

INHERITANCE TAX AVOIDANCE THROUGH THE FAMILY FIRM

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Abstract

This paper demonstrates that family firms act as vehicles for inheritance tax avoidance among wealthy individuals. By leveraging a major tax reform in Catalonia, which widened the tax rate differential between tax-favored and non-tax-favored assets, I study asset-shifting responses to the change in inheritance taxation. To identify causal effects, I use the universe of inheritance tax returns and a difference-in-difference design comparing wealthy descendants to other wealthy heirs who were minimally affected by the policy change. After the tax reform, wealthy descendants inherit substantially more wealth through tax-favored assets. This effect is driven entirely by the top 0.5% of descendants, whose inheritances strongly shift towards equity in family firms. This change in the composition of inheritances is consistent with wealthy testators transferring assets to their firms as capital contributions before their passing. My estimates suggest that Catalonia forgoes 27% of current inheritance and gift tax revenues due to the reclassification of private wealth as business wealth via family firms.

Keywords: inheritance tax, tax avoidance, tax reform, top wealth.

JEL classification: H24, H26, O23.

Resumen

Este artículo documenta el uso, por parte de los individuos más ricos, de las empresas familiares como vehículos para la elusión fiscal del impuesto de sucesiones. Aprovechando una importante reforma fiscal del impuesto en Cataluña que aumentó el diferencial de tipos entre activos con y sin privilegios fiscales en sucesiones, estudio las estrategias de minimización de la carga fiscal a través de cambios en la composición del patrimonio. Para identificar efectos causales, utilizo el universo de las declaraciones del impuesto y una estrategia de diferencias en diferencias que compara descendientes con otros herederos en la parte alta de distribución que apenas se vieron afectados por la reforma fiscal. Encuentro que, después de la reforma, los descendientes heredan sustancialmente más riqueza a través de activos fiscalmente favorecidos. Este efecto viene explicado por la reacción de los descendientes en el top 0,5% de la distribución, cuya composición de herencias experimenta un fuerte giro hacia participaciones en empresas familiares. Este cambio en la composición de las herencias es consistente con transferencias de patrimonio, por parte de los ascendientes, a empresas familiares como aportaciones de capital antes de su muerte. Mis estimaciones sugieren que, debido la reclasificación del patrimonio privado en activos empresariales vía empresa familiar, Cataluña deja de percibir anualmente ingresos equivalentes a un 27% de la recaudación de este impuesto.

Palabras clave: impuesto de sucesiones, elusión fiscal, reforma fiscal, riqueza.

Códigos JEL: H24, H26, O23.

1 Introduction

The recent trends in wealth inequality have revived the debate about how to tax inherited wealth (OECD, 2021; Piketty et al., 2023). Similar to wealth taxes in many countries, the design of inheritance taxes often includes preferential treatment of certain assets like the main residence or family-firm assets¹. The existence of such preferential tax regimes relies mostly on liquidity concerns (Scheuer and Slemrod, 2021; Loutzenhiser and Mann, 2021). However, introducing asset-specific tax exemptions provides strong incentives for individuals to reallocate their wealth towards those assets to minimize their tax liabilities. The use of tax-favored assets, particularly closely-held businesses, as tax-planning vehicles available to the wealthy, has often been linked to the unpopularity of the inheritance tax (Henrekson and Waldenström, 2016) and the wealth tax (Perret, 2021). Still, the empirical evidence on the magnitude of this tax avoidance margin and its fiscal consequences remains very scarce.

This paper provides comprehensive evidence on the use of family firms as an inheritance tax avoidance vehicle. Using the universe of inheritance tax returns filed in Catalonia, I study the shift in the composition of inheritances towards tax-favored assets in response to a difference in inheritance tax rates. My empirical strategy leverages the 2014 Catalan inheritance tax reform that increased the tax differential across asset categories faced by wealthy descendants. This reform took place after some years of extremely low inheritance tax rates, providing wealthy testators with strong incentives to change the form in which they held wealth before death to reduce their heirs' tax liabilities. I find a sizable response to the reform whereby the composition of inheritances strongly shifts toward tax-exempted business assets. The magnitude of responses suggests that the preferential treatment of family firms might challenge the progressivity of the tax system and lessen the government's ability to raise revenues.

I estimate asset-shifting responses of wealthy individuals by studying how the composition of inheritances at the top of the distribution evolves around the reform. The composition of inheritances is defined in terms of two asset groups: tax-favored assets and non-tax-favored assets. The first group comprises the main residence of the deceased person, life insurance provisions, family-firm assets, agricultural assets, and cultural property. In general, all these assets are granted generous tax benefits if not almost full tax exemptions². The second group includes financial wealth, other real estate wealth, and household items. To provide causal evidence, I exploit the differential exposure of heir's groups to the 2014 Catalan inheritance tax reform. This reform led to a progressive increase in the tax differential between non-

¹See OECD (2021) for a full discussion on preferential tax regimes in OECD countries

²All these assets enjoy 95% tax credit, except for life insurance which goes up to 100%. There is a maximum amount deductible for the main residence and life insurance is 500,000 per dwelling and 25,000 euros per heir.

privileged and privileged assets for descendants with taxable inheritance above 750,000 (i.e. top 2% heirs). In contrast, the tax reform barely affected effective tax rates faced by surviving spouses or distant relatives with similar taxable inheritances. As a result, the reform introduced strong incentives for wealthy individuals to engage in asset-shifting strategies when planning their testament if their designed heirs are descendants. Leveraging this feature of the tax reform, I estimate the response to the policy change by comparing a treated group of descendants to a control group of spouses and distant heirs in a difference-in-differences setting. I intentionally restrict the sample to estates entirely transmitted to descendants, the surviving spouse, or distant heirs. That is, I exclude heirs of one type sharing estate with heirs of another type to avoid testament strategies involving the specific distribution of assets across inheritors to confound the results. Critically, the composition of wealth transfers evolved similarly between the two groups before the policy change. This makes the parallel trend assumption credible and supports a causal interpretation of the difference in the post-reform period.

My first finding is that wealthy descendants increase the fraction declared in tax-favored assets by 5.8 p.p. compared to the control group. This shift towards tax-privileged assets implies an average reduction in effective tax rates of around 1.3 p.p (41,000 euros in tax savings) for treated taxpayers. The asset-shifting responses are consistent with wealthy testators actively changing their wealth portfolio to reduce the tax liabilities of their heirs. In the spirit of Kopczuk (2007), one would like to observe the evolution of testators' wealth portfolios before death to give direct evidence of this behavior. As this information is unavailable in the inheritance tax returns, I exploit census-linked microdata on the universe of wealth taxpayers above 65 years old in Catalonia. This dataset contains detailed information on the assets and debts of this group of wealthy individuals in this region. Descriptive evidence suggests that wealth taxpayers above 70 years started changing the composition of their wealth towards tax-favored assets after 2014 despite no change in the wealth tax. This shift is consistent with wealthy individuals actively planning their testament at the onset of death as a response to the inheritance tax reform.

The average response masks important heterogeneity. First, I show that only those descendants with taxable inheritances above 2 million Euro react to the reform i.e. top 0.5% heirs. For this group of heirs, the fraction of tax-favored assets increases by 28 p.p in the post-reform period which entails tax savings of more than 300,000 euros. The magnitude of the response is in line with previous estimates of asset-shifting responses to wealth taxation (Duran-Cabr e et al., 2019; Alvaredo and Saez, 2009). Second, I provide evidence that the effects are entirely explained by wealthy descendants inheriting a higher fraction of assets in family firms.

The shift in the composition of inheritances towards family-firm assets is compatible with wealthy individuals relabeling their private wealth into business wealth before death as a response to the tax reform. Individuals can transfer assets to their already established firms or set up new ones for tax-saving purposes. The transfers of personal assets to firms by business owners can take different operational forms. First, business owners can add assets to their firms as paid-in capital. If this is the case, then firms issue new shares that shareholders receive in exchange for their capital contributions. Second, they can also add real assets, like buildings or vehicles, as operative capital whenever the use of these assets can be linked to the economic activities of the firm. Third, business owners can always sell any asset to their firms. I show that the shift towards family-firm assets is mostly explained by transfers in the form of equity rather than business-related real assets, pointing towards the capital contribution channel being the first driver of the results. This is not surprising given that capital contributions benefit from capital gains tax exemption and, in contrast to the case of business-related real assets, there is no need to justify or link the use of these assets to the business activity of the firm. Alternatively, wealthy individuals could create new family firms to take advantage of the associated inheritance tax benefits. While there is some empirical evidence on cross-base responses to taxation (Alstadsæter and Jacob, 2016; Waseem, 2018; Harju and Matikka, 2016; Bergolo et al., 2022; Bach et al., 2021), the Spanish setting makes it difficult for individuals to set up firms for inheritance tax-minimization purposes. Companies can only qualify as family firms in successions if they are engaged in carrying on a trade or business and the testator owns a minimum fraction of the firm's equity and is directly involved in managerial tasks.³ These requirements limit this extensive margin of response.

An unanswered question so far is why wealthy individuals use family firms as their preferred if not unique inheritance tax avoidance vehicle. First, private companies offer the opportunity to individuals to just reclassify wealth instead of engaging in real portfolio rebalancing operations. In addition, transferring assets to firms usually involve lower economic transaction costs. For instance, shifting financial wealth towards the main residence involves at least buying a new property and paying transaction taxes. Instead, transferring wealth to a closely held firm as a capital contribution is exempted from paying capital gains tax. Second, wealthy individuals have disproportionate access to this specific tax avoidance vehicle asset as business wealth is extremely concentrated at the top. This pattern is not unique to Spain (Martínez-Toledano, 2023) but is also common in other countries⁴ and makes wealthy individuals particularly well positioned to take advantage of the family firms tax exemptions.

³See Law 29/1987 for Inheritance Tax and Law 19/1991 for Wealth Tax dispositions about closely-held businesses. This definition leaves out holding companies, which are the natural vehicle to relabel private wealth into business wealth.

⁴See Fagereng et al. (2019) for Norway, Kopczuk and Zwick (2020) for the US and Advani et al. (2021) for the UK

To give a more comprehensive picture of tax-minimizing strategies, I investigate reporting behavior, and testament strategies involving the redistribution of assets across heirs as well as inter-vivos transfers around the tax reform. First, I do not find evidence suggesting that treated taxpayers reduce the inheritance they declare in response to a rise in effective tax rates. This result goes in line with (Duran-Cabr e et al., 2019) who showed that wealthy individuals reacted to the reintroduction of the wealth tax in Catalonia mostly by changing the asset composition of their wealth rather than reducing the total reported value. In Spain, the degree of tax enforcement is high and all self-reported assets are backed with third-party information or registers when possible. Therefore, there is limited scope for the undervaluation of assets (for instance, the administrative value acts as an assessment floor for real estate assets). Second, by connecting top-wealth heirs sharing the same estate, I present descriptive evidence suggesting that wealthy testators redistribute wealth strategically across heirs to reduce the tax liabilities of descendants. Third, using data on the universe of gift tax returns filed in Catalonia in the sample period covered, I find a modest and short-run increase in large transfers of real estate and financial wealth transfers in favor of descendants compared to distant heirs. This can be explained by the fiscal disincentives to do so as effective gift taxes are usually higher for all asset classes and inter-vivo transfers received 4 years before death are also subject to the inheritance tax.

To compare my results to behavioral responses to wealth taxation estimated in the literature, I translate the asset-shifting responses into an elasticity with respect to the tax differential. Building on the framework developed by (Bergolo et al., 2022; Waseem, 2018), I show that the reduced-form estimates can be converted into a pure asset-shifting elasticity and an intensive margin elasticity capturing both asset-shifting and reporting responses. Guided by the empirical results, I estimate the pure asset-shifting elasticity with respect to the tax differential. A 1 percentage point increase in the tax differential between assets leads to an increase in tax-favored assets of 17%. This estimate goes up to 20 when focusing on the top 0.5% heirs. Finally, I quantify the forgone tax revenues associated with the estimated behavioral responses through counterfactual simulations. I focus on the sample of heirs with taxable inheritances above 2 million Euro as they have been shown to be responsible for the entire response to the reform. My estimates suggest that Catalonia forgoes around 27% of its actual inheritance tax revenues (around 117 million) each year due to the reclassification of private wealth through family firms. This result highlights that the use of family firms as tax avoidance devices can entail large fiscal costs.

Related literature. This paper contributes to several strands of the literature. First, it relates to the growing body of research studying behavioral responses to inheritance taxes (Goupille-Lebret and Infante, 2018; Joulfaian, 2006; Erixson and Escobar, 2020; Glogowsky, 2021; Kopczuk, 2007; Br uhart and Parchet, 2014; Moretti and Wilson, 2023; Montserrat,

2019; Escobar et al., 2023). This literature has mostly emphasized the role of inter-vivo gifts as the main channel driving the behavioral responses to inheritance taxation and delivers rather modest elasticity estimates. Some notable exceptions are (Brüllhart and Parchet, 2014; Moretti and Wilson, 2023) who study the residential location choices of high-income or very wealthy individuals to inheritance taxes. Differently from previous work, Montserrat (2019) investigates underreporting behavior while (Kopczuk, 2007; Poterba and Weisbenner, 2003) provide evidence on portfolio reallocation towards hard-to-value assets as a response to the estate tax in the US.⁵ However, there is no direct empirical evidence on inheritance tax avoidance strategies that exploit the preferential tax treatment of certain assets. This is partly explained because asset-shifting strategies of this kind can only be used to avoid inheritance taxes to the extent that some assets offer tax advantage over others (Advani and Tarrant, 2021; Scheuer and Slemrod, 2021). This, in turn, ultimately depends on the institutional setting of each country. In addition, even if many institutional settings would allow to study such avoidance margin as many countries regulate asset-specific inheritance tax benefits,⁶ comprehensive microdata on inheritance tax returns is not always available. This paper fills the gap and provides estimates of wealth portfolio reallocation towards tax-privileged assets as a response to a rise in inheritance tax rates. This is possible because the administrative data for Catalonia covers the universe of inheritance tax returns in a region where the institutional setting provides wealthy taxpayers with strong incentives to exploit the large differential between asset-specific tax rates.

Second, this paper also contributes to the broader literature on the effects of taxation on asset-shifting and cross-base responses of wealthy individuals. Instead of studying shifting responses to changes in wealth taxes (Londoño-Vélez and Ávila-Mahecha, 2024; Duran-Cabré et al., 2019; Alvaredo and Saez, 2009; Alstadsæter et al., 2022) income taxes (Bergolo et al., 2022; Piketty et al., 2014) or dividend taxes (Alstadsæter and Jacob, 2016) this paper investigates how wealthy testators change the composition of their wealth in response to changes in inheritance taxes. The magnitude of the shifting responses from non-business to business wealth is consistent with the estimates put forward in the literature for the wealth tax (Duran-Cabré et al., 2019; Alvaredo and Saez, 2009).

The closest paper is Montserrat (2019) who exploits the quasi-repeal of inheritance tax in Catalonia in 2011 to show that inheritance taxes triggered misreporting of real estate assets

⁵Poterba and Weisbenner (2003) describe how valuation and minority discounts can reduce the effective estate-tax rates on some asset classes in the US by comparing estate tax data with SCF survey data. By using US estate tax returns, Kopczuk (2007) provides evidence that business assets and corporate stock as well as household goods are the asset categories experiencing the strongest decline in the case of long-lasting illness. The author takes this as suggestive evidence of aggressive tax planning, as these assets are hard to value. In the case of household goods, they are also easily concealed from the tax collector

⁶For a selection of 22 OECD countries, more than half of them have regulated tax exemptions or tax benefits either for at least family-owned businesses, main residences, private pensions, life insurance, and land or a combination of them. See OECD (2021)

by wealthy taxpayers. She links this underreporting behavior to future savings in capital gains tax upon potential real estate sales. In contrast, my main contribution is to study asset-shifting behavior by leveraging a posterior tax reform in Catalonia. To complement her findings, I also investigate how reported inheritances evolved around the 2014 tax reform and found no significant changes in reporting behavior. The disparities in results might be well related to the Spanish tax assessment rules⁷ and the nature of the two tax reforms - i.e. a quasi-repeal of the tax vs the re-introduction of a progressive tax. Notice that while the administrative value of real assets constitutes a tax assessment floor, there is no tax assessment ceiling. As a result, taxpayers can freely overvalue inherited real estate property when taxes are low but the scope for undervaluation behavior as a response to a rise in tax rates is limited.

The rest of this paper proceeds as follows. Section 2 and 3 describe the institutional framework and the administrative tax data used. Section 4 lays out the empirical strategy and Section 5 provides the main results before studying mechanisms in Section 6 and additional results in Sections 7 and 8. Section 9 translates the reduced-form estimates into elasticities and assesses the tax revenue implications of the behavioral responses. Finally, Section 10 concludes

2 Institutional Setting

2.1 The Spanish Inheritance Tax

The Spanish Inheritance tax was regulated in its current form back in 1987 (Law 29/1987). All regions are subject to this law except for the Basque Country and Navarre (the *Foral* regions) which, due to their special fiscal status, enjoy regulatory power to design most taxes, including the inheritance tax⁸. The tax is levied on heirs and depends on their degree of kinship with the deceased or donor, respectively. The law distinguishes four groups of heirs: (i) descendants younger than 21, (ii) descendants older than 21, spouses and ascendants, (iii) siblings, stepchildren, nephews/nieces, uncles/aunts, and (iv) more distant relatives and non-relatives.

Tax base. Heirs' tax base is defined as the sum of the individual portion inherited, life insurance benefits derived from the deceased's death as well as other assets transferred before

⁷In Spain, heirs must self-report the value of the assets inherited. The tax authority will consider the highest value between the self-reported one and the third-reported one by the competent institution (banks and financial institutions, registers, other administration offices, etc.) for calculating the tax liabilities. See Law 1987/29 for more details

⁸Notwithstanding this special status, these two regions have regulated inheritance tax rates similar to the rest of Spain.

death⁹. The net tax base is calculated after applying any eligible tax deductions. If the net tax base is positive, a progressive marginal tax schedule is applied to obtain the net tax liability.

Tax benefits. The Spanish inheritance tax law regulates a first set of tax deductions depending on the degree of kinship between the deceased person and heirs, which usually take the form of a fixed monetary amount. The law also includes a second set of tax benefits accruing certain types of assets - like the main residence of the deceased person, life insurance provisions, assets in closely-held businesses, cultural property, or agricultural land. Some of these tax benefits take the form of unconditional 95% tax credits, meaning that only 5% of the asset value enters the net tax base.

Tax schedule and tax liability. The tax schedule defines 16 brackets with tax rates ranging from 7.65% to 34%. The final tax liability to be paid is obtained after considering the corresponding scaling factor, which depends on the pre-inheritance gross wealth of the taxpayer and kinship group. Appendix A.2 overviews all the general and asset-specific tax benefits applicable, the tax schedule, and the tax formula.

Assessment rules and tax enforcement. Heirs are asked to self-report the value of all the assets inherited at market prices and back up their assessment with third-party information. Financial asset value can be third-reported by banks and financial institutions. Real estate and closely-held business valuation at market prices is less straightforward. In this case, the tax administration will keep the highest value between the one self-reported and the one determined by some specific assessment rules¹⁰. Taxpayers can rely on balance sheet information¹¹ to value closely-held business assets while they can use the updated administrative value of the property to value the real estate assets¹². The scope for under assessment is limited as the tax administration constantly supervises that assessment rules have been followed accordingly.

Decentralization of the inheritance tax. The administration and regulation of the Spanish Inheritance Tax were decentralized in 1996. This meant that regions were awarded regulatory power to modify many aspects of the tax code, including the tax deductions or marginal tax rates, whenever these changes would not compromise the tax benefits already regulated in the national law. Heirs are required to file the inheritance tax within the next 6 months after the death event in the region of residence of the deceased person,

⁹The inheritance tax base also includes those assets transferred to the heirs by the deceased during the four years preceding the moment of death to avoid tax planning strategies.

¹⁰See Art 18 Law 29/1987 for assessment rules

¹¹Taxpayers can use the assessment rules specified in the Spanish Wealth Tax law. See Law 19/1991

¹²The Catalan tax administration publishes the adjustment rules to measure real estate property at market prices given its administrative (cadastral) value. These adjustment rules are updated yearly and vary at the municipal level. See here

independently of the region where the assets being transferred are located. Still, they can ask for tax installment or/and tax moratorium for an extra 6 months but they become subject to interest on late payment.

2.2 The 2014 Inheritance Tax Reform in Catalonia

Since the early 2000s most Spanish regions started to exercise their right to modify the inheritance tax code by regulating new tax benefits for close heirs (Micó-Millán, 2023). Usually, the tax benefits took the form of large increases in kinship-related tax deductions or the introduction of general tax credits applicable to the final tax liabilities. These tax credits were regulated on top of the already existing asset-specific tax benefits. In Catalonia, the main residence of the deceased person, life insurance provisions, assets in closely-held firms, agricultural assets, rural land, and cultural property have enjoyed preferential tax treatment and are defined as the group of *tax-favored assets*. In particular, they have been benefiting from 95%-100% tax credit which implies an almost full tax exemption with some exceptions¹³ (see Appendix Table A.4). The rest of the assets - financial assets, other real estate property, and household items - are the group of *non-tax-favored assets* and are subject to standard tax treatment.

Catalonia undertook its first inheritance tax reform between 2010 and 2011, which culminated with the introduction of a 99% tax credit for close heirs. The size of the tax credit, 99% of the resulting tax liabilities, acted as a quasi-repeal of the inheritance tax in this region (see Montserrat (2019)) and made negligible any differences in effective tax rates between privileged assets and non-privileged assets¹⁴ for close heirs. Distant heirs (i.e. second-degree relatives and non-relatives) were kept out from this reform and only were granted an increase in their corresponding kinship-related tax deduction.

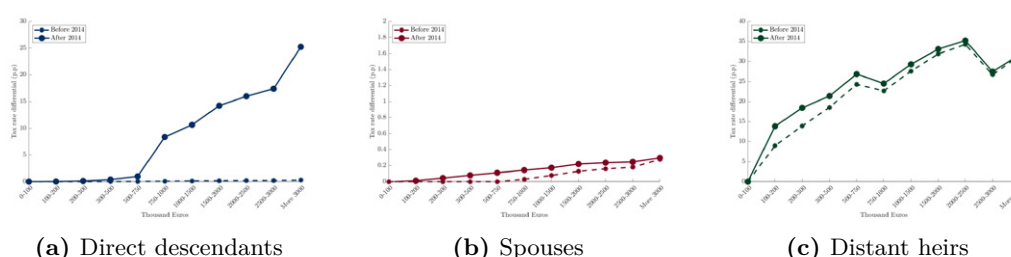
In February 2014, the Catalan government decided to cut back some of these tax benefits as part of a fiscal package aimed at reducing the government deficit in the region. The reform implied a (i) decrease in all kinship-related tax deductions and (ii) the repeal of the 99% general tax credit for descendants and ascendants, which was replaced by a progressive tax credit depending on the tax base ranging from 99% to 20%. Appendix Tables A.2 - A.9 gather a detailed description of all the tax parameters modified.

¹³All tax-favored assets except for the main residence and life insurance benefit from an unconditional 95% tax credit. Instead, life provisions and main residence enjoy a 100% and 95% tax credit up to 25,000 euros and 500,000 euros respectively

¹⁴Since 2011, the 99% tax credit was fully compatible with tax benefits applicable to life insurance and the main residence of the deceased and partially incompatible with all other asset-specific tax benefits. In particular, the tax credit halves if heirs apply to tax reliefs applicable to assets in family firms, agricultural and rustic land, and cultural property. For more details, see Law 19/2010

To illustrate how the 2014 tax reform affected the tax differential between privileged and non-privileged assets, Figure 1 simulates the difference between asset-specific average tax rates by type of heir and wealth bracket in the pre and post-reform period. As shown in Figure 1a, the reform led to a substantial increase in tax rate differential for direct descendants with inheritances above 750,000 Euro. In particular, heirs with taxable inheritances above that threshold experienced an average increase starting at 6 p.p. The size of the increase rises steeply with taxable inheritances as the tax credit schedule for descendants introduced in 2014 had a progressive nature. In contrast, Figures 1b and 1c show that the reform barely affected the tax differential faced by other heirs.

Figure 1: Average Effective Tax Rate Differential Between Assets - Before and After the 2014 reform



This figure plots the average effective tax rate differential between non-tax-favored and favored assets along the distribution of inheritances in Catalonia before and after the tax reform. The average effective tax rate has been computed using a self-constructed tax simulator and a pre-reform average asset composition of inheritances by wealth bracket. Data from the universe of inheritance tax returns in Catalonia between 2011 and 2019 (Catalan Tax Agency)

3 Administrative Data

The analysis builds on administrative data provided by the Catalan Tax Agency (*Agència Tributària Catalana*), containing the universe of anonymized inheritance tax returns filed in Catalonia between 2011 and 2019¹⁵. Heirs are asked to file two tax returns: one specifying the individual portion inherited, the asset-specific and general tax deductions and credits applicable, and heirs' age and family relationship with the deceased (*650 form*) and another one detailing the value and composition of the entire estate transmitted (*660 form*). Table C.1 reports summary statistics for the proportion of taxpayers by their kinship relationship with the deceased person. On average, around 87% of taxpayers are close heirs (ascendants, descendants, and spouses) while only 13% have more distant family ties with the deceased person. Among those classified as close heirs, direct descendants represent around 66% while spouses make up around 20%. I use the detailed tax information contained in the 650-form together with a self-constructed tax simulator for Catalonia to recover the value of the assets

¹⁵In Spain, only regional tax authorities can potentially provide data on inheritance tax returns as the administration and regulation of the tax was transferred to them in 1996. So far, only the Catalonian Tax Authority has made the effort to collect and anonymize the universe of inheritance tax returns filed in this region since 2006

inherited by asset class for each heir. I also complement this information with the one contained in the 660-form as it allows me to link heirs sharing the same estate (i.e. spouses and descendants, descendants and other relatives, etc.) and, occasionally, helps me construct a better measure of some asset-specific tax benefits¹⁶. To cleanly identify the effects of the 2014 tax reform on the outcome variables, I focus on the sample period 2011-2019 as the Catalan government had already reformed the inheritance tax code in 2010.¹⁷ Therefore, inheritance tax returns filed in the years previous to 2011 are excluded from the analysis to avoid confounding results.

Descriptive statistics. Table C.2 presents summary statistics. The average tax base for close heirs is 109,100 € while the average tax liability is 418 €. After 2014, the proportion of taxpayers subject to positive tax liabilities doubled as descendants represent more than 80% of close heirs. However, it remained lower than 20% as the tax reform affected only wealthy descendants. This also gets reflected in the increase in the average tax liabilities from 33 € to 643 € which is entirely explained by tax payments of heirs at the top of the inheritance distribution. Table C.2 also shows that distant heirs also experienced an increase in tax liabilities after 2014 due to the decrease in tax deductions. However, the average increase was considerably less sizable as it affected mostly the median distant heir. Regarding the composition of inheritances, Figure C.2a disaggregates inherited wealth between tax-favored and non-tax-favored assets and shows that the fraction of tax-privileged assets declared rises with inherited wealth, reaching around 30% at the top 1%. Interestingly, the composition of tax-favored assets declared also changes along the inheritance distribution as shown in Figure C.2b. In particular, the most common forms of tax-privileged assets are life insurance and primary residence for heirs below the 95th percentile. For those above, business assets represent most of their tax-favored inherited wealth.

4 Empirical Strategy

To provide causal evidence on tax minimizing strategies of wealthy heirs, I leverage the differential exposure to the 2014 tax reform by kinship relationship (see Figure 1). By relying on a difference-and-difference design, I compare shifts in the asset composition of inheritances as well as changes in other outcome variables between wealthy descendants and other wealthy heirs.

¹⁶For instance, the tax benefits related to the main dwelling are defined based on the total value of the asset and not on the individual portion inherited. By using the information on the 660-form I can recover the total value of the main dwelling inherited and assign it to each heir.

¹⁷The 2010 tax reform implied a gradual increase in the exemption thresholds over the years 2010 and 2011 as well as the introduction of a new tax schedule. It culminated with the regulation of a 99% tax credit for close heirs in 2011. See Appendix A.2

Treatment and Control Groups. Taxpayers in the treatment (control) group are direct descendants (spouses and distant heirs) with taxable inheritance above 750,000 euros, i.e. top 2% of the pre-reform inheritance distribution. To avoid potential spillovers across groups if heirs share the same estate, I restrict the sample to estates entirely transmitted to either descendants, spouses, or distant heirs. In the robustness check section, I study spouses and distant heirs as separate control groups.

Descriptive Statistics. Table C.3 presents descriptive statistics for the treatment and control group before 2014. The average taxable inheritance in the treatment and control group goes up to 3.2 and 2.5 million Euro, respectively. Similarly, the average fraction of tax-favored assets inherited by descendants and the other group of heirs is 22.03% and 22.22%, respectively.

Empirical Specification. The differences-in-differences specification is given by:

$$Y_{it} = \sum_{\substack{j=2011 \\ j \neq 2013}}^{2019} \beta_j D_{j=t} \times T_i + \gamma_t + \epsilon_{it} \quad (1)$$

where Y_{it} is the outcome variable in year t , D_j denotes time dummies¹⁸, T_i is a treatment indicator, γ_t refers to time fixed effects and ϵ_{it} represents the idiosyncratic error term. Standard errors are clustered at the year-month level. The coefficient of interest is β_j which captures the average difference in the outcome between wealthy descendants and other wealthy heirs in year t with respect to the reference year.

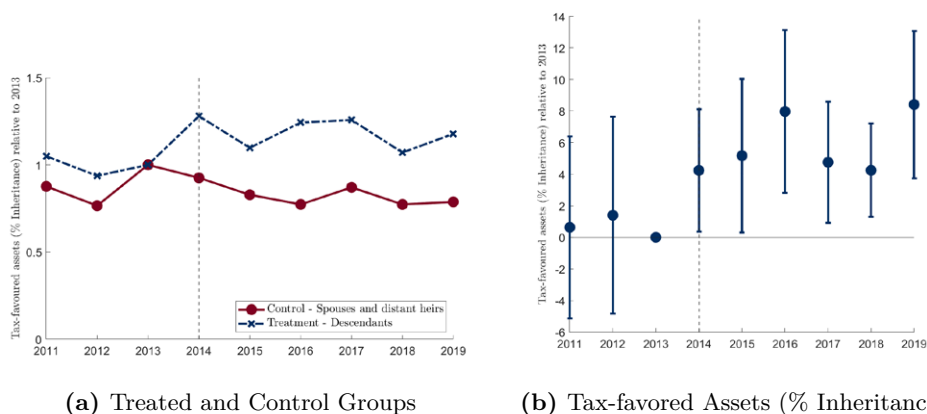
The key identifying assumption is that the outcome of the wealthy descendants and other types of wealthy inheritors would have evolved similarly in the absence of the 2014 tax reform. While it is not possible to test this assumption empirically, the tax rate differential between privileged and non-privileged assets faced by spouses and distant heirs was barely affected by the reform and therefore, the incentives for them to engage in tax-minimizing strategies should at least be weaker. A key concern is that descendants might differ from other heirs in the asset composition of inheritances or taxable assets *per se*. This would translate into changes in the outcome variable not reflecting behavioral responses to the tax reform but rather differences in the composition of estates. The empirical specification allows me to detect some of these confounders by comparing trends in the outcomes across wealthy heirs in the years before tax reform: to the extent that confounding shocks occur in an earlier year than the tax reform, they will appear as a differential trend for wealthy descendants in the pre-reform period.

¹⁸I define time dummies from February to January, instead of using the natural year (i.e. January to December). The reason is that the 2014 tax reform was put in place on the 1st of February 2014

5 Asset-shifting Responses to the Inheritance Tax Reform

Baseline results. Figure 2a presents how the fraction of tax-favored assets inherited evolved around the reform for the treated and control group, normalized to one period before the tax change. As can be inspected, the fraction of tax-favored assets evolved strikingly similarly in both groups before the reform and only started to diverge immediately after. Figure 2b plots the dynamic effects of the tax reform on the outcome of interest. On average, wealthy descendants declared a fraction of tax-favored assets 5.8 p.p higher compared to the control group in the full post-reform period. Given the average pre-reform tax base of treated taxpayers, this shift toward tax-favored assets implied a decline in total average effective tax rates of 1.3 p.p (i.e. 41,000 euros in tax savings).

Figure 2: Average Effects of the Tax Reform on Asset Composition of Inheritances



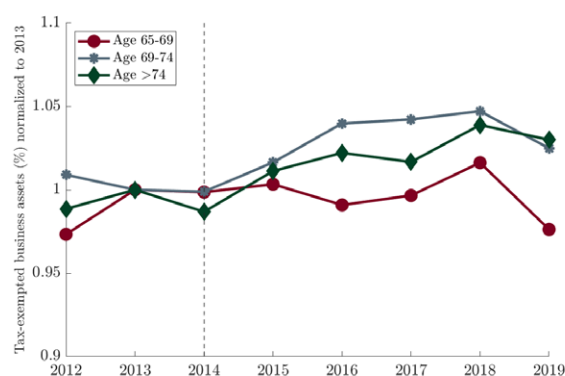
This figure plots the time series of the treated and control group (normalized to 2013) and estimated β_j coefficients from Equation 1. The treated (control) group are descendants (spouses and distant heirs) with taxable inheritances above 750,000 euros between 2011-2019. The dependent variable is the fraction of inherited tax-favored assets. Standard errors are robust and clustered at the year-month level.

Evidence from wealth tax returns. The responses uncovered are consistent with wealthy individuals actively shifting their portfolios towards tax-favored assets as a testament planning strategy. Still, providing direct evidence on this would require tracking the wealth of treated heirs' ascendants in the years before death. Since this information is unavailable in the tax returns, I use longitudinal microdata on the universe of wealth taxpayers above 65 years old in Catalonia as an alternative data source.¹⁹ This dataset provides detailed information on wealth taxpayers' assets and liabilities which makes it suitable to study the asset-shifting behavior of wealthy individuals planning their testament as a response to the tax reform.

¹⁹The Spanish wealth tax has been in place since 1978 although it was briefly suppressed between 2008 and 2010. When reintroduced in 2011, Catalonia set up a lower exemption threshold (500,000 Euro of net taxable wealth) than the default (700,000 Euro) and a slightly more progressive tax schedule. See (Agrawal et al., 2023) for more details. In Spain, wealth taxpayers are not asked their age when filing a wealth tax return so taxpayers' age is not directly observable. To overcome this limitation, the microdata on wealth tax returns has been linked to taxpayers' census information

To make a reasonable comparison, I focus on the top 25% wealth taxpayers as their average wealth declared is similar to the average estate wealth received by heirs in the sample (around 7.5 million Euro). Table C.6 presents summary statistics for the composition and total wealth declared for the two comparable samples. Figure 3 shows the evolution of the fraction of tax-exempted assets declared by age group, normalized to 2013. Importantly, those assets exempted from the wealth tax - business assets in closely-held firms and main dwelling - represent around 80% of total wealth tax-favored in successions for heirs in the sample (see Table C.3). Despite no wealth tax reform in Catalonia during this period, there has been a clear increase in the fraction of tax-exempted assets declared by taxpayers older than 70 years since 2015 providing further evidence on the testament planning channel.

Figure 3: % Tax-exempted Assets (Total Wealth) - Wealth taxpayers above 65 years old



This figure depicts the (annual average) tax-exempted wealth (i.e. family firm assets and main dwelling) as a fraction of total taxable wealth by age group in Catalonia, normalized to 2013. Data from a panel of census-linked wealth tax filers in Catalonia

6 Mechanisms

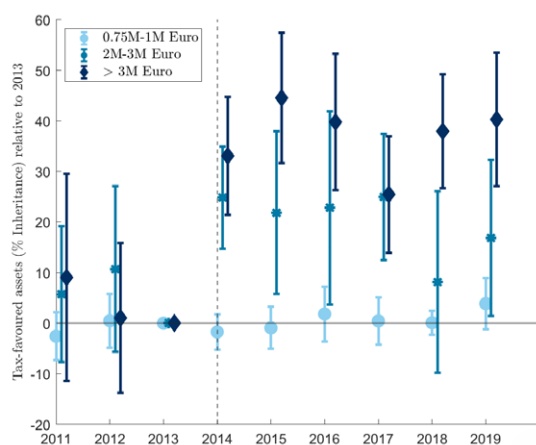
In this section, I explore in depth the mechanism behind the change in the composition of inheritances. First, I explore the heterogeneity of the asset-shifting responses by wealth bracket and show that the results are entirely driven by descendants receiving the largest inheritances. Second, I study the anatomy of the asset-shifting response and show it is mainly explained by transfers of equity in family firms. This suggests that wealthy testators add personal wealth to their firms as capital contributions to relabel these assets as business wealth.

6.1 Heterogeneity by wealth bracket

Although the Catalan tax reform raised tax rates for all descendants inheriting wealth above 750,000 euros, the magnitude of the tax increase was *progressive* along the inheritance distribution (see Figure 1a). Thus, we should expect stronger responses for descendants receiving

larger wealth transfers as tax incentives are higher. To explore in deep the heterogeneity in the asset-shifting responses by wealth bracket I group heirs in bins depending on their taxable inheritance. Figure 4 presents the results for this exercise and shows that the average response to the tax reform is entirely driven by descendants with taxable inheritances above 2 million Euro (i.e. top 0.5% heirs). Given the average pre-reform taxable inheritance for this group of heirs²⁰, this increase in the fraction of tax-favored assets implies a drop in effective tax rates of 3.83 p.p (360,000 euros in tax savings). This result suggests that among wealthy descendants affected by the 2014 tax reform, only those at the very top of the inheritance distribution and experiencing the largest increase in tax rates responded strongly to the policy change.

Figure 4: Effects of the Tax Reform on Asset Composition of Inheritances - By wealth bracket



This figure plots the time series of the treated and control group (normalized to 2013) and estimated β_j coefficients from Equation 1. The treated (control) group are descendants (spouses and distant heirs) by wealth bracket. Wealth brackets (in thousand euros) are 750-2000, 2000-3000, and above 3000. The dependent variable is the fraction of inherited tax-favored assets. Standard errors are robust and clustered at the year-month level.

6.2 The anatomy of asset-shifting

Shifting the form in which wealth is held is not a frictionless process. In Catalonia, the group of inheritance tax-privileged assets includes a wide variety of assets. Although it is not unreasonable to think that certain assets are more prone to be held in different forms than others (for instance, financial wealth can be held through a firm), the magnitude of the shifting responses as well as the vehicles used remains an empirical question (Advani and Tarrant, 2021). Fortunately, the richness of the inheritance tax data allows us to study the anatomy of the asset-shifting responses by asset category. I focus on heirs with taxable

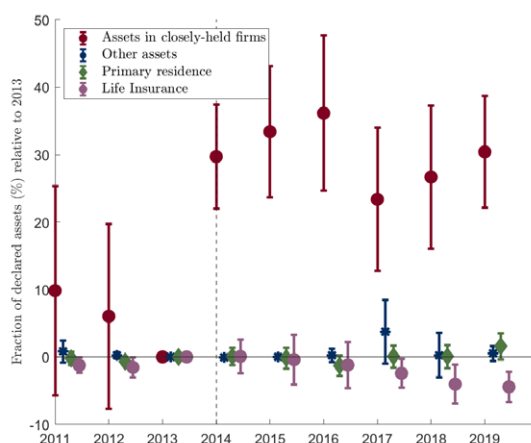
²⁰The average pre-reform tax base for this group of heirs was 9.4 million euros. Table C.4 gathers summary statistics for the control and treatment group of this segment of heirs.

inheritances above 2 million Euro as this segment of heirs is entirely responsible for the average responses uncovered.

Figure 5 breaks down the effects of the tax reform by type of tax-favored asset: assets in closely-held businesses, main residence, life insurance and other assets (agricultural land, rural land, and cultural property). As can be inspected, the increase in the fraction of tax-favored assets is entirely explained by wealthy descendants inheriting a higher fraction of family-firm assets compared to the control group. In particular, this fraction rose by an average of 30 p.p in the years after the reform. In turn, the tax reform has slightly to no effects on other tax-privileged assets such as agricultural and rural land, cultural property, primary residence, or life insurance provisions.

These results go in line with previous literature on the role of closely held business as tax avoidance instrument. (Alstadsæter et al., 2014) find a large accumulation of assets - like company cars, planes, and boats - in Norwegian firms after the introduction of dividend taxation for personal but not corporate owners. In terms of the magnitude of the responses, the amount of wealth shift towards business assets is similar to the previous estimates by (Alvaredo and Saez, 2009; Duran-Cabr e et al., 2019) who exploit similar tax privileges in the Spanish Wealth Tax. Alvaredo and Saez (2009) take advantage of a tax reform introduced in 1993 to estimate that the fraction of exempted closely-held business equity increased by 33 p.p for the top 1%. Leveraging the reintroduction of the wealth tax in 2011 and administrative tax returns, Duran-Cabr e et al. (2019) show that 1 p.p increase in the average wealth tax rate resulted in a 9.6 p.p increase in the share of exempted business assets for top 50% taxpayers.

Figure 5: The Anatomy of Asset-shifting Responses to The Tax Reform



This figure plots the estimated β_j coefficients from Equation 1 when the dependent variable is the fraction of declared (i) assets in closely-held businesses (ii) other tax-favored assets (agricultural land and cultural property) (iii) primary residence (iv) life insurance declared out of the total tax base. The treated (control) group are descendants (spouses and distant heirs) with taxable inheritances above 2 million Euro. Standard errors are robust and clustered at the year-month level.

Finally, I check whether this change in the asset composition of inheritances towards family-firm assets is present in the wealth tax returns data. Figure D.1 shows that the patterns described in Figure 3 are mostly explained by the portfolio shift towards tax-exempted business assets rather than the main residence. Notice that while the increase in the fraction of wealth declared as main residence is similar in all age groups, the shift towards business assets is steeper for taxpayers above 70 years old. Similarly to the previous analysis, Figure D.2 disaggregates these trends by wealth percentile and shows that the portfolio change towards family-firm assets is stronger as we move up in the wealth distribution for the group of taxpayers most likely planning their testament (i.e. those above 74 years old).

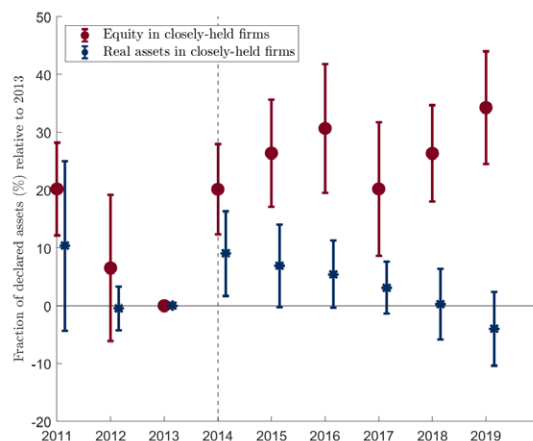
6.3 The relabeling of private wealth into business wealth

Transfer of assets to firms. The increase in the fraction of family-firm assets inherited by treated taxpayers can be compatible with wealthy individuals transferring their personal assets, namely financial and/or real estate wealth, to their firms before death. Business owners can transfer private assets to their firms in different ways. First, they can add financial or real estate assets as capital contributions to their running business. If this is the case, then firms raise new company shares that shareholders receive in exchange for these capital contributions. Alternatively, they can also add real assets, like buildings or vehicles, as operative capital to their businesses. However, the use of these assets for strictly business purposes must be justified. Finally, they can sell any asset to their firm. While capital gains associated with sales are subject to capital gains tax, business-related asset transfers were granted a full tax exemption in 2010.²¹ I explore some of these mechanisms by exploiting information on the type of family-firm assets inherited. Critically, the Catalan tax data allows me to disentangle inheritances in the form of equity in family firms from those in the form of business-related real assets. Figure 6 shows the dynamic effects of the tax reform on the fraction of family-firm equity inherited and real assets, respectively. As can be inspected, the shift in the composition of inheritances towards family-firm assets is mostly explained by wealthy descendants inheriting more equity in closely held businesses with respect to the control group. These results point towards capital contributions being the operation most preferred by wealthy individuals to reclassify their personal assets.

Family firm creation for tax-saving purposes. Wealthy individuals can transfer assets to their running businesses but they could also set up new firms to relabel private wealth into business wealth. Notice that the transfer of assets and the creation of firms would show up in the tax returns as an increase in the amount of family-firm assets inherited. In Spain, setting up a new firm for inheritance tax-saving purposes might be challenging, as

²¹See Law 828/1995 for the Spanish Property Transfer Tax and Law 13/2010 for the exemptions granted to capital contributions and operative assets transfers

Figure 6: Effects of the Tax Reform on Family-Firm Assets (% Inheritance) - Equity vs Real Assets



This figure plots the estimated β_j coefficients from Equation 1 when the dependent variable is the fraction of declared (i) equity in closely-held businesses (ii) real assets in closely-held businesses. The treated (control) group are descendants (spouses and distant heirs) with taxable inheritances above 2 million Euro. Standard errors are robust and clustered at the year-month level.

these companies have to fulfill certain requirements to qualify as family firms and enjoy the corresponding tax benefits. In particular, firms have to be engaged in carrying on a trade or business, testators have to own a minimum fraction of the firm's equity and be directly involved in managerial tasks for firms²². Because holding companies are not engaged in trade or business, they cannot be created for inheritance tax-saving purposes despite being the natural vehicle to relabel personal into business wealth. This is the case for all holding companies except for venture capital firms which, in some cases, qualify as family firms. Figure D.8 shows that very few venture capital firms have been registered in Catalonia with no clear pattern of increase after 2014. This can be taken as suggestive evidence that the creation of new closely-held firms for tax-saving purposes might be of second order compared to the use of already established ones.

Further discussion. From a pure tax-minimization perspective, all tax-favored assets offer similar tax incentives to wealthy individuals to be used as inheritance tax avoidance vehicles. However, shifting the form assets are held is not frictionless. In this respect, private companies offer a unique opportunity to individuals to reclassify wealth without engaging in costly real portfolio rebalancing operations. For instance, shifting financial wealth towards the main residence involves a real portfolio rebalancing response and non-negligible transaction costs (selling the older main residence, paying transaction and capital gains taxes, etc). Instead, transferring the same amount of financial wealth to a closely-held firm as a capital contribution is capital gains tax-free and does not involve a real rebalancing operation. In addition, wealthy individuals are particularly well positioned to use firms as

²²See Law 29/1987 for Inheritance Tax and Law 19/1991 for Wealth Tax dispositions about closely-held businesses

tax avoidance vehicles as business wealth is extremely concentrated at the top. This pattern is not unique to Spain (Martínez-Toledano, 2023) but is also common in other countries²³. All these arguments help justify why the shift of inheritances towards tax-privileged assets after the tax reform is explained by the rise of family-firm equity inherited.

7 Robustness checks

The choice of the control group. One potential concern is that the composition and total value of inheritances of surviving spouses and distant heirs might differ. In order to validate the results presented in section 5, I estimate the response to the reform using either the group of surviving spouses or the group of distant heirs as a control group. Figure D.3 shows that the asset-shifting responses are very similar irrespective of the choice of the control group. This is particularly true when we focus on the group of top-wealth heirs who have been shown to be the ones responsible for the average responses uncovered.

Placebo exercise. The 2014 Catalan tax reform increased progressively the tax differential faced by direct descendants with taxable inheritances above 750,000 euros. Thus, only the tax incentives of that segment of heirs were substantially modified after the tax reform. To provide evidence that the results presented so far capture this differential change in tax incentives across groups of heirs, I run a placebo exercise where I compare direct descendants to a control group of heirs with taxable inheritances between 500,000 and 750,000 euros. For this tax base range, all groups of heirs faced a small and similar increase in the tax differential (see Figure 1) and therefore we should not observe significant asset-shifting responses. Figure D.4 presents the results of this exercise and shows no significant change in the composition of inheritances received between the two groups.

Outliers. The results presented indicate that the portfolio shift of inheritances towards tax-exempted business assets is entirely explained by the responses of very wealthy heirs. My empirical analysis can capture such responses because the administrative data in Catalonia covers the entire universe of the inheritance tax returns filed in this region. At the same time, the use of uncensored data makes the estimates of the average responses very sensitive to outliers. I address this potential concern by estimating Equation 1 without including inheritances above the 99.9 percentile. Panel D.5a compares the average response in the baseline and restricted sample for heirs with inheritances above 750,000 euros. As can be inspected, the exclusion of extremely large inheritances from the sample reduces the significance of the estimated coefficients capturing the average response to the reform. This is not surprising given that only the top 0.5% of descendants have been shown to be the

²³See Fagereng et al. (2019) for Norway, Kopczuk and Zwick (2020) for the US and Advani et al. (2021) for the UK

ones reacting to the policy change. Critically, Panel D.5b shows very similar results in terms of magnitude and significance in both samples for heirs with inheritances above 2 million Euro. This alleviates concerns about responses to the reform being driven by just a few descendants receiving extremely large wealth transfers.

8 Other margins of response

Reported inheritances. The recent literature on the behavioral responses to wealth taxation finds strong to moderate underreporting responses in settings with there is little or no third-party reporting ²⁴(Seim, 2017; Alstadsæter et al., 2022; Jakobsen et al., 2020; Londoño-Vélez and Ávila-Mahecha, 2024). For the case of the inheritance tax, the literature is considerable more scarce. While Glogowsky (2021) finds rather small elasticity estimates in Germany for top 30% heirs, Montserrat (2019) shows strong overassessment responses by Catalan wealthy taxpayers after the quasi-repeal of the tax in 2011. To add and complement these previous results, I also study the effects of the 2014 tax reform on reported inheritances. Figure D.6 shows no significant effect of tax reform on total declared inheritance. This piece of evidence is consistent with Duran-Cabré et al. (2019) who show that wealthy individuals reacted to the reintroduction of the wealth tax in Catalonia through asset reallocation responses towards tax-exempted business assets instead of changes in reported wealth. However, it contrasts previous results found by Montserrat (2019). The disparities with these previous results might be related to the Spanish tax assessment rules and the nature of the two tax reforms studied. Notice that while the administrative value of real assets constitutes a tax assessment floor, there is no tax assessment ceiling. As a result, taxpayers can freely overvalue inherited real estate property when taxes are low but the scope for undervaluation behavior as a response to a rise in tax rates is limited.

Redistribution of inheritances within the family. So far, the baseline sample has consisted of estates entirely transmitted to either the direct descendants, the surviving spouse, or distant heirs. This sample selection controls for potential spillovers between treatment and control heirs as some of them might potentially belong to the same family. In Spain, descendants have the right to inherit full property rights of at least one-third of the total estate. Instead, spouses are only granted usufruct rights for the same proportion of the estate. This means that the other two-thirds can be distributed freely among all heirs. Thus, the redistribution of the estate itself can be used strategically for tax-minimization purposes if effective tax rates between descendants and spouses differ. Table C.5 shows that around 73% of descendants with taxable inheritances above 750,0000 do not share their estate with

²⁴Scheuer and Slemrod (2021) or Advani and Tarrant (2021) for a full discussion of the estimates provided in the literature

the surviving spouse. In contrast, around 46 % of spouses above that threshold belong to estates also shared with the deceased person's descendants.²⁵ I start by studying descriptively how the inheritances are distributed after the tax reform for treated descendants sharing the estate with the surviving spouse (27% of descendants above 750,000 Euro). Panel D.7a shows the evolution of the fraction of wealth inherited by the spouse and descendants in estates where at least one descendant receives taxable wealth above 750,000 euros. As can be inspected, the surviving spouse receives a higher share of the estate after the tax reform, which mirrors the decrease experienced by descendants. Next, I analyze how the fraction of family-firm assets inherited evolves for treated descendants and the surviving spouse. Panel D.7b depicts a sharp increase in this fraction for descendants which mirrors again the decline in the fraction inherited by spouses. This evidence suggests that wealthy families also react to the reform by (i) redistributing wealth from descendants to spouses and (ii) shifting business wealth from spouses to descendants in order to reduce total tax liabilities.

Inter-vivo gifts. There is vast empirical evidence showing that inter-vivos gifts are used as a tax-planning device to reduce inheritance tax liabilities (Kopczuk, 2007; Escobar et al., 2023; Glogowsky, 2021; Sturrock et al., 2022). In Spain, the tax law limits the use of *inter-vivo* gifts as a tax-planning device in several ways. First, it regulates that those gifts made 4 years before death will be also subject to the inheritance tax. Second, it considers very low tax benefits in general which raises the effective tax rates for all assets (for instance, there is no tax credit applicable to final tax liabilities). The last column in Table A.2 gathers information on *inter-vivos* tax benefits as regulated in the default law while Table A.10 presents those in place in Catalonia.

Still inter-vivos gifts might provide some room for wealthy individuals to reduce the tax liabilities of their future heirs. For instance, inter-vivos gifts could be used to transfer real estate or/and financial assets that are difficult to relabel. In an attempt to investigate this channel, I study how large transfers²⁶ in the form of real estate or/and financial assets received by descendants react to the reform compared to distant heirs.²⁷ I focus on transfers of real estate property or/and financial wealth above 100,000 euros that are not granted any

²⁵The non-negligible number of estates transmitted only to the spouse (around 50% in the sample) can be linked to the marital property regime of separation of property. In the absence of a testament, this division rule, which is the default in Catalonia, leaves the surviving spouse with only usufruct rights for some assets outside her estate share (See Law 14/1975). This contrasts with community property, which in the absence of a testament, gives both usufruct and property rights to the surviving spouse (50% of those assets acquired during marriage). This could explain why we observe such a high number of estates transmitted only to spouses in Catalonian tax data, as a way for wealthy testators to protect the property of the surviving spouse.

²⁶Ideally, one would like to define wealthy recipients based on information of their wealth holdings. Although there is some information in the tax returns about the net wealth holdings of recipients, the information available is very incomplete

²⁷I explicitly do not include spouses in the control group as intra-household transfers of assets can likely respond to other tax incentives (wealth tax, etc.) in the sample period covered

gift tax benefit²⁸. Table C.7 gathers summary statistics for these two groups of gift recipients before 2014. Importantly, the Catalan government has not modified the gift tax law in the sample period considered. Figure D.9 shows that the tax reform did trigger small and short-run increases in inter-vivo transfers of non-tax-favored assets received by descendants compared to the control group. The effect dissipated two years after the reform took place. Compared to the asset-shifting responses uncovered in this paper, these results suggest that portfolio reallocation strategies were prioritized to inter-vivo transfers as a response to the rise in effective tax rates on non-tax-favored assets.

Changes in fiscal residence. Wealthy individuals can also respond to a rise in tax rates by changing their fiscal residence to another region with lower levels of taxation. The yet scarce empirical literature finds mixed evidence on inheritance tax-induced mobility (See Brüllhart and Parchet (2014); Moretti and Wilson (2023)). In Spain, there are substantial differences in effective tax rates across regions due to the decentralization of the tax (see Micó-Millán (2023)), and therefore inheritance-tax induced mobility could be relevant in the Spanish setting. The Spanish law regulates that inheritance taxes are filed in the deceased person's region of residence, independently of where the assets being transferred are located. Differently from the Spanish wealth tax that considers the property where the taxpayer has lived continuously during the last 3 years as her fiscal residence, for inheritance tax filing purposes this 3-year rule goes up to 5 years. Still, this rule is very vague and gives room to potential fraudulent changes in fiscal residence. Agrawal et al. (2023) provide evidence on wealth tax-induced mobility effects in Spain by exploiting the re-introduction of this tax in 2011, after which all regions levied positive tax rates except Madrid. Unfortunately, the administrative data used in this paper does not allow me to explore this margin of response and would require relying on wealth tax returns and tracking changes in the fiscal residence of wealthy taxpayers previous to their death.

9 Tax revenue analysis

This section leverages the reduced-form results on the asset-shifting responses to the 2014 tax reform in Catalonia to estimate the associated intensive margin elasticity and assess its revenue implications.

9.1 Conceptual framework

I build on (Bergolo et al., 2022; Waseem, 2018) as well as on Kopczuk and Slemrod (2000) to develop a simple model of inheritance avoidance behavior. Consider for simplicity an

²⁸The Catalan government introduced tax reliefs for the transfer of cash or a dwelling from ascendants to descendants whenever these were linked to the purchase of the descendant's first home. See Table A.10

economy with a continuum of individual pairs consisting of unmarried individuals (testators) and single heirs of measure one. Each unmarried individual cares about the well-being of her heir and would like to maximize her after-tax inheritance.²⁹ Testators can choose to report between two sources of wealth, tax-favored assets which are taxed at rate τ_F , and non-tax-favored assets which are taxed at $\tau_{NF} > \tau_F > 0$.^{30 31}

Define taxable wealth of testator i to be transferred to her heir j as $I_i = I_i^{NF} + I_i^F$, where I_i^F denotes reported wealth in tax-favored assets and I_i^{NF} refers to reported wealth in non-tax-favored assets by heir j . Aggregating over all individuals and similar to Waseem (2018); Bergolo et al. (2022), it can be shown that the change in tax revenues associated to $d(\tau_{NF} - \tau_F)$ can be expressed as:

$$\frac{\partial B}{\partial(\tau_{NF} - \tau_F)} = -\tau_{NF} \times \frac{\partial I^{NF}}{\partial(\tau_{NF} - \tau_F)} + \tau_F \times \frac{\partial I^F}{\partial(\tau_{NF} - \tau_F)} \quad (2)$$

where $\tau_{NF} \times \frac{\partial I^{NF}}{\partial(\tau_{NF} - \tau_F)}$ refers to the intensive margin response of non-tax-favored assets, that is, the revenue loss associated with lower reported non-tax-favored assets. Notice that this response captures both lower reported non-tax-favored assets because of pure shifting towards tax-favored assets and because of misreporting. Instead, $\tau_F \times \frac{\partial I^F}{\partial(\tau_{NF} - \tau_F)}$, captures the pure asset-shifting margin response, that is, the revenue loss associated with testators relabeling tax-favored assets into tax-favored assets.

I choose to define elasticities with respect to the tax differential, $(\tau_{NF} - \tau_F)$, instead of the non-tax-favored assets tax rate, τ_{NF} , because the Catalan 2014 tax reform implied an increase in the tax differential. Following Waseem (2018); Bergolo et al. (2022) it can be shown that:

$$\frac{\partial B}{\partial(\tau_{NF} - \tau_F)} = \frac{\partial I}{\partial(\tau_{NF} - \tau_F)} = \frac{1}{(\tau_{NF} - \tau_F)} \left[-\tau_{NF} \cdot \eta_s \cdot I^{NF} + \tau_F \cdot \nu_s \cdot I^F \right] \quad (3)$$

where η_s and ν_s are the wealth-weighted average intensive margin elasticity of the reported non-tax-favored assets and tax-favored assets, respectively, with respect to changes in the tax differential³².

In general, we have that $\eta_s \geq \nu_s$. Notice that η_s can capture other avoidance responses (i.e. misreporting of wealth, etc) on top of pure relabeling of assets into tax-privileged assets, which is captured by ν_s . An increase in the tax differential will entail a revenue loss as long

²⁹Kopczuk and Slemrod (2000) model this by adding the after-tax inheritance in the utility function of testators

³⁰I abstract from modeling avoidance behavior through inter-vivos gifts guided by the reduced-form results in Section 8

³¹See Appendix B.1 for a full description of the simple model of avoidance behavior

³²See Appendix B.2 for the steps taken to obtain Equation 3

as $\tau_F < \tau_{NF}$ and $\eta_s \geq \nu_s$. Notice that even in the case where avoidance only takes place through asset-shifting, that is, $\eta_s = \nu_s$, we have by construction that:

$$\frac{\partial I}{\partial(\tau_{NF} - \tau_F)} = \frac{1}{(\tau_{NF} - \tau_F)} \left[(\tau_F - \tau_{NF}) \cdot \eta_s \cdot I^{NF} \right] = -\eta_c I^{NF} < 0$$

Finally, it is worth mentioning that this simplified framework assumes linear inheritance and gift tax rates. However, in reality, the Spanish Inheritance Tax regulates a progressive tax schedule with multiple asset-specific tax credits. Therefore, I will use a tax simulator to compute the corresponding asset-specific effective tax rates and estimate the relevant elasticities with respect to the effective tax rate differential.

9.2 Pure Asset-shifting Elasticity

Estimation. Guided by the reduce-form estimates in the previous sections, I provide estimates of the asset-shifting elasticity only. Notice that treated taxpayers do not significantly report lower inheritances (intensive margin) compared to the control group. Given that the tax rate differential between tax-favored and non-tax-favored assets is endogenous, I rely on an IV-2SLS strategy:

$$\log(I_{it}^F) = \nu_s(\tau_{it}^{NF} - \tau_{it}^F) + \gamma_t + u_{it} \quad (4)$$

where $\frac{\tau_{it}^{NF} - \tau_{it}^F}{1 - \tau_{it}^{NF}}$ instrumented using the interaction $Treat_i \times Post_t$. As specified in the baseline Equation 1, the treatment indicator (T_{it}) takes a value equal to 1 for direct descendants and 0 for spouses and other distant heirs while the time dummy ($Post_t$) takes value equal to 1 in the post-reform period (i.e. after February 2014) and 0 otherwise. I focus on the same sample heirs with taxable inheritances above 750,000 euros as in Section 4.

Results. Table D.1 shows that the estimate of the pure asset-shifting elasticity is equal to 17 (s.e 3.0). This means that a 1 percentage point increase in the inheritance tax differential raises tax-favored assets by 17%. If we focus on the top 0.5% heirs, who have been shown to be responsible for the average response to the tax reform, this elasticity estimate increases to 20 (s.e 3.9).

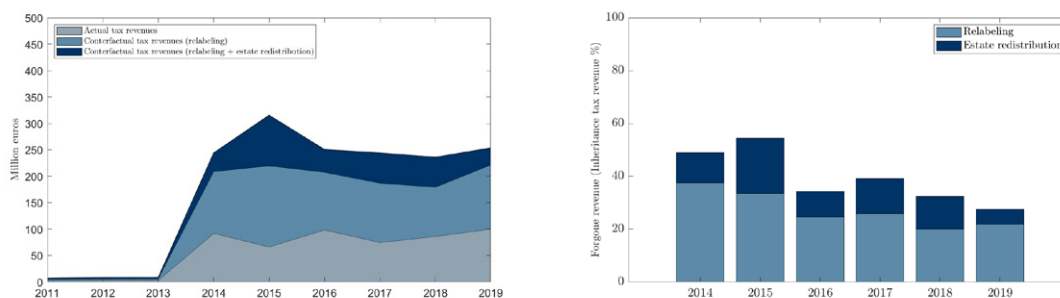
The yet limited empirical evidence on the asset-shifting responses to changes in tax differentials also delivers relatively high elasticity estimates. By exploiting the introduction of closely-held stocks tax exemption in Spain, Alvaredo and Saez (2009) found that the share of these assets held by the top 1% increased by 33%, which translates into an elasticity of 25 with respect to the tax differential. Duran-Cabr e et al. (2019) find an elasticity with respect to the average wealth tax of 32.5 by leveraging the re-introduction of the Spanish wealth tax in 2011. Since the authors do not find evidence of changes in total reported wealth, their

estimated elasticity can be mostly attributed to asset composition responses. Recent work on the effects of wealth taxes on portfolio choices by Herry (2023) estimates a cross-elasticity between real estate and financial assets of around 5. As highlighted by Herry (2023), the difference in the magnitude of his estimate with respect to asset-shifting elasticities, like the one uncovered in this paper, emphasizes the importance of distinguishing real portfolio rebalancing effects from avoidance when interpreting the behavioral responses to changes in taxation.

9.3 Tax Revenue Effects

To assess the impact of the tax reform on the forgone tax revenues due to the estimated behavioral responses in Section 5, I make use of the self-constructed tax simulator to construct counterfactual tax revenues. I proceed by simulating the revenue effects of closing down asset-shifting responses in the years 2014 to 2019. To do so, I focus on the sample of treated taxpayers, that is, descendant inheritors with taxable inheritances above 2 million and assign to each taxpayer the average fraction of tax-favored assets in the pre-reform period. I decided to include also heirs in shared estates in order to capture all asset-shifting responses triggered by the tax reform. In this way, I estimate the counterfactual tax revenues absent responses in the form of private-to-business wealth reclassification and redistribution of business wealth from spouses to descendants.

Figure 7: Inheritance Tax Revenue Simulations



(a) Tax revenue simulations - Wealthy descendants (b) Foregone tax revenue (% Total tax revenue)

Panel 7a depicts potential tax revenue from descendants with taxable inheritances above 2 million Euro in Catalonia when shutting down the asset-shifting channels. Panel 7b presents forgone tax revenue as a percentage of actual inheritance tax revenue. Calculations only include descendants with a tax base above 2 million Euro

Figure 7a compares the actual tax revenues from top 0.5% descendants (gray area) with the counterfactual tax revenues for this group of taxpayers when shutting down the asset-shifting channel. As can be inspected, the revenue losses rose sharply at the time of the tax reform and stabilized in the following years. The forgone tax revenue derived from the

reclassification of wealth through family firms is higher than the one derived from direct testament planning. This is a mechanical result driven by the fact that the majority of treated descendants in the sample do not share their estate with the surviving spouse³³.

Figure 7b depicts the forgone tax revenue (i.e. the light blue and dark blue area) as a percentage of total tax revenue in Catalonia. In the first years after the implementation of the tax reform, the estimated forgone tax revenues associated with the relabeling of private wealth into firm equity represent around 37% of the total inheritance tax revenues collected in the region. This fraction stabilized around 25% in the following years, consistent with the revenue simulations in Panel 7a. This is not surprising given that the top 0.5% descendants account for 26% of total tax inheritance revenues since 2014. Overall, these results suggest that the use of family firms as inheritance tax avoidance instruments can entail large fiscal costs.

10 Conclusion

This paper exploits comprehensive administrative data and a salient inheritance tax reform to study the asset-shifting behavior of wealthy individuals and the resulting consequences for tax revenues. The strong and timely change in the composition of wealth transfers towards family-firm assets suggests that family firms can be easily used as tax avoidance vehicles with non-negligible fiscal consequences.

These results provide important insights for current debates over the design of inheritance taxes around the world as many of the features of the Spanish inheritance tax system are common to other countries. Preferential treatment of business assets to support family business successions is recurrent in most countries levying an inheritance tax. The usual argument is that taxing heavily business succession can put firm liquidity at risk, therefore affecting negatively employment and growth. However, evidence on the link between inheritance and lifting liquidity constraints is scarce and mixed. Tsoutsoura (2015) finds that the 2002 repeal of inheritance taxation in Greece increased the investment of firms transferred and connects this effect with a release of financial constraints. Along these lines, Brunetti (2006) also finds a small positive effect of the estate tax on the likelihood of selling a business using probate records from San Francisco (US). In contrast, Holtz-Eakin et al. (2001) study life insurance purchases of entrepreneurs and conclude that they do not take full advantage of opportunities to protect their firms from being sold to meet the estate tax liability.

While inheritance taxation can potentially affect firm liquidity upon succession, it cannot be neglected that introducing preferential taxation of family firms incentivizes wealthy

³³75.4% of heirs with a tax base above 2 million Euro belong to estates entirely transmitted to descendants. The other 24.6% share their estate with the surviving spouse

individuals to use them as inheritance tax avoidance vehicles. The results of this paper shed light on how sharp and rapidly wealthy individuals do so. This not only can generate adverse tax revenue consequences but can harm the progressivity of a tax that is usually thought of as a tool to promote social mobility. At the same time, the injection of personal wealth into private firms can potentially generate positive externalities on employment and investment. Unfortunately, the data in this paper does not allow me to study this question and the empirical evidence is scant. To my knowledge, there is only one paper finding evidence in favor of these positive externalities in Norway (Bjørneby et al., 2020). A better understanding of the equity-efficiency trade-off of taxing the intergenerational transmission of business wealth is therefore needed and constitutes a promising avenue for future research.

References

- Advani, Arun, George Bangham and Jack Leslie. (2021). "The UK wealth distribution and characteristics of high-wealth households". *Fiscal Studies*, 42(3-4), pp. 397–430. <https://doi.org/10.1111/1475-5890.12286>
- Advani, Arun, and Hannah Tarrant. (2021). "Behavioural responses to a wealth tax". *Fiscal Studies*, 42(3-4), pp. 509–537. <https://doi.org/10.1111/1475-5890.12283>
- Agrawal, David R., Dirk Foremny and Clara Martínez-Toledano. (2023). "Wealth tax mobility and tax coordination". *American Economic Journal: Applied Economics*, Forthcoming. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3676031
- Alstadsæter, Annette, Marie Bjørneby, Wojciech Kopczuk, Simen Markussen and Knut Røed. (2022). "Saving effects of a real-life imperfectly implemented wealth tax: Evidence from Norwegian micro data". *AEA Papers and Proceedings*, 112, pp. 63–67. <https://doi.org/10.1257/pandp.20221056>
- Alstadsæter, Annette, and Martin Jacob. (2016). "Dividend taxes and income shifting". *The Scandinavian Journal of Economics*, 118(4), pp. 693–717. <https://doi.org/10.1111/sjoe.12148>
- Alstadsæter, Annette, Wojciech Kopczuk and Kjetil Telle. (2014). "Are closely held firms tax shelters?". *Tax Policy and the Economy*, 28(1), pp. 1–32. <https://doi.org/10.1086/675586>
- Alvaredo, Facundo, and Emmanuel Saez. (2009). "Income and wealth concentration in Spain from a historical and fiscal perspective". *Journal of the European Economic Association*, 7(5), pp. 1140–1167. <https://doi.org/10.1162/JEEA.2009.7.5.1140>
- Bach, Laurent, Antoine Bozio, Brice Fabre, Arthur Guillouzouic, Claire Leroy and Clément Malgouyres. (2021). "Follow the money! Why dividends overreact to flat-tax reforms". *PSE Working Paper*. https://www.parisschoolofeconomics.com/bozio-antoine/fr/documents/BBGLM_dividends.pdf
- Bergolo, Marcelo, Gabriel Burdin, Mauricio De Rosa, Matias Giacobasso, Martin Leites and Horacio Rueda. (2022). "How do top earners respond to taxation? Evidence from a tax reform in Uruguay". *Working paper*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4007698
- Bjørneby, Marie, Simen Markussen and Knut Røed. (2020). "Does the wealth tax kill jobs?". *IZA Discussion Paper*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3708628
- Brühlhart, Marius, and Raphaël Parchet. (2014). "Alleged tax competition: The mysterious death of bequest taxes in Switzerland". *Journal of Public Economics*, 111, pp. 63–78. <https://doi.org/10.1016/j.jpubeco.2013.12.009>
- Brunetti, Michael J. (2006). "The estate tax and the demise of the family business". *Journal of Public Economics*, 90(10-11), pp. 1975–1993. <https://doi.org/10.1016/j.jpubeco.2006.05.012>
- Duran-Cabré, José Ma., Alejandro Esteller-Moré and Mariona Mas-Montserrat. (2019). "Behavioural responses to the (re)introduction of wealth taxes: Evidence from Spain". *IEB Working Paper*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3393016

- Erixson, Oscar, and Sebastian Escobar. (2020). "Deathbed tax planning". *Journal of Public Economics*, 185(104170). <https://doi.org/10.1016/j.jpubeco.2020.104170>
- Escobar, Sebastian, Henry Ohlsson and Håkan Selin. (2023). "Giving to the children or the taxman?: Lessons from a Swedish inheritance tax loophole". *European Economic Review*, 153(104382). <https://doi.org/10.1016/j.euroecorev.2023.104382>
- Fagereng, Andreas, Martin Blomhoff Holm, Benjamin Moll and Gisle Natvik. (2019). *Saving behavior across the wealth distribution: The importance of capital gains*. <https://doi.org/10.3386/w26588>
- Glogowsky, Ulrich. (2021). "Behavioral responses to inheritance and gift taxation: Evidence from Germany". *Journal of Public Economics*, 193(104309). <https://doi.org/10.1016/j.jpubeco.2020.104309>
- Goupille-Lebret, Jonathan, and Jose Infante. (2018). "Behavioral responses to inheritance tax: Evidence from notches in France". *Journal of Public Economics*, 168, pp. 21–34. <https://doi.org/10.1016/j.jpubeco.2018.09.016>
- Harju, Jarkko, and Tuomas Matikka. (2016). "The elasticity of taxable income and incomedshifting: What is 'real' and what is not?". *International Tax and Public Finance*, 23, pp. 640–669. <https://doi.org/10.1007/s10797-016-9393-4>
- Henrekson, Magnus, and Daniel Waldenström. (2016). "Inheritance taxation in Sweden, 1885–2004: The role of ideology, family firms, and tax avoidance". *The Economic History Review*, 69(4), pp. 1228–1254. <https://doi.org/10.1111/ehr.12280>
- Herry, Segal Le Guern. (2023). "Wealth taxation and portfolio allocation". *Working paper*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4911583
- Holtz-Eakin, Douglas, John W. R. Phillips and Harvey S. Rosen. (2001). "Estate taxes, life insurance, and small business". *Review of Economics and Statistics*, 83(1), pp. 52–63. <https://doi.org/10.1162/003465301750160036>
- Jakobsen, Katrine, Kristian Jakobsen, Henrik Kleven and Gabriel Zucman. (2020). "Wealth taxation and wealth accumulation: Theory and evidence from Denmark". *The Quarterly Journal of Economics*, 135(1), pp. 329–388. <https://doi.org/10.1093/qje/qjz032>
- Joulfaian, David. (2006). "The behavioral response of wealth accumulation to estate taxation: Time series evidence". *National Tax Journal*, 59(2), pp. 253–268. <https://doi.org/10.17310/ntj.2006.2.04>
- Kopczuk, Wojciech. (2007). "Bequest and tax planning: Evidence from estate tax returns". *The Quarterly Journal of Economics*, 122(4), pp. 1801–1854. <https://doi.org/10.1162/qjec.2007.122.4.1801>
- Kopczuk, Wojciech, and Joel Slemrod. (2000). "The impact of the estate tax on the wealth accumulation and avoidance behavior of donors". NBER Working Paper Series, 7960, National Bureau of Economic Research Working Paper. <https://doi.org/10.3386/w7960>
- Kopczuk, Wojciech, and Eric Zwick. (2020). "Business incomes at the top". *Journal of Economic Perspectives*, 34(4), pp. 27–51. <https://doi.org/10.1257/jep.34.4.27>

- Londoño-Vélez, Juliana, and Javier Ávila-Mahecha. (2024). "Behavioral responses to wealth taxation: Evidence from Colombia". *Review of Economic Studies*. Forthcoming. <https://doi.org/10.1093/restud/rdae076>
- Loutzenhiser, Glen, and Elizabeth Mann. (2021). "Liquidity issues: Solutions for the asset rich, cash poor". *Fiscal Studies*, 42(3-4), pp. 651–675. <https://doi.org/10.1111/1475-5890.12281>
- Martínez-Toledano, Clara. (2023). "House price cycles, wealth inequality and portfolio reshuffling". *Working Paper*. https://www.dropbox.com/scl/fi/708a91d5or6j0kmogdb04/mtt_wealthinequality_2023.pdf?rlkey=kmuout57tzmhxyqdhb5qw49e&e=1&dl=0
- Mas Montserrat, Mariona. (2019). "What happens when dying gets cheaper? Behavioural responses to inheritance taxation". *Working paper*. https://drive.google.com/file/d/1YQBG9XQoLKzjn4Ukas3nxfmXbMHCuUw_/view
- Micó-Millán, Isabel. (2023). "The effects of inheritance and gift taxation on upward wealth mobility at the bottom: Lessons from Spain". *Working paper*. https://isabelmicomillan.github.io/isabelmicoweb/IMM_2023.pdf
- Moretti, Enrico, and Daniel J. Wilson. (2023). "Taxing billionaires: Estate taxes and the geographical location of the ultra-wealthy". *American Economic Journal: Economic Policy*, 15(2), pp. 424–466. <https://doi.org/10.1257/pol.20200685>
- Organisation for Economic Co-operation and Development. (2021). *Inheritance Taxation in OECD Countries*. <https://doi.org/10.1787/e2879a7d-en>
- Perret, Sarah. (2021). "Why were most wealth taxes abandoned and is this time different?". *Fiscal Studies*, 42(3-4), pp. 539–563. <https://doi.org/10.1111/1475-5890.12278>
- Piketty, Thomas, and Emmanuel Saez. (2013). "Optimal labor income taxation". In *Handbook of public economics*, vol. 5, Elsevier, pp. 391–474. <https://doi.org/10.1016/B978-0-444-53759-1.00007-8>
- Piketty, Thomas, Emmanuel Saez and Stefanie Stantcheva. (2014). "Optimal taxation of top labor incomes: A tale of three elasticities". *American Economic Journal: Economic policy*, 6(1), pp. 230–271. <https://doi.org/10.1257/pol.6.1.230>
- Piketty, Thomas, Emmanuel Saez and Gabriel Zucman. (2023). "Rethinking capital and wealth taxation". *Oxford Review of Economic Policy*, 39(3), pp. 575–591. <https://doi.org/10.1093/oxrep/grad026>
- Poterba, James M., and Scott J. Weisbenner. (2003). "Inter-asset differences in effective estate-tax burdens". *American Economic Review*, 93(2), pp. 360–365. <https://www.jstor.org/stable/3132255>
- Scheuer, Florian, and Joel Slemrod. (2021). "Taxing our wealth". *Journal of Economic Perspectives*, 35(1), pp. 207–230. <https://doi.org/10.1257/jep.35.1.207>
- Seim, David. (2017). "Behavioral responses to wealth taxes: Evidence from Sweden". *American Economic Journal: Economic Policy*, 9(4), pp. 395–421. <https://doi.org/10.1257/pol.20150290>

- Sturrock, David, Stefan Groot and Jan L. Möhlmann. (2022). “Wealth, gifts and estate planning at the end of life”. *IFS Working Paper*. https://ifs.org.uk/sites/default/files/output_url_files/WP202229-Wealth-gifts-and-estate-planning-at-the-end-of-life.pdf
- Tsoutsoura, Margarita. (2015). “The effect of succession taxes on family firm investment: Evidence from a natural experiment”. *The Journal of Finance*, 70(2), pp. 649–688. <https://doi.org/10.1111/jofi.12224>
- Waseem, Mazhar. (2018). “Taxes, informality and income shifting: Evidence from a recent Pakistani tax reform”. *Journal of Public Economics*, 157, pp. 41–77. <https://doi.org/10.1016/j.jpubeco.2017.11.003>

Appendix

A The Spanish Inheritance and Gift Tax

A.1 Institutional Background

The Spanish Inheritance and Gift Tax Law was first introduced in the tax system during the reign of Charles IV in the 18th century. It suffered several modifications during the 19th and 20th centuries until it became finally regulated in 1987 (Law 29/1987) as part of one the major tax system reforms undertaken after the arrival of democracy in Spain. All regions are subject to this law except for the Basque Country and Navarre (the *Foral* regions) which, due to their special fiscal status, enjoy regulatory power to design most taxes, including the inheritance and gift tax.³⁴

Different from other countries, Spanish law regulates inheritances and gift taxes jointly. The tax is levied on heirs and donees and depends on their degree of kinship with the deceased or donor, respectively. The law distinguishes four groups of heirs/donees: (i) descendants younger than 21, (ii) descendants older than 21, spouses and ascendants, (iii) siblings, stepchildren, nephews/nieces, uncles/aunts, and (iv) more distant relatives and non-relatives. Heirs' tax base is defined as the sum of the individual portion inherited and life insurance benefits derived from the deceased's bequests³⁵ while donees' tax base is defined as the sum of assets transferred *inter vivos* by an alive donor. The net tax base of heir or donee i is calculated after applying any eligible tax deductions as follows

$$\begin{aligned} \text{Net Tax Base}^i = \min \left\{ 0, \left(\sum_r (\text{Tax-favored Assets}_r - k_r) \times (1 - tc^{r,i}) \right. \right. \\ \left. \left. + \sum_s \text{Non tax-favored Assets}_s \right) - td^i \right\} \quad i \in \{\text{heir, donee}\} \end{aligned}$$

where $tc^{r,i}$ denotes the tax credit specific to tax-favored assets up to some limit k and td^i denotes the corresponding exemption threshold. Next, if the net tax base is positive, the tax quota is computed as follows:

$$\text{Tax Quota}^i = (q_j + (\text{Net Tax Base}_j^i - b_j^{lb}) \times \tau_j) \times (1 - tc^i) \times \text{SF}$$

where q_j is the tax payment corresponding to the first X euros of the net tax base for bracket j and τ_j is the marginal tax rate applicable to the remaining amount (i.e. $\text{Net Tax Base}_j^i - b_j^{lb}$)

³⁴Notwithstanding this special status, these two regions have regulated inheritance and gift tax rates similar to the rest of Spain

³⁵The inheritance tax base also includes those assets transferred to the heirs by the deceased in a short period before her death. An illustrative example is gifts made by the deceased to heirs during the four years preceding the moment of death.

where b_j^b is the lower bound of tax bracket j). Finally, tc^i denotes any general tax credit, which usually takes the form of a tax credit expressed as a fraction of the net tax base, and SF refers to the scaling factor, which is increasing in heirs or donees' pre-inheritance or pre-gift wealth. Once the tax quota and the net tax base are computed, the effective tax rate can be obtained as:

$$\tau^{E,i} = \frac{\text{Tax Quota}^i}{\text{Net Tax Base}^i}$$

Table A.1 describes the exemption thresholds as well as the asset-specific tax credits regulated in default law while Table A.2 collects information on the tax brackets and marginal tax rates.

Table A.1: Inheritance and inter-vivos gift tax benefits - Default law

Exemption threshold	Inheritance	Inter-vivos gifts
Group I. Descendants < 21	$\max\{16k + 4k(21 - age), 48k\}$	-
Group II. Descendants > 21, spouses & ascendants	16K	-
Group III. Relatives 2nd degree	8K	-
Group IV. More distant relatives & non-relatives	-	-
Asset-specific tax benefits (Groups I & II)		
Primary residence	95% tax credit; limit 122k	-
Equity shares in closely-held business	95% tax credit	95% tax credit
Business-related real assets	95% tax credit	95% tax credit
Agricultural, rural land	-	-
Cultural property	95% tax credit	95% tax credit
Life insurance	100% tax credit; limit 10k	-
General tax benefits		
	-	-
Scaling factor		
Group I, II. Descendants, spouses & ascendants		
Less than 400k	1.0000	1.0000
Between 400k and 2M	1.0500	1.0500
Between 2M and 4M	1.1000	1.1000
More than 4M	1.2000	1.2000
Group III. Relatives 2nd degree		
Less than 400k	1.5882	1.5882
Between 400k and 2M	1.6676	1.6676
Between 2M and 4M	1.7421	1.7421
More than 4M	1.9059	1.9059
Group IV. More distant relatives & non-relatives		
Less than 400k	2.0000	2.0000
Between 400k and 2M	2.1000	2.1000
Between 2M and 4M	2.2000	2.2000
More than 4M	2.4000	2.4000

The administration and regulation of the inheritance and gift tax in Spain were decentralized in 1996³⁶. This meant that regions were awarded regulatory power to (i) introduce new general and asset-specific tax credits (ii) increase the generosity of default exemption

³⁶The wealth tax was also subject to decentralization. See Agrawal et al. (2023) for more details

Table A.2: Marginal tax rates

Tax base	Tax quota	Excess tax base	Tax rate
0	0	8000	7.65%
8000	600	8000	8.50%
16000	1300	8000	9.35%
24000	2000	8000	10.20%
32000	2900	8000	11.05%
39900	3700	8000	11.90%
47900	4700	8000	12.75%
55900	5700	8000	13.60%
63900	6800	8000	14.45%
71900	7900	8000	15.30%
79900	9200	39900	16.15%
119800	15600	39900	18.70%
159600	23100	79800	21.25%
239400	40000	159400	25.50%
398800	80700	398800	29.75%
797600	199300	0	34.00%

thresholds and asset-specific tax benefits and (iii) modify the tax schedule or the scaling factors. Regional governments did not exercise this right until the beginning of the 2000s when they started to modify the inheritance and gift tax code rather frequently (see Micó-Millán (2023)).

The Spanish law establishes that inheritance taxes must be paid in the region of residence of the deceased person, independently of the region of the assets being transferred are located. By contrast, the region where gift taxes are paid depends on the type of assets transmitted. For example, inter-vivos transfers involving real assets are paid in the region where assets are located while taxes for gifts entailing any other type of asset are paid in the region of residence of the donee.

A.2 The Inheritance and Gift Tax in Catalonia

Similar to other Spanish regions, Catalonia started to exercise its right to modify the inheritance and gift tax code in the mid-2000s. The first time the regional government reformed the inheritance tax code was in 2002, when increased the exemption threshold for group I and II³⁷ and regulated a new tax schedule with marginal rates from 7.42% to 32.98%. In 2006, the Catalan government introduced tax benefits applicable to agricultural land for the first time. However, the two major reforms took place during the years 2010-2011 and 2014.

³⁷The exemption threshold for group I and group II changed to $\max\{18k + 12K(21 - age), 114K\}$ and 18,000 euros, respectively with respect to the default law (see Table A.1)

A.2.1 Inheritance tax

Table A.3: Exemption Thresholds in Catalonia

	2003-2010	Jan-Jun 2010	Jun-Dec 2010	Jan 2011 - Jan 2014	Feb 2014- Dec 2019
Close heirs					
<i>Direct Descendants</i>					
Son or daughter < 21	18k+ 12k(21 – age) max. 114k	69+ 8k(21 – age) max. 134k	171k+ 20k(21 – age) max. 337k	275k+ 33k(21 – age) max. 539k	100k+ 12k(21 – age) max. 196
Son or daughter > 21	18k	68.75k	171.87k	275k	100k
Other descendants	18k	37.50k	93.75k	150k	50k
<i>Spouse</i>	18k	125k	312.50k	500k	100k
<i>Ascendants</i>	18k	25k	62.50k	100k	30k
Distant heirs					
<i>Group III</i>	9k	12.50k	31.25k	50k	8k
<i>Group IV</i>	-	-	-	-	-

Table A.4: Asset-specific Tax Credits

	2003-2007	2008-2009	2010-2019
Close heirs			
Primary residence	As default As default	95% tax credit limit 500k on property	95% tax credit limit 500k on property
Equity shares in closely-held businesses	As default	As default	As default
Business-related real assets	As default	As default	As default
Agricultural land	As default	95% tax credit	95% tax credit
Rural land	95% tax credit	95% tax credit	95% tax credit
Cultural property	As default	As default	As default
Life insurance	As default	As default	100% tax credit; limit 25k

Table A.5: Other tax deductions in Catalonia

	2003-2010	Jan-Jun 2010	Jun-Dec 2010	Jan 2011 - Jan 2014	Feb 2014- Dec 2019
Close heirs					
<i>Direct Descendants</i>					
Son; daughter < 21	-	125k	125k	125k	-
Son; daughter > 21	-	max{32.5k, 0.5 × (net tax base)}	max{78.13k, 0.5 × (net tax base)}	max{125k, 0.5 × (net tax base)}	-
Other descendants	-	max{12.5k, 0.5 × (net tax base)}	max{31.25k, 0.5 × (net tax base)}	max{50k, 0.5 × (net tax base)}	-
<i>Spouse</i>	-	max{37.5k, 0.5 × (net tax base)}	max{93.75k, 0.5 × (net tax base)}	max{150k, 0.5 × (net tax base)}	-
	-	275k if age>75	275k if age>75	275k if age>75	-
<i>Ascendants</i>	-	max{6.25k, 0.5 × (net tax base)}	max{15.63k, 0.5 × (net tax base)}	max{25k, 0.5 × (net tax base)}	-

Table A.6: Inheritance tax schedule in Catalonia 2010-2019

Tax base (from)	tax quota	Excess tax quota	Tax rate
0	0	50,000	7%
50,000	3500	150,000	11%
150,000	14,500	400,000	17%
400,000	57,000	800,000	24%
800,000	153,0000	more	32%

Table A.7: Tax Quota Scaling Factors in Catalonia 2010-2019

Group	Scaling factor
Group I and II <i>Descendants, ascendants, spouses</i>	1.0000
Group III <i>Relatives 2nd degree</i>	1.5882
Group IV <i>More distant relatives; non-relatives</i>	2.0000

Table A.8: General tax credits

	2003-2010	Jan 2011- Jan 2014	Feb 2014-Dec 2019
Close heirs			
<i>Spouses</i>	-	99%	99%
<i>All descendants and ascendants</i>	-	99%	Table A.9

Table A.9: General tax credits descendants & ascendants - Feb 2014- Dec 2019

Tax base	Tax credit	Excess Tax base	Tax credit
0	0.00%	100,000	99.00%
100,000	99.00%	100,000	97.00%
200,000	98.00%	100,000	95.00%
300,000	97.00%	200,000	90.00%
500,000	94.20%	250,000	80.00%
750,000	89.47%	250,000	70.00%
1,000,000	84.60%	500,000	60.00%
1,500,000	76.40%	500,000	50.00%
2,000,000	69.80%	500,000	40.00%
2,500,000	63.84%	500,000	25.00%
3,000,000	57.37%	more	20.00%

Since 2010, general tax credits in A.8 will be reduced by 50% if descendants and ascendants report any asset enjoying specific tax credits (those in Table A.4) except for primary residence of the deceased and life insurance benefits.

A.2.2 Gift tax

Table A.10: Asset-specific Tax Credits

	2003-2007	2008-2019
Close heirs		
Equity shares in closely-held businesses	As default	As default
Business-related real assets	As default	As default
Agricultural	As default	95% tax credit
Cultural property	As default	As default
Cash for acquisition of first residence	80% tax credit; 18k	95% tax credit; 60k limit
House for first residence	-	95% tax credit; 60k limit

Table A.11: Gift tax schedule in Catalonia 2008-2019- Close heirs

Tax base (from)	tax quota	Excess tax quota	Tax rate
0	0	200,000	5%
200,000	10,000	600,000	7%
600,000	38,000	more	9%

B Conceptual Framework

B.1 A simple model of inheritance tax avoidance

Assume individual j transfers wealth $i = i^F + i^{NF}$ to her heir such that i^F denotes tax-favored assets (i.e. business assets) and i^{NF} refers to non-tax-favored assets (i.e. financial assets). Individual i decides how much to consume c , how much wealth shifts from non-tax-favored to tax-favored assets x , and how much non-tax-favored wealth underreports z . For simplicity, I assume that testators are the ones engaging in underreporting, for example, through inflating tax deductible debt.³⁸ The utility costs of relabeling and underreporting assets are represented by two strictly increasing and convex functions, $\gamma_i(x)$ and $\psi_i(z)$, and normalized so that $\gamma'_i(0) = \psi'_i(0) = 0$.

Let's denote \bar{i} as the true amount of wealth to be transferred absent any behavioral response to inheritance taxes.³⁹ Reported tax-favored and non-tax-favored assets can be expressed as $i^F = \bar{i}^F + x$ and $i^{NF} = \bar{i}^{NF} - x - z$, respectively. Following Piketty and Saez (2013), I assume that both types of assets are taxed at a linear rate τ with $\tau^F < \tau^{NF}$ and that individual's utility follows a quasi-linear functional form to simplify the derivations and eliminate cross-elasticity effects between saving and avoidance decisions.

³⁸In reality, changes in declared inheritances can arise from testators' or heirs' underreporting behavior. For instance, testators can create artificial debt which reduces reported inheritances, while heirs can simply underreport the value of inherited assets.

³⁹One can think of this object as the amount of transferred wealth absent any tax differential between asset types. It could also reflect real saving decisions of testators that might depend on other taxes

$$\begin{aligned} & \max_{c,x,z} c - \gamma_j(x) - \psi_j(z) \\ \text{s.t. } & c = (1 - \tau_{NF})i^{NF} + (1 - \tau_F)i^F \end{aligned}$$

Following Kopczuk and Slemrod (2000), I am implicitly assuming that transferring wealth gives utility to individual j as $c = i - T(i, \tau)$.⁴⁰ Using the definitions of reported inheritance, the above maximization problem can be rewritten as:

$$\begin{aligned} & \max_{c,x,z} c - \gamma_j(x) - \psi_j(z) \\ \text{s.t. } & c = y + (1 - \tau_{NF})\bar{i}^{NF} + (1 - \tau_F)\bar{i}^F + (\tau_{NF} - \tau_F)x - (1 - \tau_{NF})z \end{aligned}$$

The first order conditions are:

$$\begin{aligned} x : (\tau^{NF} - \tau^F) &= \gamma'_j(x) \\ z : \tau^{NF} &= h'_j(z) \end{aligned}$$

These two conditions can be interpreted as usual. First, in equilibrium, the marginal cost of relabeling an additional unit of non-tax-favored assets must be equal to the marginal benefit of asset shifting, which is the marginal increase in consumption from the increased inheritance: $\tau^{NF} - \tau^F$. Second, the marginal cost of underreporting non-tax-favored assets must be equal to the marginal benefit of evading taxes, that is, τ^{NF} . Notice that these conditions imply that the asset-shifting elasticity will heavily depend on the tax differential across asset types. However, the tax rate on non-tax-favored assets is the relevant parameter for deriving the corresponding asset-specific intensive margin elasticity.

B.2 Tax revenue impact of avoidance

Aggregating over all individuals and following Bergolo et al. (2022); Waseem (2018), the revenue impact of a change with respect to the tax differential $d(\tau_{NF} - \tau_F)$ can be expressed as:

$$\frac{\partial B}{\partial(\tau_{NF} - \tau_F)} = -\tau_{NF} \times \frac{\partial I^{NF}}{\partial(\tau_{NF} - \tau_F)} + \tau_F \times \frac{\partial I^F}{\partial(\tau_{NF} - \tau_F)} \quad (5)$$

where $I^F = \int i_j^F d\theta_j$ and $I^{NF} = \int i_j^{NF} d\theta_j$

The first term, $\tau_{NF} \times \frac{\partial I^{NF}}{\partial(\tau_{NF} - \tau_F)}$, refers to the intensive margin response of non-tax favored assets, that is, the revenue loss associated due to lower reported non tax-favored assets because of pure shifting towards tax-favored assets and misreporting. The second

⁴⁰Kopczuk and Slemrod (2000) develop a more general model of tax avoidance where the heir's utility, v , enters the individual's utility function as a function of his endowment and the after-tax inheritance. In this simple and static version, I am assuming this function v to be linear.

term, $\tau_F \times \frac{\partial I^F}{\partial(\tau_{NF}-\tau_F)}$, captures the pure asset-shifting margin response, that is, the revenue loss associated only with testators relabeling tax-favored assets into tax-favored assets.

Intensive margin response

$$\begin{aligned}
 -\tau_{NF} \times \frac{\partial I^{NF}}{\partial(\tau_{NF}-\tau_F)} &= -\tau_{NF} \int \frac{\partial i_j^{NF}}{\partial(\tau_{NF}-\tau_F)} d\theta_j = \tau_F \int \frac{\partial i_j^{NF}}{\partial(\tau_{NF}-\tau_F)} \times \frac{(\tau_{NF}-\tau_F)}{(\tau_{NF}-\tau_F)} \times \frac{i_j^{NF}}{i_j^{NF}} d\theta_j = \\
 &= \frac{-\tau_F}{(\tau_{NF}-\tau_F)} I^{NF} \times \underbrace{\int \frac{\partial i_j^{NF}}{\partial(\tau_{NF}-\tau_F)} \frac{(\tau_{NF}-\tau_F)}{i_j^{NF}} \frac{i_j^F}{I^{NF}} d\theta_j}_{\eta_{s,j}} = \frac{\tau_F}{(\tau_{NF}-\tau_F)} I^{NF} \bar{\eta}_s
 \end{aligned}$$

Pure asset-shifting response

$$\begin{aligned}
 \tau_F \times \frac{\partial I^F}{\partial(\tau_{NF}-\tau_F)} &= \tau_F \int \frac{\partial i_j^F}{\partial(\tau_{NF}-\tau_F)} d\theta_j = -\tau_{NF} \int \frac{\partial i_j^F}{\partial(\tau_{NF}-\tau_F)} \times \frac{(\tau_{NF}-\tau_F)}{(\tau_{NF}-\tau_F)} \times \frac{i_j^F}{i_j^F} d\theta_j = \\
 &= \frac{\tau_F}{(\tau_{NF}-\tau_F)} I^F \times \underbrace{\int \frac{\partial i_j^F}{\partial(\tau_{NF}-\tau_F)} \frac{(\tau_{NF}-\tau_F)}{i_j^F} \frac{i_j^F}{I^F} d\theta_j}_{\nu_{s,j}} = \frac{-\tau_F}{(\tau_{NF}-\tau_F)} I^F \bar{\nu}_s
 \end{aligned}$$

C Summary Statistics

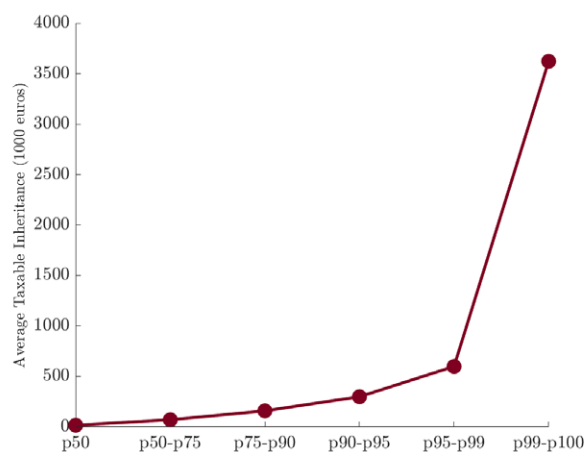
Table C.1: Summary Statistics - Heirs by Kinship

<i>Close heirs. Group 1</i>	
Descendants < 21 age	2.3%
<i>Close heirs. Group 2</i>	
Son or daughter > 21 age	57.7%
Spouse	19.9%
Other direct descendants	5.8%
Ascendants	0.9%
<i>Distant heirs. Groups 3 & 4</i>	13.3%

Table C.2: Summary Statistics

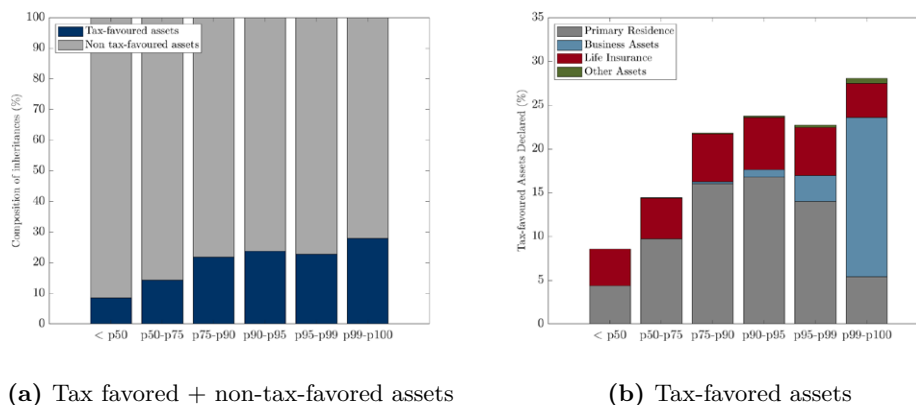
	Close heirs			Distant heirs		
	All	Before 2014	After 2014	All	Before 2014	After 2014
Taxpayers with tax liabilities > 0	0.14	0.06	0.18	0.64	0.39	0.75
Tax Base (1000 euros)						
Mean	109.10	110.26	108.51	102.61	118.50	94.99
p25	14.67	13.09	15.47	10.32	10.29	10.29
p50	44.73	41.35	46.47	33.08	33.04	33.10
p90	240.64	239.69	241.16	199.67	202.27	198.49
Tax Liabilities (euros)						
Mean	418.36	33.06	643.85	11239.69	9470.93	12106.41
p25	0.00	0.00	0.00	0.00	0.00	0.00
p50	0.00	0.00	0.00	337.50	0.00	1186.68
p90	15.13	0.00	51.83	18391.80	11466.45	20893.10
Tax Liabilities (euros) > 0						
Mean	4639.79	569.82	5487.84	17324.45	22617.86	15905.10
p25	0.59	0.00	4.00	436.88	53.88	538.53
p50	37.01	0.00	49.73	2755.44	2363.59	2851.65
p90	1989.22	738.88	2374.23	29559.56	35208.56	28229.19
Observations	908,793	306,046	602,777	152,561	50,172	102,389

All variables are expressed in 2016-cpi adjusted prices. Close heirs refer to surviving spouses and direct descendants. Distant heirs refer to distant relatives (2nd degree or more) and non-relatives. Data from the universe of inheritance tax returns filed in Catalonia (Catalan Tax Agency).

Figure C.1: Average taxable inheritance - All heirs

This figure plots the average taxable wealth along the inheritance distribution. Data is from the universe of inheritance tax returns in Catalonia between 2011-2019

Figure C.2: Composition of Inheritances - All heirs



This figure plots the composition of inherited assets along the inheritance distribution. Panel C.2a disaggregates assets between tax-favored and non-tax-favored assets. Panel C.2b differentiates tax-favored assets by type. Inherited wealth has been obtained by applying the tax simulator to the universe of inheritance tax returns in Catalonia between 2011-2019

Table C.3: Summary Statistics - Treatment and Control Group Pre-reform Period

	(1)		(2)	
	Treated Group		Control Group	
	Before 2014	All	Surviving spouse	Distant heirs
Tax Base (1000 euros)	3198.12	2519.98	1826.61	3346.90
Tax-favored Assets (% Tax Base)	22.03	22.22	21.29	23.33
Business Assets (% Tax Base)	11.31	9.84	3.79	17.07
Primary Residence (% Tax Base)	6.92	6.88	11.97	0.82
Life Insurance (% Tax Base)	3.19	5.42	5.58	5.21
Other Tax-favored Assets (% Tax Base)	0.82	0.08	0.02	0.16
Inheritance Tax Rate (%)	0.08	6.17	0.05	14.67
Observations	3433	1655	901	754
Total number of observations	9,784	4,990	2,918	2,072

This table presents summary statistics for the treatment and control group before 2014. Treated and control group heirs are those with taxable inheritances above 750,000 euros. Variables referring to total amount values are expressed in thousands of euros, 2016 CPI-adjusted. Data from the universe of inheritance tax returns filed in Catalonia (Catalan Tax Agency).

Table C.4: Summary Statistics - Treatment and Control Group Pre-reform Period (Tax base > 2M)

	(1) Treated Group	(2) Control Group All
	Before 2014	Before 2014
Tax Base (1000 euros)	9545.48	8129.51
Tax-favored Assets (% Tax Base)	30.62	25.23
Business Assets (% Tax Base)	26.73	18.87
Primary Residence (% Tax Base)	2.52	3.26
Life Insurance (% Tax Base)	1.32	3.09
Other Tax-favored Assets (% Tax Base)	0.46	0.00
Inheritance Tax Rate (%)	0.10	5.86
Observations	850	337
Total number of observations	2,004	1,031

This table presents summary statistics for the treatment and control group with taxable inheritances above 2 million euros before 2014. Variables referring to total amount values are expressed in thousands of euros, 2016 CPI-adjusted. Data from the universe of inheritance tax returns filed in Catalonia (Catalan Tax Agency).

Table C.5: Summary Statistics - Heirs with taxable inheritance > 750,000 Euro

	Descendants	Spouses	Distant relatives
Sharing estate	26.56%	46.42%	0.97%
Not sharing estate	73.44%	53.58%	99.03%

This table presents the proportion of descendants (spouses and distant heirs) with taxable inheritances above 750,000 euros sharing and not sharing their estates with spouses and distant heirs (descendants). Data from the universe of inheritance tax returns filed in Catalonia (Catalan Tax Agency).

Table C.6: Summary Statistics - Wealth Tax Returns vs Inheritance Tax Returns

	(1) Wealth tax returns			(1) Inheritance tax returns	
	Top 25%	Top 10%	Top 5%	Top 2%	Top 0.5%
Total wealth/estate declared	7,682	15258.65	25612.71	7,544	24365.78
Family-firm assets (% Total wealth)	28.58	43.92	52.14	10.83	24.50
Main dwelling (% Total wealth)	5.84	3.52	2.51	6.91	2.72

This table presents summary statistics of different groups of wealth taxpayers and inheritance taxpayers. Variables referring to total amount values are in thousands of euros, 2016 CPI-adjusted. The top 2% (0.5%) are heirs in non-shared estates with taxable inheritances above 750,000 euros (2 million euro) before the tax reform. Data from the universe of inheritance tax returns and the universe of wealth tax returns by individuals above 65 filed in Catalonia (Catalan Tax Agency).

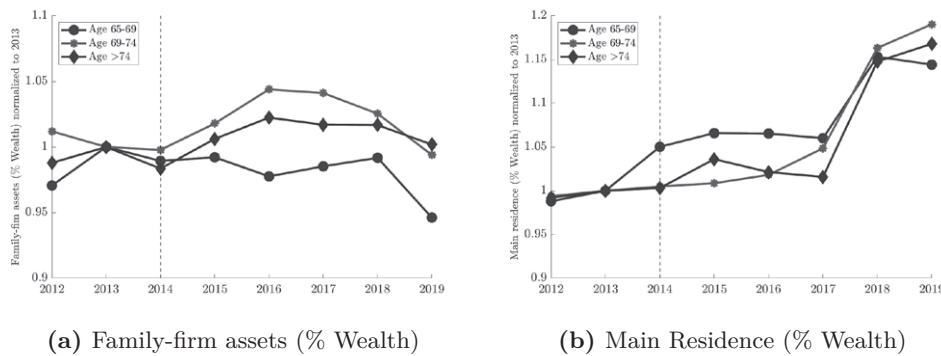
Table C.7: Summary Statistics Gift Tax Returns (Tax base > 100,000 euros)

	(1)	(2)
	Descendants	Distant recipients
	Before 2014	Before 2014
Tax Base (1000 euros)	478.32	677.83
Non-tax favored assets (1000 euros)	257.21	488.66
Tax favored assets (1000 euros)	195.87	188.680
Gift tax rate(%)	4.70	14.92
Observations	6045	529
Total Number of Observations	21,570	2,015

This table presents summary statistics of recipients with taxable gifts above 100,000 euros. Distant recipients include distant relatives (2nd degree or more) and non-relatives. Variables referring to total amount values are expressed in thousands of euros, 2016 CPI-adjusted. Data from the universe of gift tax returns filed in Catalonia before 2014 (Catalan Tax Agency).

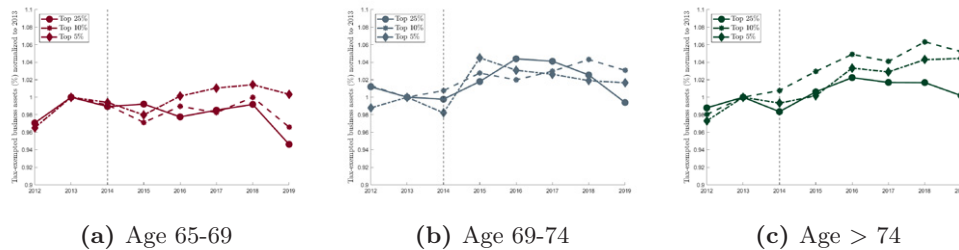
D Results

Figure D.1: Composition of Wealth - Taxpayers above 65



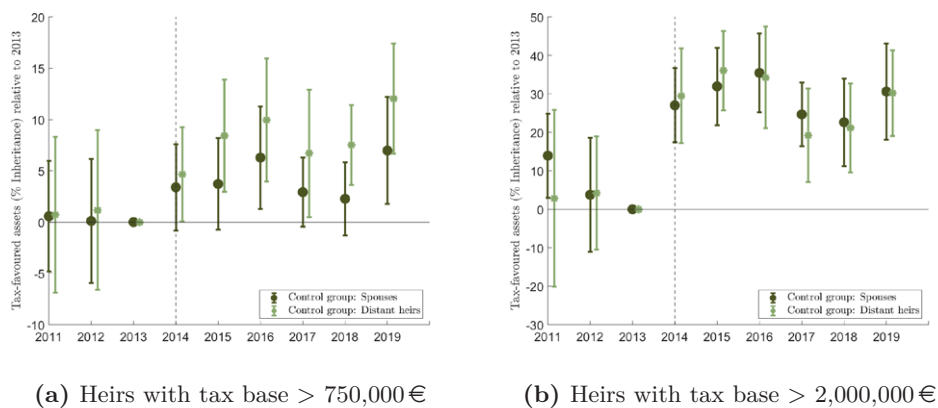
This figure depicts the (annual average) tax-exempted assets in family firms (Panel D.1a) and tax-exempted main dwelling (Panel D.1b) as a fraction of total taxable wealth and age group in Catalonia, normalized to 2013. Data from a panel of census-linked wealth tax filers in Catalonia

Figure D.2: Family-firm Assets (% Wealth) - By age group and wealth percentile



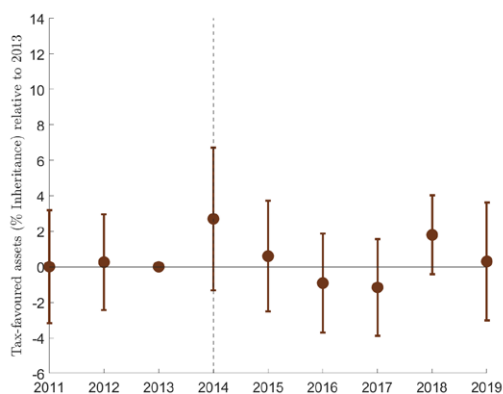
This figure depicts the (annual average) tax-exempted assets in family firms as a fraction of total taxable wealth by age and wealth group in Catalonia, normalized to 2013. Wealth groups are top 25%, top 10% and top 5% taxpayers. Data from a panel of census-linked wealth tax filers in Catalonia

Figure D.3: Effects of the Tax Reform on Asset Composition of Inheritances by Control Group - Diff-in-Diff Estimates



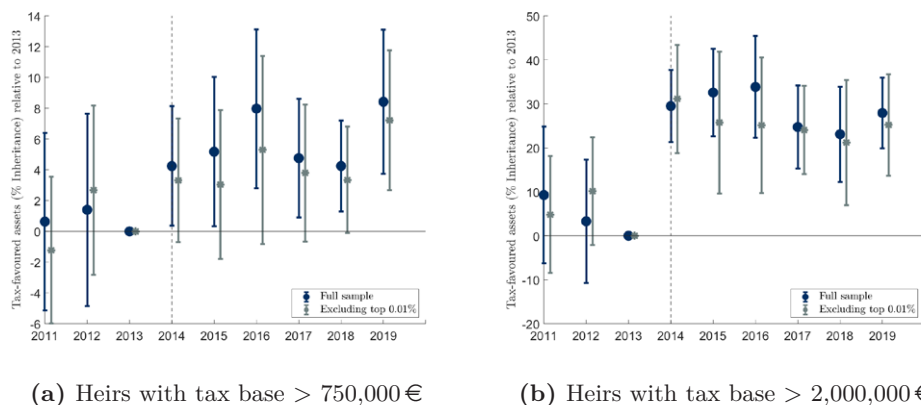
This figure plots estimated β_j coefficients from Equation 1. The treated group are descendants with taxable inheritances above 750,000 euros. The control groups are (i) surviving spouses with taxable inheritances above 750,000 euros, (ii) distant heirs with taxable inheritances above 750,000 euros. The dependent variable is tax-favored assets (% inheritances). Standard errors are robust and clustered at the year-month level.

Figure D.4: Placebo Exercise



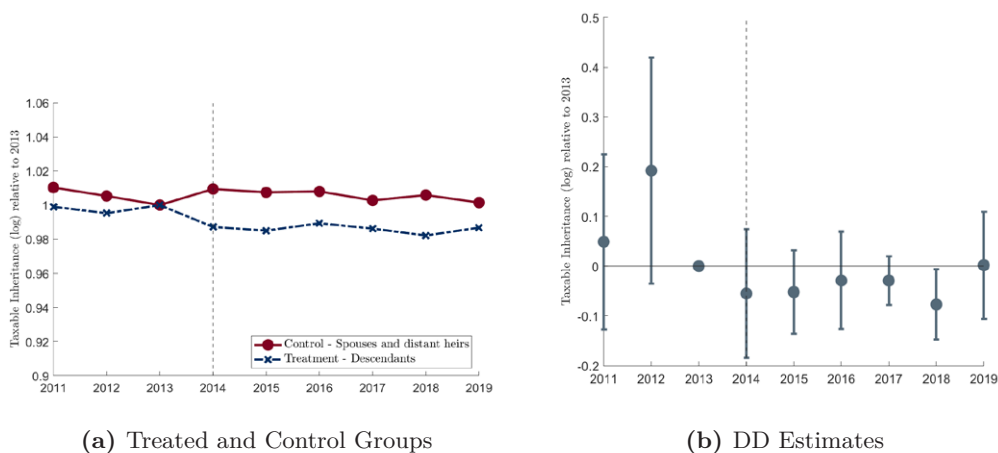
This figure plots estimated β_j coefficients from Equation 1. The treated group are descendants with taxable inheritances between 500,000-750,000 euros. The control group are surviving spouses and distant heirs with taxable inheritances above 500,000 euros and 750,000 euros. The dependent variable is tax-favored assets (% inheritances). Standard errors are robust and clustered at the year-month level.

Figure D.5: Effects of the Tax Reform on Asset Composition of Inheritances - Outliers



This figure plots estimated β_j coefficients from Equation 1. The treated (control) group are descendants (spouses and distant heirs) with taxable inheritances above 750,000 euros. The dependent variable is tax-favored assets (% inheritances). Standard errors are robust and clustered at the year-month level.

Figure D.6: Effects of the Tax Reform on Reported Inheritance- Diff-in-Diff Estimates



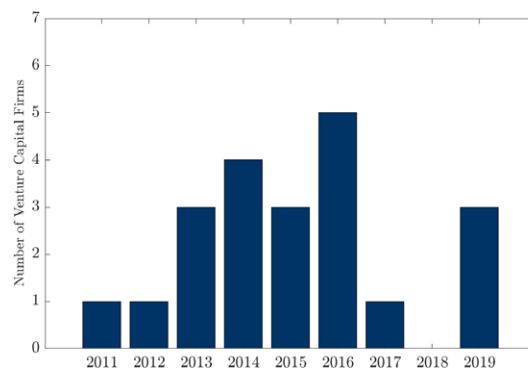
This figure plots the time series of the treated and control group (normalized to 2013) and estimated β_j coefficients from Equation 1. The treated (control) group are descendants (spouses and distant heirs) with taxable inheritances above 750,000 euros. The dependent variable is the 2016-cpi adjusted total taxable inheritance (in logs). Standard errors are robust and clustered at the year-month level.

Figure D.7: Redistribution of estates within wealthy families



Panel D.7a shows the evolution of the fraction of wealth inherited by spouses and all descendants in estates where at least one descendant receives more than 750,000 euros. Panel D.7b shows the evolution of the fraction of family-firm assets inherited by the surviving spouse and treated descendants (i.e. only those with a tax base above 750,000 euros) in estates where at least one descendant receives more than 750,000 euros.

Figure D.8: Number of Venture Capital Firms Registered in Catalonia 2011-2019



This figure plots the number of registered venture capital firms in Catalonia between 2011-2019. Data from the Spanish Securities Regulator (*Comisión Nacional del Mercado de Valores*)

Figure D.9: Effects of the Tax Reform on Inter-vivos Transfers of Financial and Real Estate Assets
- Diff-in-Diff estimates



This figure plots the estimated β_j coefficients from Equation 1. The treated (control) group are descendants (distant heirs) recipients. The dependent variable is the log of non-tax-favored gifts (financial wealth or/and real estate property). Standard errors are robust and clustered at the year-month level.

Table D.1: Asset-shifting Elasticity Estimates

	(1)	(2)
	Tax-favored assets All heirs	Tax-favored assets Heirs with tax base > 2 million
Elasticity w.r.t. ($\tau^{NF} - \tau^F$)	16.919*** (3.010)	20.228*** (3.888)
F-stat First stage	129.68	129.68
Time FE	Yes	Yes
Observations	7721	1628

This table presents the 2SLS estimates of Equation 4. The tax differential is instrumented by the interaction between $T_i \times Post_t$, where T_i takes the value 1 (0) for descendants (spouses and distant heirs) with taxable inheritances above 750,000 euros. Standard errors are robust and clustered at year-month level.

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