



Determinants of Regional Asymmetry in Inheritance and Gift Tax in Spain

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Abstract

Based on the hypothesis that there is an asymmetry in the tax burden of the Inheritance and Gift Tax in the different Spanish regions, the internal and external factors that determine its design and the tax burden exerted in each region were analyzed. Two models have been used for this purpose, logistic regression, and the ordinary least squares model. Economic, demographic, and fiscal policy variables are variables that affect both variables and explain the differences existing in the regions.

Keywords: Regional tax, Regional inequality, Spain, Tax burden, Tax design, Longitudinal analysis.

JEL Classification: C23, K34, R58.

1. Introduction

The debate on inheritance and gift taxation is a constant in the European Union. Both the design and the tax burden differ from country to country. The spectrum moves from countries that do not impose the tax to others that have a complex inheritance tax (Kudła *et al.*, 2023). The importance of this issue has been exposed by previous literature. Kudła *et al.* (2023) has tried to identify which are the determinants of tax design and revenue raised in the European Union, such as country wealth, political preferences, equity preferences, ageing rate, state tax

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status and country size, in inheritance tax systems. As this author reflects, it is important to differentiate, and this has been done in this article, between the design of the tax, over which each country has authority, and the revenue obtained from it.

However, the debate in Spain is not a minor issue. On the one hand, from a comparative perspective with the European Union, in Spain the maximum effective rate can reach 81.60% of the countries of our environment, approaching only Belgium, which has a maximum rate of 80% for inheritances between non-family members, and on the other hand, an issue that is constantly repeated in this debate is the differences that exist between regions (EY, 2023). The regulation of this tax presents a series of particularities, some of them derived from the fact that it is a tax ceded by the State to the regions. In other words, there are as many tax regulations as there are Spanish regions. For over two decades, experts in the field in Spain, including the Spanish General Council of Economists, have pointed out a regional asymmetry in the configuration of IGT. In other words, the tax burden to which the taxpayer will be subjected varies substantially according to the Autonomous Community, in which the tax obligation must be complied with. This issue is so heightened in Spain that the Community of Madrid is accused of being a domestic *tax haven* (Agrawal *et al.*, 2020). All this stems from the transfer of regulatory powers to the Autonomous Regions and requires tax reform, as well as other taxes such as the Wealth Tax, according to the White Paper for Tax Reform in Spain¹.

All this leads us to consider the work done at EU level by Kudła *et al.* (2023) in a case as particular as the Spanish one. We understand that knowing which determinants explain the IGT is fundamental for the Spanish public authorities.

Our research focuses on the study of the public sector, although the scientific literature has paid special attention to the study of tax administration from the point of view of expenditure, as discussed by Molina Morales *et al.* (2011), this study aims to offer a perspective on public revenues. The financial activity of local and regional public authorities is divided into two clearly differentiated aspects, the expenditure side and the revenue side (including taxes). This study aims to study the latter, since revenues are essential for the implementation of expenditure to achieve the satisfaction of the general interest. Particularly, since there is an asymmetry in the tax burden in the different Spanish regions, the aim of the research is to find out what are the internal and external factors that define this different IGT tax burden. These factors may explain the existing regional asymmetry. Knowing the components of this variable could provide policymakers the tools they need to set the course for public policies and decisions. This is extremely important in the context of unsustainable declining tax competition, as the OECD has already stressed. Especially if the purpose of taxation is to help reduce inequality and redistribute income (OECD, 2021).

This article is structured in this initial introduction, an econometric analysis and some conclusions. The following section explains the background of the research, i.e. the territorial pattern for Spain is specified. In addition, on the one hand, by a legal analysis of the regional regulation of IGT, reaching the conclusion that there is a disparity of regulations. On the other hand, an econometric study is carried out to determine if a series of internal and external

factors, identified based on previous research, explain both the design of the tax and the tax burden of IGT. The document culminates in a discussion and some brief conclusions.

2. Research context: regional government

The Spanish territorial model is known as the “State of Autonomies”. To be more precise, Article 137 of the Spanish Constitution (SC), protected by the provisions of Article 2, determines that “The State is territorially organized in municipalities, provinces and the Autonomous Communities which may be constituted”. Therefore, the Spanish State is made up of 17 Autonomous Communities (Andalusia, Aragon, Principality of Asturias, Balearic Islands, Canary Islands, Cantabria, Castile-La Mancha, Castile and Leon, Catalonia, Valencian Community, Extremadura, Galicia, La Rioja, Community of Madrid, Region of Murcia, Foral Community of Navarre and the Basque Country) plus two autonomous cities, Ceuta and Melilla.

Article 137 recognises that “all such entities have autonomy to manage their respective interests”. In other words, the regions have the right to self-government and the autonomy required to manage their respective interests. However, as a logical consequence of this autonomy, a series of financial resources are required to ensure that. According to the Spanish Constitutional Court, they can select and achieve their own political, administrative, social, or economic goals. To achieve this, Articles 156 to 158 of the Spanish Constitution lay down the system of financing the autonomous regions, in line with Article 133, which legitimises their taxation power, i.e. the possibility of establishing and demanding taxes. Thus, Article 157 names as one of the sources of revenue for the Autonomous Communities taxes transferred entirely by the State. Inheritance and gift tax is one of these taxes.

Finally, it must be pointed out that in Spain there are two financial systems, the common system and that of the Autonomous Communities, which have a statutory system. It comprises the Foral Territories of Alava, Gipuzkoa and Bizkaia, and the Foral Community of Navarre. To be able to carry out comparative analyses, this article only analyses the regions which make up the common system.

3. Regional asymmetry in the settlement of inheritance and gift tax in Spain

The taxable event taxed by IGT is set out in Article 3 of Law 29/1987, of 18 December 1987, on Inheritance and Gift Tax (LIGT). Specifically, free acquisitions “mortis causa” and free acquisitions “inter vivos” are subject to this tax.

In Spain, this tax has been devolved to the autonomous communities since 1983, according to the possibility provided for in Article 157.1.a) of the Spanish Constitution. However, the transfer of regulatory powers took place in 1996 (Sánchez Galiana, 2014). Currently, regulatory authorities have been transferred to quantify tax debt: taxable base, rate, determination of the amount and coefficients of pre-existing assets, deductions, and allowances

in the quota. In addition, a range of enforcement authorities have been granted, such as the regulation of management and winding-up (Alfonso Galán, 2010).

These powers devolved to the Spanish regions give rise to significant differences in the assessment of the tax depending on the Autonomous Community where the taxable event takes place.

Firstly, with respect to the jurisdiction to reduce the tax base, the autonomous regions may:

- Setting up reductions “based on economic or social circumstances specific to the autonomous community”. However, when considering this limitation, it is difficult to imagine a reduction that does not meet a generic condition (Alfonso Galán, 2010).
- Maintain or improve government reductions by increasing the amount or percent of the reduction. A contrario sensu, what is vetoed for the autonomous regions is to worsen the reductions in accordance with the provisions of the LIGT (Ruiz Almendral, 2003).
- Extending the persons who form part of the groups of article 20 of the LIGT or reducing the requirements for applying the reductions. The evolution of the wide range of regional regulations has been to reduce the taxation of the closest relatives to support the family as an institution (Alfonso Galán, 2010).

All the Autonomous Regions have exercised this competence to improve the state reductions or create their own, thus creating a network of IGT reductions.

Second, as regards the rate to be applied, nine regions have exercised this power, either by modifying the State scale, or by establishing a specific rate for certain groups of relatives, or both.

Thirdly, as regards the amounts and multiplier coefficients, seven autonomous regions have made use of this competence. The lines of amendment have focused mainly on the amounts of pre-existing assets and the tax burden. This has been changed by the coefficients regulated according to family groups and pre-existing assets.

Fourth, regarding deductions and allowances, the autonomous regions have the power to create their own, provided that they are compatible with those of the State and do not modify them. However, these deductions and rebates play a secondary role since they are applied after State deductions have been applied. This competence has been used, as have the reductions, by all the Autonomous Regions.

The main problem with this broad delegation of powers is that it could bring out a tax war that affects the principles and limits that should guide the actions of the autonomous region’s taxing power. In other words, it would be unthinkable for this transfer of powers would cross the insurmountable red line formed by the principles of tax justice in article 31.1 of the SC (Sánchez Galiana, 2014). However, in the current tax context, the fact that Spain has a fiscal asymmetry in terms of IGT can be questioned. There are as many variants of the tax as there are Spanish regions. This causes a wide disparity in the determination of the net tax liability de-

pending on the autonomous community where the tax is settled, even ranging, in the same case of liquidation, for a taxable base of €800,000, between €103,135.48 in Asturias, €9,786.89 in Catalonia or €0 in Andalusia (Consejo General de Economistas de España, 2022).

This highlights a worrying reality within the Spanish tax system: situations of inequality are arising in the face of identical circumstances depending on the region of residence of the donor or donee. We are talking about unequal treatment stemming from different laws and therefore from different legislative powers, which means that it does not represent a breach of the principle of equality enshrined in the Spanish Constitution. In the words of the Constitutional Court “Autonomy means precisely the capacity of each region to decide when and how to exercise its own powers, within the framework of the Constitution and the Statute. And if, as is logical, this exercise leads to inequalities in the legal position of the citizens residing in each of the different Autonomous Communities”. Therefore, this inequality is not unconstitutional (Sánchez Blázquez, 2020; Varona Alabern, 2014), but, under the filter of proportionality, it is at least questionable (García de Pablos, 2010). Mainly due to the fiscal competition that is generated between the different Autonomous Regions. Furthermore, all of this undermines one of the main objectives of any devolved tax, which is none other than to provide the regions with sufficient economic means for each of them to be able to provide a series of services to their residents (Varona Alabern, 2014).

Consequently, this study carries out an explanatory analysis of the regional tax burden for the years 2007 to 2019, studying the determining factors behind the map of regional inequalities in the treatment of IGT in Spain. In this sense, these factors are divided in two areas, that of the Public Administration that has the powers to settle IGT and that of the taxpayer who must pay the tax.

4. Definition of the design of the tax and tax burden in IGT: data set-up

On the one hand, identifying the different types of tax designs through a variable is somewhat complicated in the case of Spain, since we start from the fact that state regulation of the tax is complex. Also, as we have seen, the competences of the Autonomous Communities are wide-ranging. To create our variable, we wanted to identify the axis of the different types of tax designs. To construct the variable, we have narrowed down the tax design through a series of steps:

- First, as Kudła *et al.* (2023) does, we will focus only on inheritance as it is the most important tax,
- Second, we narrowed it down by focusing on the most frequent taxpayers, those who are part of group 1 (all descendants and adoptees under 21) and group 2 (descendants and adoptees over 21, spouses, ascendants, and adopters).
- Third, when analysing the example given over time in Consejo General de Economistas de España (2022), we conclude that what causes the net tax liability of the

same taxpayer on the same assumptions to be significantly different are the kinship allowances that exist in each region.

Without prejudice to the relevance of the reductions or the tax rate, the variable we will call tax design type was coded as a cardinal number from 0 (no tax rebate competition) to 2 (total tax rebate) and will be used in one of the models as a dependent variable.

On the other hand, the tax burden is one of the key variables for studying a territory's fiscal policy from the point of view of revenue (Villar Rubio, 2012). Moreover, this financial concept is assigned many functions. We can highlight the fact that it allows us to know the revenues collected, which will provide the necessary resources to the public administrations to finance public services and investments (Ocampo, 2017). It also makes it possible to compare the financial sacrifices over time and of different economic categories (Jarach, 1941).

Specifically, the concept of tax burden is defined as the share of tax revenue in Gross Domestic Product (GDP) (Jarach, 1941). The scientific literature has usually analysed the concept of total tax burden to compare of the total tax revenues of the country or region at different levels: European (Esteve Sosvilla-Rivero and Tamarit, 2000; Delgado Rivero and Fernández Llera, 2007), national (Bellod Redondo, 2015; Romero-Jordán and Sanz Sanz, 2020) or local (Cárcaba García, 2003; Benito *et al.*, 2010).

This paper analyses the tax burden of the tax under analysis, the IGT, since the aim is to carry out an inter-regional study of this tax for the period 2007-2019. It is understood that an individual analysis is necessary, as is done by the General Council of Economists of Spain in its Panoramas of Regional and Local Taxation, given that in global analyses this tax is diluted among all those taxes levied on personal income.

$$TB_{IGT} \left[\frac{\text{Total IGT revenue}}{\text{Regional GDP}} \right] * 100 \quad (1)$$

As we can see in equation 1, the IGT Tax Pressure (TBIGT) is calculated as the weight of the total IGT collection in the Autonomous Community, extracted from the databases provided by the Ministry of Finance and Public Function (Collection and Statistics of the Spanish Tax System), over the regional GDP that can be found in the National Institute of Statistics (Spanish Regional Accounts) (see Table 1).

Based on the assumption that each region has a different tax burden, the aim is to determine the factors that explain this different tax burden in the period in question. In this way, it will be possible to evaluate how the autonomous administrations have dealt with this controversial tax and on what they have based their decisions.

Therefore, the chosen study period covers the years 2007 to 2019. This period focuses on the key period of the transfer of regulatory powers for the tax. Although the transfer of regulatory powers began in 1996, it was in 2001 when all the powers analysed were specified and consolidated by the legislator in 2009 (Sánchez Galiana, 2014). Likewise, the databases used make it possible to use of this time span for the different variables.

Table 1
REGIONAL INHERITANCE AND GIFT TAX BURDEN (%) (2007-2019)

Region	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Andalusia	0.1900	0.2139	0.1992	0.2137	0.2276	0.2311	0.2534	0.2652	0.2760	0.2556	0.2344	0.1864	0.1584
Aragon	0.3884	0.3930	0.3548	0.3748	0.383	0.4242	0.3859	0.4302	0.3496	0.4644	0.4790	0.3798	0.2743
Principality of Asturias	0.3328	0.3158	0.3172	0.4689	0.4612	0.4994	0.5842	0.5153	0.5387	0.5264	0.4421	0.3372	0.2879
Balearic Islands	0.3284	0.2158	0.2130	0.2118	0.2065	0.2144	0.2518	0.3091	0.3112	0.2578	0.3099	0.3387	0.3236
Canary Islands	0.1313	0.1236	0.1099	0.1161	0.0919	0.0888	0.1401	0.1667	0.2123	0.1209	0.0816	0.0955	0.0558
Cantabria	0.2722	0.2549	0.2745	0.3342	0.3494	0.3452	0.6440	0.2939	0.2999	0.2639	0.2881	0.2562	0.2373
Castile and Leon	0.2919	0.2193	0.2303	0.2077	0.2169	0.2620	0.2602	0.1364	0.1288	0.1171	0.1261	0.1134	0.1179
Castile-La Mancha	0.1892	0.2044	0.2172	0.2067	0.1728	0.1738	0.1806	0.4685	0.4619	0.5155	0.4882	0.4358	0.4436
Catalonia	0.3829	0.4681	0.4221	0.3022	0.1701	0.1753	0.1554	0.1599	0.2243	0.2142	0.1957	0.2023	0.2357
Valencian Community	0.1857	0.1245	0.1069	0.1242	0.1309	0.1293	0.1515	0.1879	0.1937	0.1732	0.2308	0.2292	0.2302
Extremadura	0.2146	0.1896	0.1957	0.2178	0.2306	0.2461	0.3166	0.2865	0.2361	0.2270	0.1866	0.1691	0.1394
Galicia	0.4219	0.3938	0.2774	0.2767	0.3122	0.3548	0.2902	0.4323	0.2914	0.2337	0.2117	0.3194	0.2040
Comumunity of Madrid	0.2725	0.2033	0.2286	0.1742	0.1787	0.2057	0.2205	0.2211	0.1759	0.1983	0.1851	0.1618	0.1889
Region of Murcia	0.1994	0.1574	0.1167	0.1214	0.0958	0.1260	0.1619	0.3599	0.2808	0.2220	0.2005	0.1621	0.1228
La Rioja	0.2303	0.2001	0.1989	0.2344	0.2795	0.2108	0.2374	0.2154	0.2108	0.1850	0.2530	0.1894	0.1883
Mean	0.253824												
S.D.	0.110091												

Source: Author's calculations based on Ministry of Finance and Public Administration and National Statistics Institute.

5. Determinants of the inheritance and gift tax in Spain

5.1. Literature review and hypotheses

To analyse the explanatory factors of the differences in a tax in different countries, a review of the main research has been carried out. The factors identified have been divided, as in tax doctrine, into internal factors, which are specific to the administration, and external factors, which affect the taxpayer (Jarach, 1941).

5.1.1. *Internal factors*

The approach suggested by economic theory emphasizes the role of institutions in shaping the tax burden. Thus, we can point to the following variables:

On the one hand, Bird *et al.* (2008) establish a relationship between revenue collection and the level of quality of public institutions. Furthermore, these same authors, like Aixalá Pastó and Fabro Esteban (2007), in various studies in which tax burden analysis is performed at an international level, comparing countries at different levels of development, establish a positive effect with respect to the degree of institutional democracy. In other words, the higher the level of democracy in the country, the higher the tax burden in the countries analysed (Bird *et al.*, 2008). In this paper, the level of quality of the institutions is not considered as we understand that there are no significant differences between the various regions within the same country in terms of institutional democracy.

Along these lines of research, authors such as Misiolek and Elder (1988) determine that the size of the administration and the revenue-raising capacity of the Treasury directly affect the tax burden. In this sense, Cárcaba García (2003), Benito and Bastida (2004) and Zafra and López-Hernández (2006) highlight the autonomy of the administration as an explanatory variable, understood as its revenue budget. Public debt is understood as a factor that has a positive impact on fiscal pressure due to the need for resources to try to alleviate it (Tanzi, 1992; Lemberger and Shirras, 1925). Moreover, countries with the highest public debt tend to lead the list of countries with the highest tax burden. Although it should not be stated that the increase in one variable is proportional to the increase in the other (Domínguez Martínez, 2012).

In the current investigation, the size and revenue-raising capacity of the autonomous regions have been measured through their public debt and their revenue-raising capacity in proportion to the budget.

In this sense, the following assumptions are made:

- H1: Regions with higher public debt have a higher IGT tax burden due to a greater need for financial resources.
- H2: Regional treasuries with greater revenue collection capacity, measured as the weight of revenue as a percentage of the total revenue budget, have a greater IGT tax burden.

On the other hand, in the model by Benito *et al.* (2010), the role of political parties, and more specifically their political colour, is incorporated as a determinant of a higher or lower tax burden. In fact, there are models in which a positive relationship is established between left-wing governments and an increase in tax revenue, since they tend to spend more (Allers *et al.*, 2001; Borge, 1995). However, it is important to note that the tax doctrine does not agree on the role of political parties (Cusack, 1997) and, therefore, some authors, such as Hagen and Vabo (2005) and Imbeau *et al.* (2001), do not find a relationship between tax burden and political sign.

Accordingly, we therefore propose the following hypothesis:

H3: The ideology of the political party determines the tax burden on the regions, with a higher IGT tax burden in the region where more progressive parties govern.

Finally, in the Spanish case, the regions can manage a certain number of taxes, there are taxes ceded by the state to the regions, such as the IGT, and their own taxes. The latter reflect the political preferences of the electorate. In this sense, the fiscal policy on autonomous regional taxes introduces heterogeneity, not only in the IGT. Therefore, it is necessary to control for the degree of heterogeneity in other own taxes to control for voter preferences.

H4: The existing heterogeneity in the fiscal policy of own taxes has a negative influence on the tax burden of IGT.

5.1.2. *External factors*

Many authors argue that macroeconomic variables and demographic factors are external variables that explain the tax burden. Among others, the following can be highlighted.

Firstly, the level of income per capita, understood as a variable which measures the level of economic development, has a positive relationship with the tax burden, according to the literature. The higher the level of economic development, the greater the demand for services and the greater the need for financing, and therefore, the higher the level of financing required by the administration (Musgrave, 1969; Bergstrom and Goodman, 1973). Along those lines, at the local level, Pettersson-Lidbom (2001) and Kenny and Winer (2006) relate the economic level achieved by the locality to fiscal capacity. Specifically, Allers *et al.* (2001), in their model on the Netherlands, establish that the economic level is positively related to the tax burden. Likewise, Hulten and Peterson (1984), Easterly and Rebelo (1993) and Garriga *et al.* (2018) find that per capita income and tax burden are positively correlated. However, more recent studies such as Bird *et al.* (2008), using the same hypothesis as the authors cited above, conclude that there is a negative relationship between GDP per capita (GDPpc) and the tax burden. In this line Messere *et al.* (2003) added that industrialised countries, for reasons of tax policy, give more weight to the efficiency and integrity of the tax administration than to economic criteria.

In this paper, GDPpc is used to measure the level of economic development. In this sense, the following hypothesis is put forward:

H5: Regions with higher GDPpc have a higher IGT tax burden.

We also examined a variable that can approximate the level of population suffering from liquidity constraints, the level of renunciation of inheritances. The hypothesis proposed would be:

H6: In regions where the proportion of disclaimers per managed file is higher, there is a lower IGT tax burden.

Secondly, variables related to population, such as the number of inhabitants or population density, are classified by scientific doctrine as essential to explain the tax burden. This is because they understand that the larger the population in a territory, the more public services are needed and, as a result, the more recourses are needed to fund them (Borge, 1995, 2005; Misiólek and Elder, 1988; Pettersson-Lidbom, 2001; Alm, *et al.*, 1993; Gonçalves Veiga and Veiga, 2007; Bahl and Wallace, 2005; Kudła, *et al.*, 2023). Similarly, other demographic variables such as the immigration rate (Borge, 1995) and the dependency ratio (Benito *et al.*, 2010; Garriga *et al.* 2018; Le *et al.*, 2012; Mahdavi, 2008; Langford and Ohlenburg, 2016; Kudła, *et al.*, 2023) have been defined as also being explanatory of the tax burden by the literature.

The hypotheses related to population are:

H7: In regions where population density is higher requires governments to require more resources, which in turn implies a higher IGT tax burden.

H8: In regions where the dependency ratio is higher, the IGT tax burden is higher due to the greater need for resources.

Third, there is a negative correlation between the unemployment rate and the tax burden. The higher the unemployment rate, the more governments tend to reduce fiscal pressure (Shamsub and Akoto, 2004; Gupta, 2007; Ocampo, 2017; Kudła *et al.*, 2023). Moreover, the unemployment rate is inversely related to economic growth, as it is an indicator of business cycles (Kodrzycki, 1988; Badu and Yung Li, 1994). This increase, as mentioned above, is directly affected by the fiscal pressure exerted by the different territorial levels.

The assumption advanced in this article is as follows:

H9: A higher unemployment rate within the Autonomous Community reduces the tax burden on the IGT.

Fourthly, educational attainment, defined in many studies as the illiteracy rate, is understood as a determinant variable of the level of public revenue and, therefore, of the tax burden, according to the works of Musgrave (1969), Lotz and Morss (1970) and Garriga *et al.* (2018). In fact, in agreement with Fuente and Jimeno (2011), the level of education achieved by the population presents a trade-off at the fiscal level, given that the more years people remain in the education system, the lower the tax revenue. However, when this population moves into the workforce in the future, tax revenues will go up.

As regards this factor, we hypothesize that:

H10: In those regions with higher educational attainment of the population the tax burden of IGT is higher.

5.2. Empirical approach

The empirical analysis used in this study consists of 180 observations for the dependent variable (tax burden) and for each of the explanatory variables that the scientific literature has identified as determinants, considering the availability of information in the study period (2007-2019) for the 15 Spanish Autonomous Communities of common regime. The definition of each variable, mean and standard deviation are included in Table 2. As we have already mentioned, we have two explanatory models, on the one hand, a model for the design of the tax and, on the other hand, the explanatory model of the tax burden.

Table 2
VARIABLES USED IN THE EMPIRICAL APPROACH

Name	Definition	Source	Mean	S.d.
<i>Dependent Variable</i>				
Tax design	Cardinal number from 0 (no tax rebate competition) to 2 (total tax rebate).	Ministry of Finance and Public Function (Regional taxation).	0.821	0.511
Tax burden (y)	Total tax collection between GDP of the region.	Ministry of Finance and Public Function (Collection and Statistics of the Spanish Tax System) and the National Institute of Statistics (Regional Accounts of Spain).	0.254	0.110
<i>Independent variables</i>				
Debt per capita (x_1)	Total regional debt divided by the total population of the region.	National Statistics Institute (Spanish Regional Accounts).	3863.312	2310.543
Collection over budget (x_2)	Proportion of total tax collection over the budget of the region.	Ministry of Finance and Public Function (Collection and Statistics of the Spanish Tax System and Budgets of the Autonomous Regions).	0.015	0.007
Ideology (x_3)	Dummy variable that takes the value 1 if the political party is left-wing; 0 right-wing.	Spanish Senate (Elections. Political parties. Parliaments).	0.472	0.501

(Continued)

Name	Definition	Source	Mean	S.d.
<i>Independent variables</i>				
Heterogeneity (x_4)	Index of deviations from the mean, and aggregate using the weight of the tax instrument in total own revenues.	Ministry of Finance and Public Function (Regional taxation).	-0.00417	1.2366
GDPpc (x_5)	The GDP of the region divided by the total population of the Autonomous Community.	National Statistics Institute (Spanish Regional Accounts).	22414.070	4229.195
Waivers per case (x_6)	Total number of inheritance waivers over the number of IGT files managed by the Public Administration.	General Council of Notaries (Inheritances/outright waiver of inheritance) and Ministry of Finance and Public Function (Reports to the General Inspectorate).	0.047	0.024
Population density (x_7)	Total number of population of a geographical unit divided by the total number of km ² of its surface area.	National Institute of Statistics (Demography and Population).	163.617	189.717
Dependency (x_8)	Ratio of persons under 16 or over 64 to the working age population.	National Institute of Statistics (Demography and Population).	51.291	4.686
Unemployment rate (x_9)	Ratio between the number of unemployed and active population.	National Statistics Institute (Labour Force Survey).	18.209	6.894
Education (x_{10})	Population aged 16 and over with educational attainment.	National Statistics Institute (Labour Force Survey).	31.975	6.209

Source: Own elaboration.

The first model explaining the design of the tax, the dependent variable is the type of fiscal design, represented by an ordinal number (0-2). For this type of variable, the natural choice is random effects ordered logistic regression. In ordered choice models, it is assumed that the dependent variable takes on the values $\{0, 1 \dots j\}$ and the value j is known and equals 2. The model has the following form:

$$Y_{it} = \beta_p X_{pit} + b_i + v_t + u_{it} \quad (2)$$

where Y_{it} represents the dependent variable, while X_{pit} represents the dependent variables. b_i is the individual effect, which explains the individual differences are not include by dependent variables, i. e. the regional effect, v_t includes time trends and u_{it} represents the error term.

The empirical model used for inheritance and gift tax revenues is as follows:

$$y_{it} = \alpha + \beta_k X_{kit} + \mu_i + v_t + \varepsilon_{it} \quad (3)$$

where y_{it} is the tax burden, X_{kit} refers to each of the k selected explanatory variables, μ_i is the region-specific term, v_t includes time trends and ε_{it} is the error term.

In order to estimate both models and obtain correct estimates, it is important to assess whether several common assumptions are met.

About the logistic regression model, it assumes that the outcome variable is a linear combination of the independent variables. This implies that we assume that we have included all relevant variables and that we have not included any variables that should not be there. In one of the two cases we would have a misspecification. Therefore, the link test was performed to find out if the model has been correctly specified, at first including all variables the test was significant. After discarding some variables, the linear predicted value (\hat{y}) is significant ($z=2.34$ $p=0.019$) and the squared linear predicted value (\hat{y}^2) is not ($z=-1.75$, $p=0.080$), so the model is correctly specified taking into account those variables that do explain the model. This ratifies the subsequent results. This was further ratified by the Akaike information criterion (AIC) and the Bayesian information criterion (BIC). These criteria tend to work inversely, the latter telling us that the model with only the significant variables explained the model better (BIC1 = 352.34 and BIC2 = 337.33). For AIC the conclusion was the opposite.

Multicollinearity has also been assessed through the programme called *Collin*. If all variables are orthogonal to each other, in other words, completely uncorrelated with each other, both the tolerance and the VIF are 1. If a variable is very closely related to other variable(s), the tolerance becomes 0, and the variance inflation becomes very large. In table 3 we can see that our variables do not pose problems of this type with the mean VIF being 3.06.

Thus, given the test results, the model chosen is the ordinal logistic regression model with random effects given the results of the Hausman test ($\chi^2(09) > 0.03$; $p = 1.00$).

As regards the second model, the joint variance inflation factor (VIF) reaches a value of 3.17 and none of the determinants have a value greater than 5, indicating that no multicollinearity problems occur. The over-identified restrictions test indicates that the estimator to be used to estimate the regression is the fixed effects estimator (Sargan-Hansen statistic: 96.073; p -value: 0.000). It is important to note that the empirical model suffers from some important problems that need to be solved: autocorrelation (Wooldridge test: $F(1,14): 14.310$; $\text{prob} > F: 0.002$), heteroscedasticity (modified Wald test: $\chi^2(15): 225.62$; $\text{prob} > \chi^2: 0.000$) and contemporaneous correlation (Pesaran's test: 1.902; $\text{Pr} = 0.0572$) are present in the initial estimation of the model.

The cross-sectional dependence found in the model and the existence of cross-sectional dependence in the independent variables indicate that any change in one region influences the

rest of the regions. The results of the Pesaran test for each of the variables (see Table 3) show the presence of cross-sectional dependence in all the independent variables. This finding of cross-sectional dependence delimits the unit root tests that we must apply to assess whether the variables are stationary. Thus, we use the second generation augmented cross-sectional test (CIPS) developed by Pesaran (2007). These results confirm that for the variables at level the existence of unit root cannot be rejected but after taking the first difference all variables are stationary at 1% significance. Finally, Table 3 expresses the results of the test applied to the sample to assess the presence of endogeneity between the dependent variable and each of the continuous explanatory variables (Davidson-MacKinnon test). The economic level of the region, measured by GDPpc, together with its business cycle (unemployment rate) are the only continuous variables that reveal endogeneity problems with the dependent variable. For this reason, we have used the one-period lagged variables for the final estimation of the model.

Table 3
RESULTS OF DIAGNOSTIC TESTS OF BOTH MODELS

Model Tax Design		Model Tax Burden				
VIF	Pesaran CD test	CIPS (with trend)		Davidson- MacKinnon test	VIF	
		Level	First difference			
Debt per capita (x_1)	3.08	36.57***	1.881	-2.133***	0.226	2.82
Collection over budget (x_2)	1.55	5.50***	-3.983***	-7.103***	0.725	1.53
Ideology (x_3)	1.44	—	6.944	—	—	1.37
Heterogeneity (x_4)	1.53	-1.69*	-0.683	-5.073***	3.132	1.44
GDPpc (x_4)	5.64	34.82***	-1.963**	-3.060***	4.859***	5.60
Waivers per case (x_5)	2.35	33.70***	-0.370	-5.471***	0.086	2.32
Population density (x_6)	4.61	16.13***	-2.855***	-3.829***	2.432	4.59
Dependency (x_7)	4.75	34.57***	2.031	-2.732***	2.200	4.70
Unemployment rate (x_8)	2.49	35.33***	-1.149	-2.701***	8.847***	2.45
Education (x_9)	4.94	34.40***	0.251	-5.632***	0.063	4.85

Note: *** p<0.01, ** p<0.05, * p<0.1.

Source: Own elaboration.

Considering the unbiased and inefficient estimates that the statistical detected problems generate in the initial model when applying OLS, the final estimation of our model is obtained using Panel-Corrected Standard Errors (PCSE), since, as Beck and Katz (1995) point out, they provide an accurate estimation in panel data considering the problems of heteroscedasticity, autocorrelation and contemporaneous correlation that we found in the initial estimation of our model. Furthermore, in their research Beck and Katz (1995) show that PCSE estimators are more accurate than feasible generalised least squares estimators.

6. Results and discussion

The findings obtained with the final estimation of the model, using panel data, are shown in Table 4. The results are presented differentiating between two models, the one that establishes an explanation of the tax design with an ordered logistic regression of random effects (model 1) and the OLS model that explains the tax burden in which these effects are controlled by regional dummy variables (model 2).

Table 4
FINAL ESTIMATES OF THE PANEL DATA MODELS

	Model tax design	Model tax burden
Debt per capita (x_1)	0.0005023***	-1.85E-06
Collection over budget (x_2)	17.8407	15.588***
Ideology (x_3)	-1.0464***	0.0049662
Heterogeneity (x_4)	-0.4944***	-0.00573**
GDPpc (x_5)	-0.000158	-1.36E-06***
Waivers per case (x_6)	-1.17504	-0.5726336***
Population density (x_7)	0.0011326	-0.0002451***
Dependency (x_8)	-0.009974	-0.0024179***
Unemployment rate (x_9)	-0.18259	0.00044
Education (x_{10})	0.05462	0.0006645
Constant		0.261647***
Wald test	48.43	5786.77
p-value	0.000	0.000
R ²		0.970

Note: *** p<0.01, ** p<0.05, * p<0.1.

Source: Own elaboration.

6.1. The model explaining the design of the tax

This model contrasts the factors that explain the divergent design of the inheritance and gift tax in Spain.

On the one hand, the model shows that the different fiscal policies applied by the Spanish regions with respect to their own taxes lead to greater differences in the design of the tax, since the statistically significant coefficient is negative. Likewise, the ideology of the ruling regional party is also explanatory of the design, the variable has a negative coefficient. Both variables are related in decision making, as tax policy will be in line with party colour. As highlighted by Kudła *et al.* (2023) it is interesting to be able to expect an impact of policy measures on the tax design. In our case, the fact that a right-wing party governs translates into a tax design that tends to be subsidized, as well as those that present less heterogeneity in the imposition of their own taxes.

On the other hand, those variables related to the economic situation of the region, such as the unemployment rate and debt per capita, also explain the design of this tax, as occurs in the model of Kudła *et al.* (2023). Although the effect is different, as might be expected, in the first case unemployment has a negative effect (higher unemployment tends to increase the tax rebate) and in the second case it has a positive effect (higher debt per capita tends to increase the tax rebate), and in the second case it has a positive effect (higher debt per capita tends to increase the tax rebate).

6.2. The model of inheritance and gift tax revenues

This model contrasts the factors that explain the divergent tax burden of the inheritance and gift tax in Spain.

Firstly, as regards the hypotheses raised in this research, the first of these hypotheses cannot be said to be fulfilled. Debt per capita is not statistically significant as an explanatory variable of the tax burden.

The size of the region's administration, measured through its revenue-raising capacity, maintains a statistically significant positive relationship in the model estimated with respect to the tax burden of inheritance and gift tax. This has been found by other previously analysed scientific studies (Cárcaba García, 2003; Misiolek and Elder, 1988; Benito and Bastida, 2004; Zafra and López, 2006). The relevance of this explanatory factor is much higher in quantitative terms than the rest of the factors evaluated.

The third hypothesis, associated with the effect of the ideology of the governing political party, is not verified in the model defined. Although it is true that this does not allow us to reach relevant conclusions related to the political nature of regional governments. Similarly, some previous scientific research has found no relationship between the fiscal pressure of the territory and the political party governing it (Hage and Vabo, 2005; Imbeau *et al.*, 2001).

Regarding the fourth hypothesis, the heterogeneity present in the fiscal policy of the regions has a negative effect on the tax burden; those regions that are farther away from the average have a lower tax burden. Therefore, the existing heterogeneity apart from the tax under analysis affects the tax burden exerted, thus fulfilling the fourth hypothesis of the study.

The economic conditions of the regions emerge as determinant variables of the inheritance and gift tax burden only when regional fixed effects are incorporated in the model, thus fulfilling the fifth and ninth hypotheses. Thus, the level of economic development of the region presents a statistically significant negative coefficient with respect to the tax burden of this tax. This represents a novelty in the scientific literature linked to this line of research, only evidenced by the scientific research of Bird *et al.* (2008). It should be noted, regarding the economic level, that the sixth hypothesis established in the empirical framework can be evidenced in the model. Its negative sign indicates that in those regions where there are more renunciations, a lower tax burden is exerted. However, with respect to the unemployment rate, the results of the model do not allow us to confirm the ninth hypothesis defined.

Fourthly, regional socio-demographic conditions are statistically significant determinants of the regional inheritance and gift tax burden, although their effect on it does not follow the same direction. Regional population density has a statistically significant coefficient, which is negatively related to the regional tax burden on inheritance and gifts, which does not allow us to verify the seventh hypothesis defined in this study.

In line with Le *et al.* (2012), our model estimates show that the regional dependency ratio is negatively and statistically associated with the tax burden imposed by the tax under study. While it is true that there is a tendency to think that regions with a higher proportion of people dependent on public resources (young and old) need a greater volume of funding, it is worthwhile considering the taxable event of this tax (mortis causa or inter vivos) determines the relationship established in the model estimate. With a smaller productive population, the forecasted tax base is lower, resulting in lower tax revenues.

Finally, the model does not reveal a statistically significant relationship between the tax burden and the level of education in the Spanish regions, thus failing to confirm the ninth hypothesis put forward in this scientific work.

Both models have included time trends in both empirical models since the sample period covered in this study includes the Great Recession (2008-2009) and the sovereign default crisis (2011-2013), which is an aggregate crisis. As highlighted by Martí and Pérez (2015) in their study to correct the fiscal imbalances arising from these crises (which exacerbated fiscal vulnerabilities), a significant number of bold policy measures were adopted that affected taxation, public spending, domestic fiscal rules, and the structure of the public sector. Thus, when measured in both models through a series of dummy variables, in the first one those referring to the years 2010-2013 are significant, so that the sovereign default crisis had an impact on the tax design and in the second model, those variables referring to the years 2007-2012, which are precisely the years of both named crises, are significant.

7. Conclusions

This paper addresses a highly controversial issue of great relevance for European public policy, as the position of the different countries on this tax diverges across the continent. This

paper focuses on the very particular case of the Spanish state, in which the regions have a very high regulatory autonomy with respect to this tax and a situation of regulatory disparity has been created throughout the Spanish territory. This situation has created a general unease among the population, which sees the situation as unfair and even questions whether the effect known as “voting with your feet” is not taking place. In other words, citizens are motivated to move to those territories where the tandem between income and public spending is satisfactory.

Furthermore, scientific doctrine has questioned the imposition and management of inheritance tax since the devolution of powers began. For all these reasons, it is extremely necessary to study and understand it, especially when the authorities are analysing possible lines of reform of this tax. Thus, determining the explanatory factors of the IGT tax burden provides us with a further understanding of the tax and facilitates decision-making by the public authorities.

In Spain, as in most developed OECD countries, the tax burden is clearly conditioned by institutional, economic, and social factors. Institutions play an essential role in alleviating the burden of this tax on their citizens. The effect on it of variables such as the level of indebtedness of the regions and their revenue-raising capacity means that regional public administrations work to achieve a better distribution of their resources with the aim of alleviating the level of indebtedness of their inhabitants and, therefore, reducing the tax burden of this tax by modifying it. In view of this situation, the Spanish regions must assess the composition of their sources of revenue, bearing in mind that those regions with the greatest revenue-raising capacity maintain a higher level of tax pressure on their taxpayers from this tax. Therefore, the modification of this tax, especially in those regions where IGT represents a higher proportion of revenue, should be assessed with special attention.

The economic environment and the level of economic development of Spanish regions has become a key factor in the IGT tax burden, considering that in an unfavourable macroeconomic environments Spanish regions have opted to reduce the tax burden on their citizens. Therefore, the situation of the economic environment leads political decision-makers to have to restructure their capacity to generate additional public revenue to be able to afford the resources used to improve the economic situation of their regions. In relation to this, it is true that those regions with a higher level of economic development have tended to reduce the tax bill of this tax for their citizens, which is perhaps related to a different revenue structure.

Finally, social, and socio-demographic variables have an influence on the design and the IGT tax burden in the Spanish regions. Thus, the dependency ratio has a positive effect on the reduction of the tax burden of this tax. This effect of the dependency ratio is counterbalanced by the impact of a higher population density and a better-educated population structure on the public coffers. This means that Spanish regions with a higher concentration of population and a higher proportion of better educated people require more public services.

All in all, considering the different effect of the institutional, economic, and social variables analysed in this study, the future of the tax is uncertain and complicated for regional

treasuries, especially considering the impact of the factors assessed in this scientific study. Similarly, it is up to the central government to decide whether, once the performance of the regions' taxing power has been assessed, the IGT should continue to be a devolved tax or not.

Note

1. The White Paper was prepared by a group of independent experts with the support of the technical staff of the Spanish Institute for Fiscal Studies.

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Resumen

Basado en la hipótesis de que existe una asimetría en la carga fiscal del Impuesto sobre Sucesiones y Donaciones entre las distintas regiones de España, se analizaron los factores internos y externos que determinan su diseño y la carga tributaria aplicada en cada comunidad autónoma. Para este propósito, se utilizaron dos modelos: la regresión logística y el modelo de mínimos cuadrados ordinarios. Las variables económicas, demográficas y de política fiscal son factores que influyen en ambas variables y explican las diferencias existentes entre las regiones.

Palabras clave: impuesto regional, desigualdad regional, España, presión fiscal, diseño tributario, análisis longitudinal.

Clasificación JEL: C23, K34, R58.