed is that, once controlling for time and individual fixed effects and the set of controls detailed above, taxpayers' reported wealth, asset portfolio and income would evolve similarly in the absence of the wealth tax. Said differently, the specific importance of the exempt elements of the wealth tax and, therefore, the different average wealth tax rates would be irrelevant to determine the evolution of reported income, wealth and its components in the absence of the tax, conditional on the set of control variables and fixed effects already explained. Again, this assumption can be validated with the robustness exercise developed with tax filers from the Community of Madrid.

In addition, Fig. 2 validates the parallel trends assumption in terms of taxable income. We requested permission to merge the wealth tax return data with the Panel of the Spanish personal income tax return micro-data. More information on the merging process is provided in the Appendix D. When combining the two datasets, we have been able to observe wealth taxpayers' taxable income for 2008–2010, the period when the wealth tax was not in force. One cannot observe statistically significant pre-trends between 2008 and 2010 in Fig. 2, in fact, coefficient estimates are very close to zero. On the other hand, despite wide confidence intervals, coefficient estimates for the period 2012–2015 are very similar to those obtained when using the full estimation sample, which are provided in Fig. 6 in Section 5. Moreover, to assess whether the merged subsample might yield biased results due to a lack of representativeness, we repeated the main analysis presented in the paper using the merged subsample. Table A7 in Appendix D shows that the coefficient estimates obtained from the merged subsample are very similar to the main estimation results for the multiple dependent variables considered.

In Appendix E we develop an additional robustness exercise that reinforces the validation of the parallel trends assumption. Using the micro-data of the Spanish Survey of Household Finances (EFF) elaborated by the Bank of Spain, waves 2008, 2011 and 2014, we implement the specification (1) using these three time periods. We do not find a significant relation between 2008 simulated taxable wealth and 2011 simulated average wealth tax rates, once controlling for 2011 wealth and income characteristics and individual fixed effects. The 2008–2011 span is precisely the time period when the wealth tax was not in force, hence this supplementary exercise does not contradict the identifying assumption under discussion. Nonetheless, this data presents a series of drawbacks discussed in the same Appendix that prevent us from using it as the main data source. Appendix F provides a further discussion and some examples of the identification assumptions.

4.3. General methodological comments and extensions

Before moving to the results, some additional methodological comments regarding our main empirical exercise need to be made. First, we need to address the potential mechanical effect of taxes on wealth. If taxes are paid out of savings, then they mechanically reduce wealth, even in the absence of behavioural responses. In order to account for this potential mechanical effect, we adjust yearly reported wealth and taxable wealth with the wealth tax liabilities paid up to that date by applying a 3% net rate of return.[41,42] The mechanical effect, however, would not be present in our estimates if the tax was paid through consumption, substituting other expenditures for such payments. Since we have no information to test these hypotheses, our results for taxable and total reported wealth are presented both omitting and adjusting for the mechanical effect. Results concerning wealth composition, though, only provide overall effects (behavioural+mechanical, if any), since we

[34] We define an extra category for those taxpayers who do not report information on income (representing 10% of the observations used in the main estimations). We also checked that our results do not substantially change when excluding these observations; they do not.

[35] Table A6 in the online Appendix provides correlations between 2011 average tax rates and the main variables used to define the set of non-parametric controls. Once the set of non-parametric controls is considered in the regressions, correlations become very small and non statistically significant, with the exception of the log of wealth and taxable income. The significance of these coefficients is driven by taxpayers located at the very top of the wealth and income distributions (top 0.5%). If these taxpayers are excluded from the estimations (see row c), all correlations approximate zero. Taxpayers located at the top 0.5% of the wealth and income distributions have been considered in all the other analyses performed in the paper. Nonetheless, estimation results do not substantially change when excluding these taxpayers.

[36] We define an extra category for those taxpayers whose age is non-available (representing just 0.06% of the observations used in the main estimations).

[37] This age indicator is not available for the Madrid robustness exercise.

[38] Estimates are not sensitive to finer age control groups (i.e. taxpayers grouped by decades with an additional cut-off at 65 years old); results are available upon request.

[39] For the Madrid robustness exercise, the baseline year is 2012, as data for prior years is not available.

[40] We do not know exactly whether a taxpayer participated in the tax amnesty or not, but we can identify those taxpayers who submitted a 2011 wealth tax return when the tax amnesty took place (October-November 2012); time in which the voluntary period had already expired. Therefore, we consider as tax amnesty participants those taxpayers who filed a 2011 wealth tax return during, or later than, October 2012. The amnesty indicator is not available for the community of Madrid.

[41] Assuming that the wealth tax is paid out of financial assets, we compute an average gross rate of return to financial assets using the 2011 Survey of Household Finances microdata. This average is 4% for households whose net wealth is above 1.5M euros (this is the lowest net wealth value in our estimation sample). In turn, we compute the net rate of return applying capital income tax rates (25% for years 2012–2014 and 21.5% for 2015).

[42] For instance, 2012 reported wealth is adjusted with (2011 wealth tax liability)*1.03. Successively, 2013 reported wealth will be adjusted with (2011 wealth tax liability)*1.03^2 and (2012 wealth tax liability)*1.03, and so on.

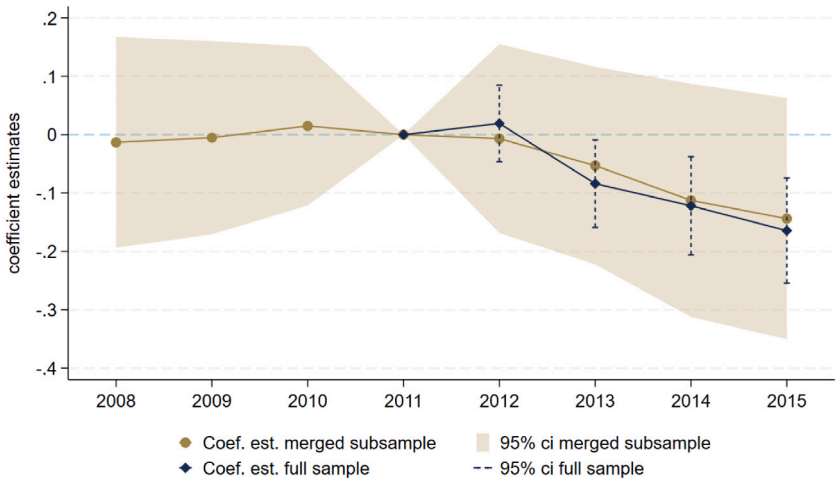


Fig. 2. Log of taxable income, 2008–2015.
Notes: This figure provides coefficient estimates and confidence intervals (ci) from specification (1) with *real* atr_i^{11} as the explanatory variable and log of taxable income as the dependent variable. The *merged subsample* estimates correspond to a subsample of wealth tax filers in Catalonia that have been merged with the Panel of the Spanish personal income tax return micro-data (N: 18,056 obs). A minority of taxpayers that switched from individual to joint personal income taxation, or vice versa, throughout the period have not been considered in the estimations. The *full sample* estimates correspond to the results illustrated in Fig. 6 when using the whole sample of wealth tax filers considered in the main analysis (N: 70,595 obs).

would need to make strong assumptions about the specific assets used to pay the wealth tax to adjust for the mechanical effect.

Second, all monetary values are expressed in 2011 euros and, third, standard errors are clustered by the married taxpayers identified in the sample. This is the case when they submit income tax returns jointly; however, they have to submit their wealth tax returns individually so as to report their own wealth.

As an extension, we check whether treatment exposure is related to the probability of disappearing from the sample. To do this, we implement the following specification:

$$Disappear_i = \gamma + \alpha \cdot atr_i^{11} + \lambda \cdot X_i^{11} + v_i \quad (2)$$

where $Disappear_i$ is a dummy which takes a value of 1 if a taxpayer who submitted a 2011 tax return subsequently disappears from the sample for reasons other than death. Alternatively, it takes a value of 0 for taxpayers who filed wealth tax returns every year between 2011 and 2015. The explanatory variable, atr_i^{11}, is the 2011 average tax rate, α is our parameter of interest and X_i^{11} is a set of non-parametric variables which include the controls defined above and two additional dummies which identify married tax filers and those who live in the province of Barcelona.[43] In contrast to specification (1), we are not able to capture unobserved individual characteristics; hence, the estimation results from (2) need to be treated with caution.

5. Results

5.1. Main analyses

Figs. 3–10 show the coefficient estimates and confidence intervals resulting from specification (1) for the multiple outcomes previously specified.[44] Estimations for Catalonia have been carried out using both the real and the "estimated" 2011 average tax rates as the explanatory variable; however, as they give very similar results, we only discuss the estimates obtained with the real average tax rates.[45]

In the case of the coefficient estimates from year 2013 onwards (for Catalonia), we are unable to disentangle which part of the response can be attributed to the wealth tax reintroduction *per se* and which to the tax increase approved at the very end of 2012.[46] In any case, we are interested in the overall responses, even if the tax was implemented in two different steps.

5.1.1. Taxable and reported wealth responses

Figs. 3 and 4 show the coefficient estimates from specification (1) when considering taxable wealth and total reported wealth, respectively, as dependent variables. Each figure provides the estimates for Catalonia, but also for the Community of Madrid for the reasons explained in Section 4.2. The top panel shows overall effects (behavioural+mechanical, if any), while the bottom panel shows behavioural effects only for Catalonia, since taxable wealth has been adjusted for the mechanical effect, assuming in this case that the wealth tax is paid out of savings.

The first important observation to highlight from Fig. 3 is that the coefficient estimates for Madrid are very small and not statistically significantly different than zero, while estimates for Catalonia reflect a negative effect of treatment exposure on taxable wealth. The response is already statistically significantly different from zero in 2012 and accumulates over time. The coefficient estimate associated with year 2012 suggests that as the 2011 average tax rate increases by 1 percentage point, taxable wealth lowers by 14.16%. This decrease accumulates to as much as 32.13% over 4 years. If we adjust taxable wealth with the (assumed) mechanical effect, the 2015 coefficient becomes −28.52%, suggesting that the behavioural (mechanical) effect accounts for 88.75% (11.25%) of the overall effect.

To interpret the coefficients, note that a 1 percentage point increase in the average tax rates represents a large experiment: applying it to the mean of 2011 average tax rates for the estimation sample, which is 0.30%, it would represent a tax increase of more than three times.

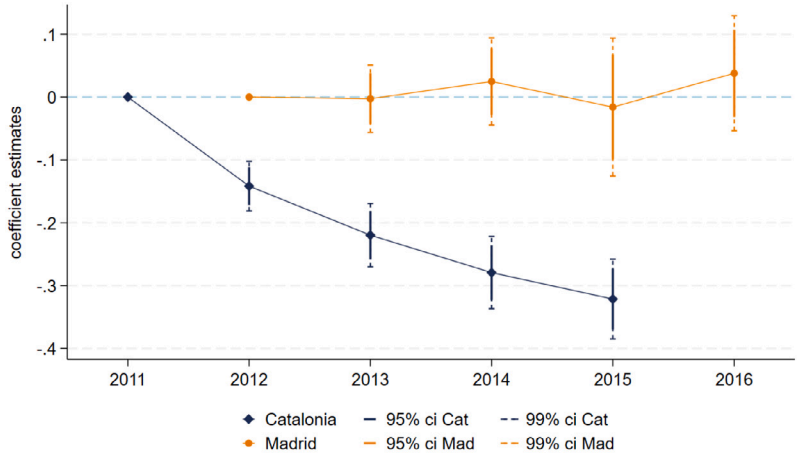
[43] These two additional dummies are captured by individual fixed effects in specification (1).

[44] Estimation tables for all the different dependent variables and specifications are available upon request.

[45] Results from using "estimated" 2011 average tax rates as explanatory variable are available upon request.

[46] The coefficient estimates for 2012 can be fully associated to a response to the wealth tax reintroduction. The 2012 wealth tax increase was passed on December 27, 2012 and until a few days before its approval had not been previously discussed. See: http://www.europapress.es/catalunya/noticia-govern-reforma-impuesto-patrimonio-ingresar-70-90-millones-extra-20121227215328.html.

(a) Catalonia vs. Madrid



(b) Catalonia, mechanical effect adjustment

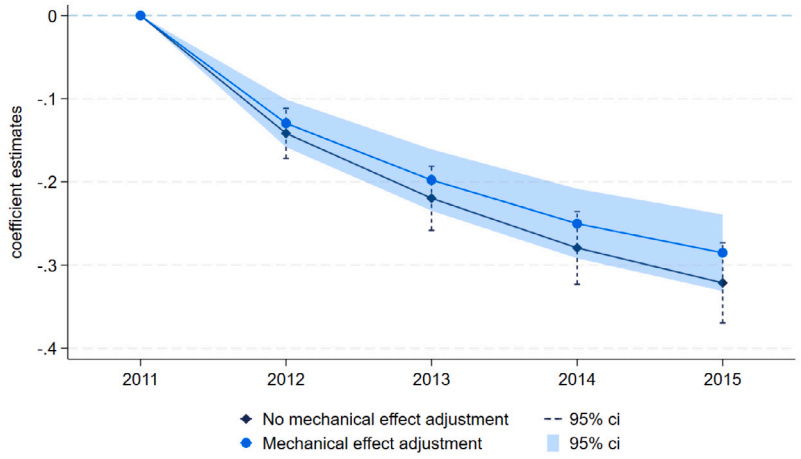


Fig. 3. Effect on taxable wealth.
Notes: Both figures provide coefficient estimates and confidence intervals (ci) from specification (1) with *real* atr_i^{11} (atr_i^{12} for Madrid) as the explanatory variable. For Catalonia, the estimation sample is a balanced panel of the 50% richest taxpayers, according to the stock of wealth reported in 2011, who filed wealth tax returns every year between 2011–15 (N: 91,305 obs). For the Community of Madrid, it is a balanced panel of tax filers who fill the wealth tax return between 2012 and 2016 (N: 23,425 obs representing 55,924 different tax returns when sampling weights are considered.). Standard errors are clustered by marriages when this information is available. The dependent variable is the log of taxable wealth. In the top panel (a), the dependent variable has no mechanical effect adjustment, as tax filers from the Community of Madrid do not pay the wealth tax.

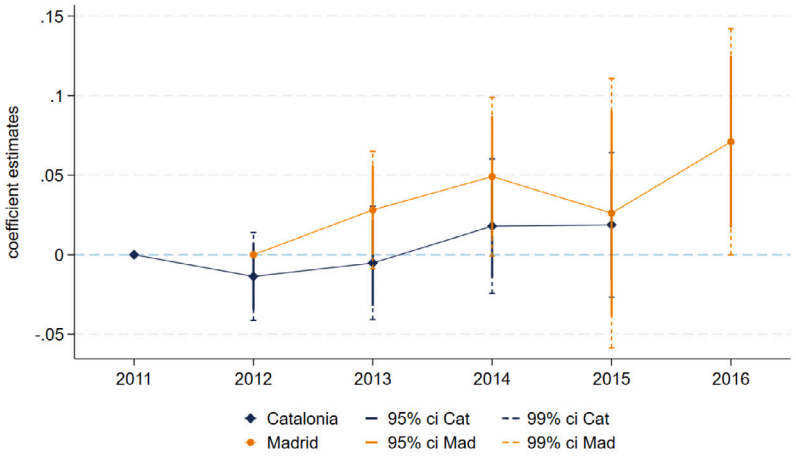
For this reason, from now on we refer to the estimates in terms of a 0.1 percentage point increase.[47]

The coefficients obtained, although they are expressed with respect to the average tax rate, are within the range reported in the literature on wealth taxes. However, the comparison that follows should be treated with caution, since tax base definitions and the overall design of the tax vary across countries (see OECD, 2018) and they might determine the responses estimated — besides other factors such as tax morale or tax enforcement (Alstadsæter et al., 2022; Garbinti et al., 2023).

Among the studies that employ similar methodologies to the one used here, the lowest estimate is reported by Zoutman (2018), who finds that a 0.1 percentage point change in the tax rate reduces accumulated taxable wealth by 1.16% in the short-run (over 2 years) and 1.38% in the long-run (over 5 years). These estimates rise to 1.3 and 1.67%, respectively, when the author looks at households above the 75th wealth percentile, a sample that might be more comparable to ours. Yet, our 2-year estimate (−2.20%) is still higher. Jakobsen et al. (2020) report an increase of taxable wealth of about 31% over 8 years for the top 1% of the wealth distribution, in response to a tax cut of 1.2 percentage points. The estimate is almost 20% in the 4th year after the reform, which is also lower than our 4th-year coefficient. Using aggregate cross-canton data, Brülhart et al. (2022) estimate that a 1 (0.1) percentage-point drop in wealth taxes raises reported taxable wealth by 43% (4.3%) after 6 years. The estimate is around 40% (4%) four years after the reform, being somewhat larger than our 4th-year coefficient. When using micro data for the Cantons of Bern and Lucerne, they find that a 0.1 percentage point decrease in wealth taxes increases wealth accumulation of stayers (balanced panel) by 0.9%–1.3% over a 4-year period. These second magnitudes are lower than our 4th-year estimate. The studies employing bunching techniques – that is, Seim (2017) and Londoño-Vélez and Ávila-Mahecha (2024) – report much lower estimates: a decrease in taxable wealth of 0.027% and 0.2%,

[47] This is also the approach followed by Brülhart et al. (2022) and Zoutman (2018).

(a) Catalonia vs. Madrid



(b) Catalonia, mechanical effect adjustment

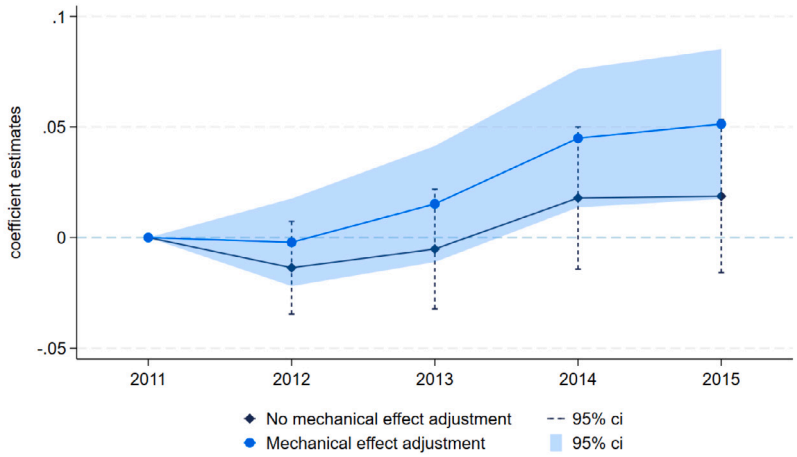


Fig. 4. Effect on total reported wealth.
Notes: Both figures provide coefficient estimates and confidence intervals (ci) from specification (1) with *real* atr_i^{11} (atr_i^{12} for Madrid) as the explanatory variable. For Catalonia, the estimation sample is a balanced panel of the 50% richest taxpayers, according to the stock of wealth reported in 2011, who filed wealth tax returns every year between 2011–15 (N: 92,325 obs). For the Community of Madrid, it is a balanced panel of tax filers who fill the wealth tax return between 2012 and 2016 (N: 23,425 obs representing 55,924 different tax returns when sampling weights are considered.). Standard errors are clustered by marriages when this information is available. The dependent variable is the log of reported wealth. In the top panel (a), the dependent variable has no mechanical effect adjustment, as tax filers from the Community of Madrid do not pay the wealth tax.

respectively, if we interpret the coefficients in terms of a 0.1 percentage point increase in the tax rates.[48]

Fig. 4 shows the coefficient estimates from specification (1) when considering total reported wealth. As in Fig. 3, the top panel shows overall effects (behavioural + mechanical, if any), while the bottom panel shows behavioural effects for Catalonia, assuming the mechanical effect takes place. Coefficient estimates for Madrid are slightly larger than those obtained in Fig. 3, but remain not statistically significantly different than zero with a 99% confidence interval. Estimation results provided in Appendix G reassure the use of Madrid tax filers as a robustness exercise.

Interestingly, when focusing on results for Catalonia, the wealth tax does not have a negative effect on wealth accumulation. Estimates from the top panel suggest that the tax does not have a significant impact on the evolution of total reported wealth. If we assume that the wealth tax is paid out of savings (thus, mechanically reducing wealth), when we account for this effect in the bottom panel, the estimates indicate that the taxpayers that are most exposed to the reintroduction of the tax increase their savings in the subsequent years. Specifically, as the 2011 average tax rate increases by 0.1 percentage point, reported wealth increases by 0.51% over a 4-year period. There could be several explanations for this: (i) taxpayers derive some utility from wealth *per se*, also known as "capitalistic spirit" motive (see Kopczuk, 2010; Saez and Stantcheva, 2018) and, hence, they increase their savings to offset the mechanical effect of wealth taxes (i.e., a positive income effect dominates a negative substitution effect see Ring, 2024; Bjørneby et al., 2023); and (ii) taxpayers make use of tax avoidance strategies and defer the realization of capital income to take advantage of the limit on tax liability. The following sections seek to shed further light on this.

5.1.2. Avoidance responses

This section will focus on our main empirical exercise developed for Catalonia. Appendix G provides coefficient estimates from specification

[48] The estimates in Seim (2017) and Londoño-Vélez and Ávila-Mahecha (2024) are not directly comparable because they account for the elasticity of taxable wealth with respect to the net-of-wealth tax rate. Nevertheless, taking into account that wealth tax rates are low (1.5% in Seim, 2017 and 1% for the first 2010 tax bracket in Londoño-Vélez and Ávila-Mahecha, 2024), we can use the property of logarithms: $log(1+x) \approx x$, for small x, to express the estimates in terms of a 0.1 percentage point change in the wealth tax rates. Considering the upper-bound estimates in both cases, the comparable coefficients are −0.027 and −0.2, respectively.

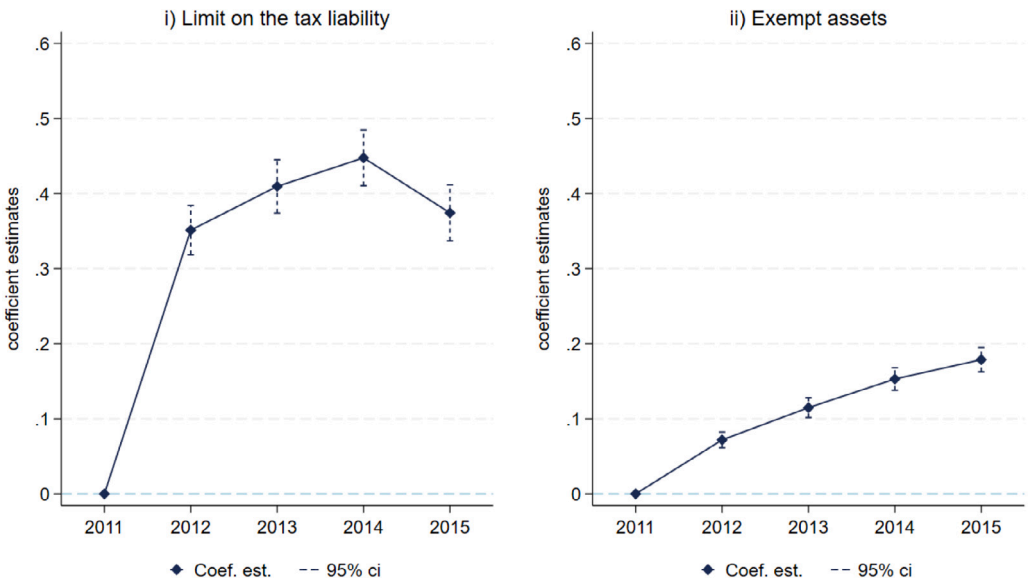


Fig. 5. Effect on potential tax avoidance strategies.
Notes: Both figures provide coefficient estimates and 95% confidence intervals from specification (1) with *real* atr_i^{11} as the explanatory variable. The estimation sample is a balanced panel of the 50% richest taxpayers, according to the stock of wealth reported in 2011, who filed wealth tax returns every year between 2011–15 (N: 92,325 obs). The dependent variable in the left-hand panel is a dummy which equals 1 if a taxpayer faces the limit on the tax liability in year t, and 0 otherwise. The dependent variable in the right-hand panel is the share of exempt assets over total reported assets.

(1) for different wealth composition outcomes, comparing results from Catalonia and Madrid.[49] It is important to note that all the coefficient estimates for Madrid are very small and not statistically significantly different than zero. Hence, a clear conclusion can then be extracted: when the wealth tax is not enforced, once controlling for wealth-related characteristics, the hypothetical average wealth tax rates are irrelevant to explain the evolution of taxable and exempt wealth levels and its composition. These results help validate the empirical strategy used in this paper.

Focusing now on our main empirical exercise, Fig. 5 shows the coefficient estimates from specification (1) when considering potential tax avoidance strategies derived from the design of the wealth tax. As explained in Section 2, these strategies are related to the use of the limit on tax liability and exempt assets. The left-hand panel shows a positive relationship between exposure to the reintroduced tax and the probability of facing the limit on wealth tax liability in subsequent years. Taxpayers respond quickly, since most of the effect has already taken place in 2012, as expected due to the low avoidance cost of this margin of response. This suggests that taxpayers take advantage of this tax feature every year and not on just one occasion. The 2012 coefficient indicates that the probability of facing the limit in 2012 increases by 3.51 percentage points as the 2011 average tax rate increases by 0.1 percentage points. This probability rises to 3.74 percentage points in 2015. This effect represents 0.26 times the share of taxpayers facing the limit in 2011.

The results in the right-hand panel of Fig. 5 are not surprising if we take into consideration the estimates from Figs. 3 and 4. Taxpayers take advantage of the exemptions, which is why taxable wealth can fall without reducing total reported wealth. The 2015 coefficient indicates that a 0.1 percentage point increase in the 2011 average tax rate leads to a 1.79 percentage points rise in the share of exempt assets over a 4-year period. Put differently, the differences in the share of exempt assets existing in 2011 (see Table A9) are reduced by one quarter after 4 years. Once we compare the different dynamics of the estimated responses shown in the left-hand panel versus the right-hand one, we can confirm that taking advantage of exemptions takes longer: that is, it is more costly, as we already discussed in Section 2.

As discussed in Section 2, there are two procedures that can help a taxpayer benefit from the limit on tax liability: reducing their realized taxable income and increasing the importance of their realized long-term capital gains in taxable income, as these gains are excluded from the computations of the limit. Fig. 6 shows that taxpayers, in fact, employ both strategies. Estimates from the left-hand panel indicate that a 0.1 percentage point increase in the 2011 average tax rate leads to a reduction in taxable income of 1.64% over 4 years.[50] This apparently large effect is less important when we consider its potential impact on wealth accumulation. Indeed, the 4-year average decrease in taxable income of almost 7000 euros[51] only represents 0.14% of the 2011 average reported wealth. Furthermore, this effect on taxable income does not necessarily imply a reduction in savings, since it could also be explained by an increase in unrealized capital income. If part of the foregone income is capitalized, then it should not impact wealth accumulation. It is not unreasonable to believe this to be the case, given that, as we see below, the taxpayers that are most exposed to the wealth tax increase their preference for assets that allow them to produce capital income in the form of capital gains easily. However, we have no further information on income sources to confirm this.

Apart from lowering taxable income, the importance of realized long-term capital gains increases over time. The different evolution

[49] As previously indicated, due to data limitations we disregard income-related outcomes for the robustness exercise.

[50] Following Brülhart et al. (2022), the elasticity of response can be expressed with respect to an implied net-of-tax rate on the annual returns to wealth. Considering a gross rate of return of 3%, computed from the 2011 Spanish Survey of Household Finances microdata and for households whose net wealth is above 1.5M euros (lowest net value in our estimation sample), and given that the mean of the average income (wealth) tax rate in 2011 is 24% (0.3%), it can be shown that a 0.1 percentage point increase in the wealth tax rate translates into a 5.05% reduction of the net-of-tax rate of return. Thus, the estimated reduction in taxable income can be expressed as an elasticity with respect to the net-of-tax rate of return, 0.32 (1.64%/5.05%). This estimate is not very different from the 0.278 capital income elasticity reported by Kleven and Schultz (2014).

[51] Considering the mean 2011 average tax rate of 0.30% and the 2011 average income of 140,216.5 euros.

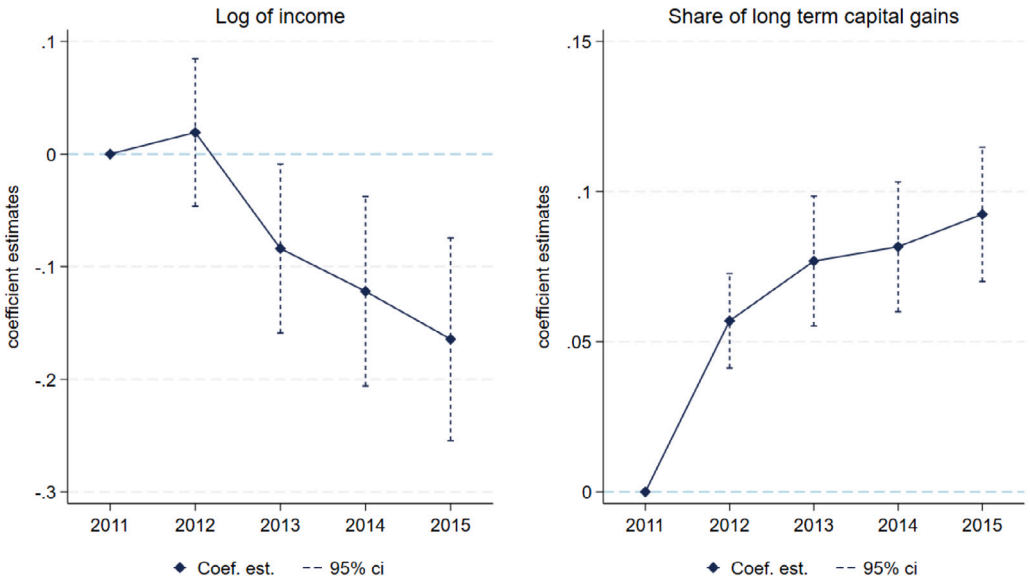


Fig. 6. Effect on income and long-term capital gains.
Notes: Both figures provide coefficient estimates and 95% confidence intervals from specification (1) with *real* atr_i^{11} as the explanatory variable. The estimation sample is a balanced panel of the 50% richest taxpayers, according to the stock of wealth reported in 2011, who filed wealth tax returns every year between 2011–15 (N: 70,595 obs). The dependent variable in the left-hand panel is the log of taxable income. The dependent variable in the right-hand panel is the share of long term capital gains over taxable income.

of both effects is not surprising, given that capital gains realization is much easier to adjust than other income sources. Indeed, the 2012 response in the share of long-term capital gains accounts for more than half of the 4-year effect, which explains the sharp rise in the probability of facing the limit on tax liability shown in Fig. 5. Moreover, the 2012 coefficient also tells us that in just one year taxpayers have almost reversed the differences in the share of long-term capital gains existing in 2011 (shown in Table A9). The estimated effect keeps rising up to a coefficient of 0.92 percentage points for 2015, which represents 0.20 times the average share of long-term capital gains in 2011.

As we explained in Section 2, the limit has a direct impact on tax liability, while exemptions impact the tax liability through the taxable wealth. Thus, in order to gauge the relative importance of both margins of avoidance, we compare their impact on wealth tax revenues. This is what we do in Appendix I. If we add the revenue losses for the 2012–2015 period and express them with respect to the 2011 estimated wealth tax revenues, the accumulated impact on tax revenue amounts to −274.93%. Out of this total, the relative importance of the use of exemptions is quite modest (i.e. 20.48/ 274.93) and hence most of the revenue impact, i.e. the remaining 92.6%, is explained by the limit on tax liability.

Responses related to taking advantage of the limit on tax liability reflect only avoidance strategies, since taxpayers exploit the provisions foreseen by the Law. However, the extent to which the use of the exemptions constitutes tax avoidance or tax evasion is difficult to define, especially in the case of closely-held business exemption. According to the Law, this exemption can only be extended to that part which is directly involved in a firm's economic activity. However, determining which assets are directly involved in the economic activity is clearly ambiguous as the law only provides general indications and, thus, ultimately, it is left up to the criteria of the taxpayers' themselves. The subjective nature of the tax regulations might in turn result in the potential abuse of this tax incentive. Indeed, Durán-Cabré et al. (2019), in estimating the tax gap in Catalonia for 2014, find that a sizable percentage of the tax gap in the wealth tax is attributable to the incorrect use of the business exemption.

Figs. 7 to 9 show the responses of the taxpayers' asset portfolios to the reintroduction of the wealth tax. The left-hand panel in Fig. 7 indicates that facing higher wealth tax rates has a negative effect on the overall importance of unlisted companies and business assets. This negative effect derives from a decrease in the importance of taxable assets, which are partly shifted to exempt assets (right-hand panel). The last coefficient in the right-hand panel tells us that a 0.1 percentage point increase in 2011 average tax rates leads to a rise in the share of exempt businesses of 0.99 percentage points over 4 years. This effect reduces the 2011 differences in the share of exempt businesses by 20.83% (see Table A9). The equivalent 4-year coefficient on taxable businesses is more than 2 times higher, with the opposite sign, which reflects a shift in preferences towards other types of asset. Estimates from Fig. 8 confirm this is indeed the case. Facing higher wealth tax rates leads taxpayers to switch their holdings in unlisted companies and business assets to listed equity and investment funds. This response is not surprising when considering the tax liability limit. These latter assets allow taxpayers to realize capital gains much more easily than is the case with unlisted companies, and, moreover, it helps them reduce their annual capital income, especially the assets that do not produce realized income until they are sold. The results shown in Fig. 6 are very much in line with this reasoning.

The 4th-year coefficient in the left-hand panel of Fig. 8 indicates that a 0.1 percentage point increase in the 2011 average tax rate leads to a rise in the overall share of listed equity and investment funds of 1.01 percentage points. According to the last estimate in the right-hand panel, 74% of this effect comes from exempt assets.[52] This is a large response considering that the average share of exempt listed equity in 2011 was 1.59%. Put differently, this effect reduces the 2011 differences in the share of exempt listed companies by 46.3%.

The left-hand panel in Fig. 9 shows that, overall, the tax has no significant effects on the share of housing. Yet, the right-hand panel estimates suggest that higher tax rates do seem to boost the use of the main-dwelling exemption, although the effect is quite small. The 4-year estimate takes a value of 0.05 percentage points, which represents 1.07% of the average share of exempt housing in 2011. Furthermore, this coefficient tells us that the differences in the share of exempt housing existing in 2011 (see Table A9) are reduced by 13.25% after 4 years.

[52] Holdings in listed companies may also be exempt from the wealth tax if the ownership share is at least 5% and other conditions specified in the Law are satisfied. See Appendix A.2 for further information.

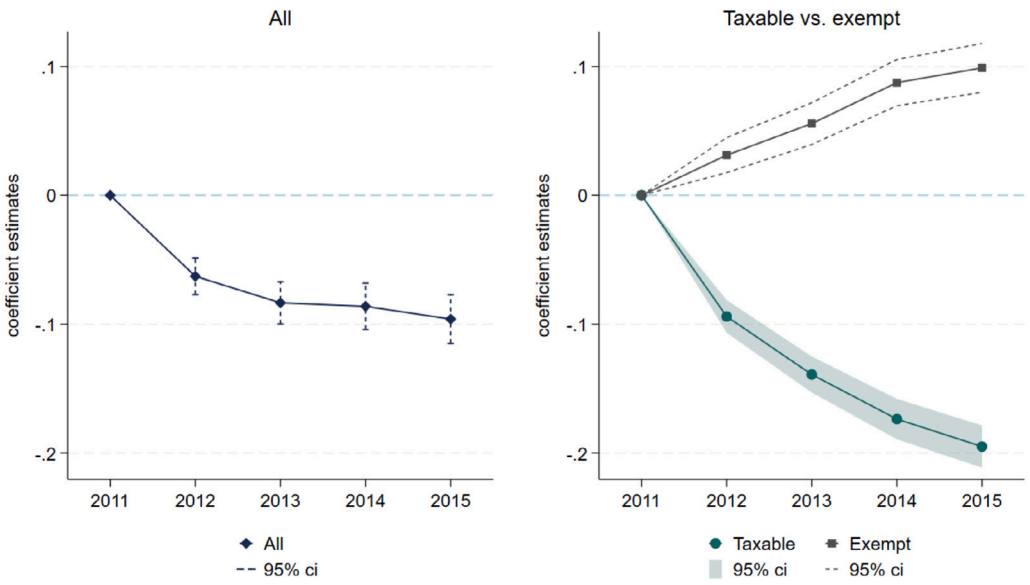


Fig. 7. Effect on unlisted companies and business assets.
Notes: Both figures provide coefficient estimates and 95% confidence intervals from specification (1) with *real* atr_i^{11} as the explanatory variable. The estimation sample is a balanced panel of the 50% richest taxpayers, according to the stock of wealth reported in 2011, who filed wealth tax returns every year between 2011–15 (N: 92,325 obs). The dependent variable for the panels (from left to right) is the share of (all and taxable/exempt) unlisted companies and business assets over total reported assets.

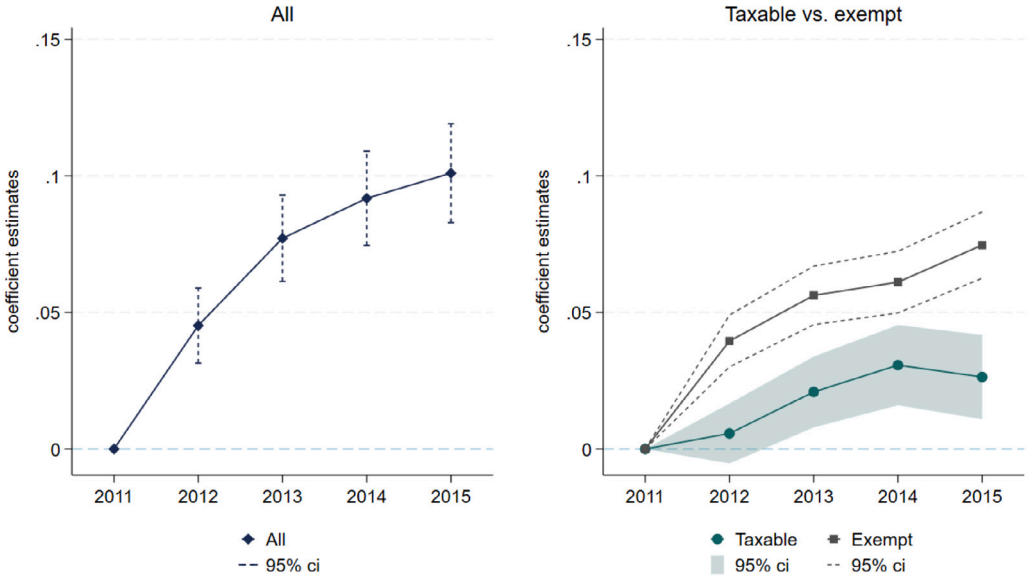


Fig. 8. Effect on listed equity and investment funds.
Notes: Both figures provide coefficient estimates and 95% confidence intervals from specification (1) with *real* atr_i^{11} as the explanatory variable. The estimation sample is a balanced panel of the 50% richest taxpayers, according to the stock of wealth reported in 2011, who filed wealth tax returns every year between 2011–15 (N: 92,325 obs). The dependent variable for the panels (from left to right) is the share of (all and taxable/exempt) listed equity and investment funds over total reported assets.

Finally, Fig. 10 shows the effect of facing higher tax rates on the probability of making a gift (as declared to the Catalan Tax Agency) in the subsequent years. The positive effect recorded in 2012 and 2013 disappears thereafter. The 2013 coefficient indicates that a 0.1 percentage point increase in the 2011 average tax rate leads to a rise in the probability of making a gift in 2013 of 0.31 percentage points. This effect represents 0.15 times the share of taxpayers who made a gift in 2011. The fact that this response does not persist over time, contrary to the other trends described up to this juncture, suggests that taxpayers prefer tax avoidance strategies that do not imply giving up wealth. This would point to a "capitalistic motive" underlying wealth accumulation, but it may also be driven by the fact that gifts are subject to gift taxes and the other avoidance strategies are less costly, at least in taxation terms.

We have also performed a heterogeneity analysis to verify whether the responses described above vary according to the initial circumstances of the taxpayers (see Appendix H). In particular, we have divided the estimation sample in two groups: those whose 2011 share of unlisted companies and business assets was below the median ("Business-Low") and those whose 2011 share was above ("Business-High"). Results reflect a clear distinction in the strategies adopted by the two groups in response to the reintroduction of the tax. As expected, on the one hand, taxable wealth was reduced significantly more by "Business-High" taxpayers in favour of business-related exempt assets. On the other hand, "Business-Low" taxpayers took more advantage of the limit on tax liability.

To sum up, our results clearly indicate that taxpayers responded significantly to the reintroduction of the wealth tax by adopting a

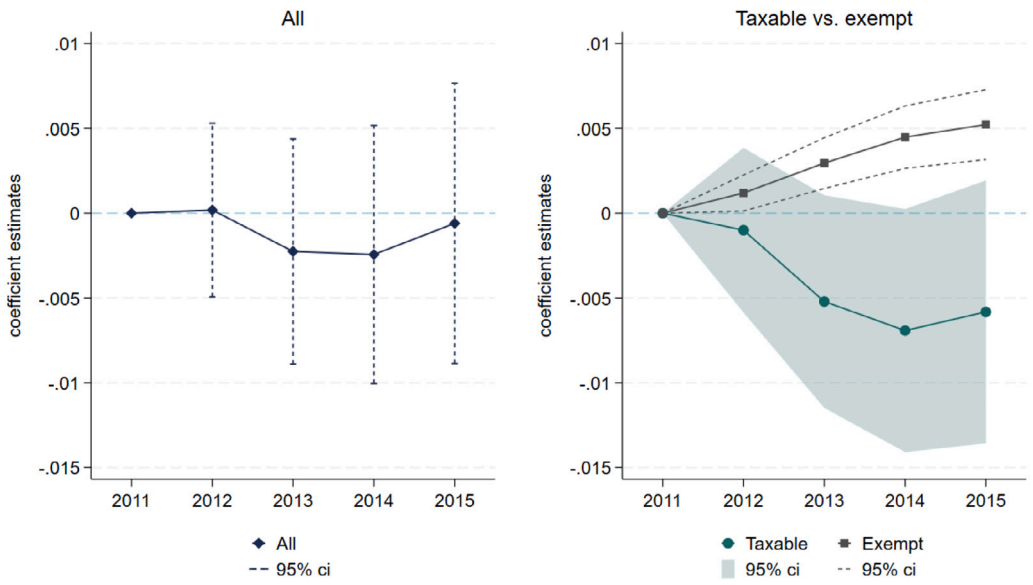


Fig. 9. Effect on real estate.
Notes: Both figures provide coefficient estimates and 95% confidence intervals from specification (1) with *real* atr_i^{11} as the explanatory variable. The estimation sample is a balanced panel of the 50% richest taxpayers, according to the stock of wealth reported in 2011, who filed wealth tax returns every year between 2011–15 (N: 92,325 obs). The dependent variable for the panels (from left to right) is the share of (all and taxable/exempt) real estate over total reported assets.



Fig. 10. Extensive-margin effect on gifts. Notes: The figure provides the coefficient estimate and 95% confidence intervals from specification (1) with *real* atr_i^{11} as the explanatory variable. The estimation sample is a balanced panel of the 50% richest taxpayers, according to the stock of wealth reported in 2011, who filed wealth tax returns every year between 2011–15 (N: 92,325 obs). The dependent variable is a dummy which equals 1 if a taxpayer makes a gift – declared to the Catalan Tax Agency – in year t, and 0 otherwise.

range of avoidance (and possibly also evasive) strategies. Online Appendix I estimates the impact of these responses on tax revenues. Overall, these avoidance responses were high in terms of foregone revenues: in 2015 they accounted for 73.5% of 2011 estimated wealth tax revenues. When considering the cumulative impact, they represent a 4-year accumulated revenue loss of 2.75 times the estimated wealth tax revenues for 2011 (i.e. 51,134 euros per taxpayer). In spite of these avoidance responses, the 5-year tax revenue gain from the wealth tax reintroduction amounts to 81,506 euros per taxpayer.[53] However, this does not account for the revenue loss in the personal income tax due to lower realized taxable income to exploit the limit on the tax liability. As we show in Appendix I, in monetary terms, this externality amounts to 3778 euros per taxpayer. Thus, there is still a net gain of 77,728 euros, and so Catalonia is not on the wrong side of the Laffer curve as a consequence of the reintroduction of the wealth tax.

5.2. Initial Wealth Tax exposure and subsequent tax filing

Finally, Table 3 shows the coefficient estimates resulting from specification (2). As previously stated, with this specification we are unable to capture unobserved individual characteristics that might bias the estimates; hence, these results should be treated with caution. Nevertheless, we believe it is still interesting to know, especially for auditing purposes, whether there is a positive relation between exposure to the reintroduction of the wealth tax and the probability of disappearing from the sample in the subsequent years. Estimates suggest this might indeed be the case. Specifically, as 2011 average tax rates increase by 0.1 percentage points, the probability of leaving the sample between 2012 and 2015 rises by 0.33 percentage points.

[53] The revenue gain per taxpayer (81,506 euros) equals total gross tax revenue gains, 1505 million of euros (302+306+291+291+315, Table A2 row 3) divided by the total number of top 50% taxpayers, 18,465, Appendix I.

Table 3
Initial wealth tax exposure and subsequent tax filing.

	(1)	(2)	(3)
2011 atr	0.0333	0.0011	0.0385
	(0.01002)	(0.0164)	(0.0135)
Observations	20,717	10,288	10,429
Sample	All	Business-Low	Business-High

Notes: Robust standard errors, clustered by marriages, in parentheses. Only taxpayers in the top 50% of the observed 2011 wealth distribution are considered. Controls include non-parametric variables which capture taxpayers' wealth, income, asset portfolio, age, indebtedness share and tax amnesty participation. For a detailed definition of these controls see Section 4.2. "Business-Low(High)" taxpayers are those whose 2011 share of unlisted companies and business assets is below(above) the median. The dependent variable is a dummy which takes a value of 1 if a taxpayer stops filing wealth tax returns after 2011 for reasons other than death, and 0 otherwise.

Columns (2) and (3) in Table 3 suggest that it is the "Business-High" taxpayers (those whose 2011 share of unlisted companies and business assets is above the median) that are driving this result.[54] A potential explanation could be that taxpayers in this group are younger (see Figure A7) and, hence, they might be more mobile. However, we cannot determine whether they moved elsewhere or stopped filing for other reasons (other than death); thus, further information would be needed to discover the mechanism responsible for this response (see the recent empirical evidence on wealth tax-induced mobility responses provided by Agrawal et al. (2025)).

6. Conclusions

The significant growth in wealth inequality has revived the debate centred on wealth taxation, both in public policy and in academia. However, little is still known about how wealth taxes affect taxpayers' behaviour, which complicates any valid evaluation of the desirability of such taxes. Against this backdrop, this paper has examined how taxpayers reacted to the reintroduction of the wealth tax in 2011. Using the universe of wealth tax returns submitted to the Catalan Tax Agency between 2011 and 2015, we have exploited the variation in wealth tax exposure to analyse taxpayers' responses, not only in terms of wealth accumulation, but also of their potential avoidance strategies.

The main conclusion to be drawn from the results is that taxpayers responded significantly to the tax, not in terms of savings, but through the adoption of avoidance strategies. Specifically, while facing higher tax rates did not have a negative effect on wealth accumulation, it did encourage taxpayers to change their asset and income composition to take advantage of exemptions and the limit set on tax liability. As such, this paper has documented two different types of response. The first type of response was to reduce taxable wealth in favour of exempt assets, mainly in terms of company shares (both listed and unlisted). Estimates indicate that a 0.1 percentage point increase in the average tax rate leads to a reduction in taxable wealth of 3.21% over 4 years. The second type of response – related to the application of a tax liability limit and adopted primarily by taxpayers holding few business shares in 2011 – involved reducing their realized taxable income and increasing their long-term capital gains realizations, on the income side, and investing in listed companies and investment funds, on the asset portfolio side. Clearly, however, these income-asset portfolio responses were not independent of one another, as the latter helped achieve the former. In terms of revenue losses, the use of the limit accounts for most of the impact on total revenue reduction (92.6%). This is a remarkable result, which can be explained by both the lower cost and the higher profitability – in terms of tax savings – of this margin of response compared to exploiting exemptions.

Hence, our results indicate that these specific tax features, initially created to incentivize small- and medium-sized businesses (in the case of the business exemption) and to prevent a confiscatory tax (in the case of the limit set on tax liability), actually have quite major perverse effects. The costs to which they give rise, in terms not only of revenues and tax auditing resources, but also of equity and efficiency, might be difficult to justify if they serve as significant channels for tax avoidance. In particular, regarding the limit on tax liability, which is the most important source of avoidance in the context under study, the non-confiscation could be achieved through alternative mechanisms: e.g. setting a very large wealth threshold so that only very rich taxpayers would be liable to the tax, or using a presumptive rate of return on reported wealth to calculate whether the tax liability is confiscatory. In any case, the evidence we provide suggests that the current design of the Spanish Wealth Tax should be reconsidered to enhance neutrality and equity.

A comprehensive tax base including all types of asset, with no differential treatment being applied across taxpayers with the same stock of wealth – as proposed by Saez and Zucman (2019, 2022) –, would make the tax more efficient and equitable, as well as going some way to facilitating the auditing tasks for the tax administration. This in turn would allow a significant reduction in the current marginal tax rates without giving up progressivity, as long as the exemption threshold is set high. By way of illustration, if only wealth stocks above 5 million euros were (fully) taxed – which represent roughly the top 10% of wealth taxpayers in 2011 and around 0.1% of personal income tax filers – a flat tax rate of 0.6% would be sufficient to collect revenues equivalent to the wealth tax income collected in 2011.[55] And this flat tax rate is much lower than existing statutory rates for these levels of wealth.

Finally, the external validity of our results might be called into question, given that they are fully linked to the design of this particular tax and its institutional context. So, while they can be readily extrapolated to the other Spanish regions that levy the same wealth tax and share a similar institutional context, they can hardly be extrapolated to other countries where wealth taxes are (or used to be) set differently. However, the findings reported here should be useful to policymakers and administrations considering the implementation of a wealth tax, as they illustrate the pitfalls to be circumvented.

Declaration of competing interest

The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent- licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.jpubeco.2025.105351.

Data availability

The authors do not have permission to share data.

[54] This is aligned with Table A5 in the online Appendix which also indicates that taxpayers who stop filing for reasons other than death own a larger share of business assets and unlisted companies, compared to taxpayers who file every year.

[55] See Durán-Cabré and Esteller-Moré (2021) for different simulations of alternative designs of the Spanish wealth tax with an emphasis on a comprehensive tax base, using the Spanish Survey of Household Finances.

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