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## The Relationship between the Revenue and the Fiscal Capacity of the Spanish Autonomous Regions

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## Abstract

This article analyses the degree of inter-territorial redistribution that occurs in Spain through the Autonomous Regions' financial model and through the flow of current and capital transfers that the regional governments receive outside that model. The results indicate a high degree of redistribution that occurs through the systems of allocation of transfers to the various regional governments. In the case of the common-regime autonomous regions, the elasticity of total resources received by the regional governments with respect to their own fiscal capacity (GDP per capita) is 0.010. This means that the resources available to them are almost unrelated to their own fiscal capacity.

Keywords: Regional financing, Territorial redistribution.

JEL Classification: H71, H73.

## 1. Introduction

The tax basket derived from the financial model of the Autonomous Regions (ARs) provides 63.4% of their total revenue for the common-regime ARs, and 98.3% for the *foral* ARs (of regional law of the "fueros"). These percentages show that a significant part of the resources of the regional governments, especially those of the *foral* territories, comes from taxes paid by their citizens and that, therefore, an important part of their resources is directly

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related to their tax capacity. The starting hypothesis is that a government with a higher tax capacity ends up having more tax resources than a government with a lower capacity. The aim of this paper is, precisely, to check to what extent this relationship is fulfilled and in how far the remaining sources of the model (in the case of the common-regime ARs, the Fundamental Public Services Guarantee Fund (FPSGF) and the three adjustment funds) and the combination of transfers that they end up receiving outside the circuit of their own model, which determine the resources that the regional governments end up having at their disposal, are or are not related to their own fiscal capacity.

To this end, we quantify the elasticity of regional resources with respect to their fiscal capacity measured by GDP per capita. A low value of this elasticity would show that regional revenues are not very elastic with respect to their fiscal capacity. In other words, an improvement in the latter translates into only a small increase in their revenues. At the same time, this provides a measure of the degree of redistribution (equalization) that takes place. The less elastic regional revenues are with respect to their fiscal capacity, the more redistribution takes place, since it would indicate that governments do not benefit from an important part of the increases in their own fiscal capacity. Instead, through other mechanisms, these funds are channelled into redistributive flows.

To verify the extent to which this behaviour occurs, we shall first briefly describe the source of revenue of both the common- and the *foral*-regime ARs (section 2). It has been considered interesting to analyse not only the case of the common-regime ARs, but also those of *foral* regime. This makes it possible to identify the different sources that make up the two current financial models as well as the ways of obtaining revenue beyond these models, that end up having an impact on the total obtained resources. Secondly, section 3 offers a measure of the inter-territorial degree of redistribution that takes place through the mechanisms that make up the regional financial models and the transfers received beyond them. For this purpose, three equations are estimated which provide us with a quantification of the elasticities of regional resources with respect to their fiscal capacity to deduce and quantify the degree of redistribution (equalization) that exists. Thirdly, only to exemplify and to provide a comparative reference, section 4 analyses the degree of redistribution that occurs in the regional governments (cantons and states) of Switzerland and the USA while estimating the same equations used for the Spanish case. The fifth section contains the summary of the main results and, finally, the paper finishes with a section of concluding remarks.

It is important to remark that this methodology diverges from the one employed in Vilalta's study (2015) and serves a different objective. Vilalta (2015) aims to quantify the degree of progressivity within each component of the regional financing model. In their analysis, the total per capita resources derived from the model serve as the dependent variable, while the explanatory variables consist of resources from different components of the model. In contrast, the present article focuses on examining the relationship between resources and GDP, which serves as a measure of the fiscal capacity of subcentral governments. Furthermore, unlike Vilalta (2015), this analysis includes the foral regional communities, incorporates transfers from sources outside the financing model, and makes comparisons with other federal countries using the same methodology employed in the Spanish case. Additionally, the analyzed period differs between the two articles.

# 2. The origin of the revenue of the ARs: the common-regime model and the *foral* model<sup>1</sup>

#### 2.1. Revenues of the common-regime ARs

In 2019, the 15 ARs of common regime obtained a total of 179,343.12 million euros, from which the 72.5% came from the sources of revenue within the current financial model (un 92,1% if income from financial operations is excluded from the calculation, as shown in table 1.

Table 1	
<b>REVENUES OF THE 15 COMMON-REGIME A ARS ACCORDING TO THEIR ORIGI</b>	IN.
2019	

	Millions of	% non financial	% total
	euros	revenues	revenues
Revenues originating from the settlement of the			
financial model	130,043.92	92.1%	72.5%
Tax Revenues	113,774.86	80.6%	63.4%
Fundamental Public Services Guarantee Fund	9,090.07	6.4%	5.1%
Sufficiency Fund	979.13	0.7%	0.5%
Competitivity Fund	3,890.12	2.8%	2.2%
Cooperation Fund	2,309.74	1.6%	1.3%
Tax revenue from the use of regulatory capacity <sup>(*)</sup>	-2,822.67	-2.0%	-1.6%
Off-model revenues	14,021.07	9.9%	7.8%
Fees and public prices	4,888.01	3.5%	2.7%
Transfers outside the model <sup>(**)</sup>	8,517.42	6.0%	4.7%
Property income	503.38	0.4%	0.3%
Disposal of real investments	112.26	0.1%	0.1%
Financial operations	38,100.80		21.2%
Financial assets	1,177.00		0.7%
Financial liabilities	36,923.80		20.6%
Total non financial revenues	141,242.32	100.0%	78.8%
Total revenues	179,343.12		100.0%

<sup>(\*)</sup> The model contributes 130,043.92 million euros, of which 113,774.86 come from tax revenue, as shown in the table. However, it should be noted that this amount reflects revenue from taxes that these governments can actually set. Yet, it does not correspond to what the regional governments end up obtaining once they have made decisions on their taxes. That is to say, it does not correspond to the "recognized rights" in chapters 1 and 2 of the regional budgets. These amount to 110,952.19 million euros, which are 2,822.67 million euros less than those calculated with the normative criteria in the regional financing agreement (113,774.92–110,952.19=2,822.67)".

(\*\*) These are transfers from the central government to the ARs through other channels outside the financial model (specific subsidies, Inter-territorial Compensation Fund, etc.), transfers from abroad, and from other entities and bodies.

Source: Compilation based on information supplied by the Spanish Finance Ministry (Ministerio de Hacienda).

- i) Data of the financing autonomous model. *Source:* https://www.hacienda.gob.es/es-ES/CDI/Paginas/Sistemas FinanciacionDeuda/InformacionCCAAs/Informes%20financiacion%20comunidades%20autonomas2.aspx.
- Data on the revenue outside the model (recognized rights of the different chapters included in the Budget). https://serviciostelematicosext.hacienda.gob.es/SGCIEF/PublicacionLiquidaciones/aspx/SelDescargaDC.aspx.

The current model, in force since 2009, is customized on the basis of:<sup>2</sup> (i) a tax basket; (ii) an equalization mechanism called the *FPSGF*; and (iii) three adjustment funds: the sufficiency fund, the competitiveness fund and the cooperation fund. The resources contributed by each of these components to the ARs in 2019 are shown in Table 1.

The tax revenues from the model are the most important channel of the common system<sup>3</sup> in quantitative terms. It is important to highlight that the model guarantees a volume of potential tax resources, whose calculation mechanism is defined in the model itself.

The *FPSGF* operates as an equalization mechanism for the model. Its objective is to ensure that each Autonomous Region receives the same resources per adjusted population<sup>4</sup> to finance the essential services of the welfare state (education, health, and social services) while making the same fiscal effort. The subsidy from the FGSPF corresponding to each regional government results from applying the following formulation:

$$Gi = \left[ \left(\frac{Pi}{P}\right) * 0.75\hat{T} - 0.75\hat{T}i \right] + \left(\frac{Pi}{P}\right)Q \tag{1}$$

Where: Gi = FPSGF corresponding to regional government *i*;  $P_i$  = adjusted population of the regional government *i*; P = total adjusted population of the 15 regional governments of common regime;  $\hat{T}i$  = potential tax revenue of regional government *i*;  $\hat{T}$  = total potential tax revenue of the 15 regional governments of common regime; Q = volume of resources contributed by the central government to the FPSGF.

The first addend of the expression (1) corresponds to a zero-sum horizontal fund and the second to a vertical fund. The amount corresponding to each AR of the horizontal fund is calculated by subtracting 75% of its potential fiscal capacity from its expenditure needs  $(0.75 \hat{T} i)^5$ ; the expenditure needs are those resulting from applying the percentage of the adjusted population  $\left(\frac{Pi}{P}\right)$  to 75% of the total potential tax resources  $(0.75T\hat{T})$ . Thus, each government contributes to the horizontal fund according to its potential tax capacity and receives according to its needs. If the needs are higher than the capacity, the equalization grant is positive; otherwise, it is negative. To understand the importance of an accurate calculation of the "fiscal capacity" variable, see Vilalta (2020). The amount corresponding to the vertical fund is calculated by distributing the amount contributed by the central government (Q) according to the adjusted population. This amount was 9,090.07 million euros as shown in table 1. The result of this mechanism is a partial equalization (75%) of the resources of the regional governments. This means that the initial differences in tax revenues are cut, but not completely eliminated, achieving a more equal distribution of resources than the existing one<sup>6</sup>

The three adjustment funds of the model (the sufficiency fund, the competitiveness fund, and the cooperation fund) contribute 4.0% of the total revenue of the common-regime Ars (5.1% if financial operations are excluded), as can be seen in table 1. The allocation of the three funds comes from the central government, and their distribution among the various ARs differs from one another according to their respective objectives.

The aim of the sufficiency fund was to ensure that with the acceptance of the 2009 model, no Autonomous Region would lose resources with respect to the previous model, but rather increased them by a previously agreed additional amount. This ensures that the status quo is maintained. The amount corresponding to each regional government from this fund in the base year was calculated as the difference between the financial needs of that year and the sum of the revenue derived from tax revenue ( $\hat{T}i$ ) and from the FPSGF. The financial needs for 2009 were estimated based on the resources that each regional government would have received under the previous model plus additional agreed allocations. This calculation was made only for the base year and is updated annually according to the growth rate of State Tax Revenues (STR). The overall volume of this fund was 979.13 million euros in 2019, as shown in Table 1<sup>7</sup>.

The aim of the competitiveness fund is to contribute to reducing the differences in the financing per (adjusted) population of the various ARs, encouraging their autonomy and fiscal capacity. Not all ARs receive resources from this fund, but only those that meet one of the following two criteria: i) those whose financing per capita is below the average; ii) those whose financing index per capita is lower than their fiscal capacity index per capita. Once the beneficiary ones have been determined, the resources are distributed according to the adjusted population. The amount to be distributed in 2019 was 3,890.12 million euros (Table 1).

The cooperation fund is a regional development fund, whose objective is to stimulate growth and regional convergence in terms of income. The beneficiaries of this fund are only those ARs that meet any of the following conditions: i) those that in average during the last three years have had a GDP per capita of less than 90% among the average of the common-regime ARs; ii) those that have a population density of less than 50% among the average of the common-regime ARs; iii) those that in the last three years have had a population growth rate of less than 90% among the average of the common-regime ARs and a population density of less than 90% among the average of the common-regime ARs and a population density of less than 90% among the average of the common-regime ARs and a population density of less than the average of the ARs multiplied by 1.25. The distribution of this fund among the beneficiaries is made by dividing the total amount (2,309.74 million euros in 2019, table 1) into two sub-funds: 2/3 of the fund is distributed according to weighted population by the difference between the autonomous region's GDP per capita and the average; 1/3 of the fund is distributed among the beneficiaries whose population growth is less than 50% of the average, and is distributed according to population. No autonomous region can receive more than 40% of this sub-fund.

Thus, the resources corresponding to each regional government from the financial model are those resulting from applying the following expression:

$$\hat{R}i = \hat{T}i \pm FGSPFi \pm FSi + Fcomp_i + Fcoop_i$$
<sup>(2)</sup>

Where:  $\hat{T}i$  = potential tax revenue of government *i*; *FPSGFi* = Fundamental Public Services Guarantee Fund corresponding to government *i*; *FSi* = sufficiency fund corresponding to government *i*; *Fcoop<sub>i</sub>* = co-operation fund corresponding to government *i*.

As can be seen in table 1, the resources from the financial model are not the only ones available to the regional governments. 29.1% of their resources come from other sources, among which financial liabilities (20.6%) and the transfers they receive through other channels outside the financial model stand out. In 2019, these transfers amounted to 8,517.42 million euros, representing 4.7% of total regional revenue (6.0% if financial operations are excluded). These transfers come from the central administration itself through other funds and specific subsidies (4,822.63 million euros); from abroad, fundamentally from the European Union (2,932.86 million euros in 2019), which in this case mainly capital transfers are aimed at financing investments; from social security (751.21 million euros); from private companies, families and non-profit institutions (10.72 million euros).

#### 2.2. Revenues of the ARs under the *foral* regime

Table 2 shows the origin of the *foral*-governments' resources (Basque Country and Navarre) in 2019. In this case, 88.0% came from the financial model (12,806.92 million euros), which is configured around two pillars: the agreed taxes (14,309.27 million euros) and the quota or contribution made to the central government as payment for the services it provides in the *foral* territory (a total of 1,502.35 million euros, which represents 10.3% of total revenue). This model is clearly different from that of the ARs under the common regime, given that the *foral* territories have ceded (agreed) all national taxes (except customs revenue, withholdings by civil servants and government employees, capital withholdings on assets issued by the national government or the common-regime ARs, fiscal monopolies, taxes and public prices associated with services not assumed by the *foral* autonomous region, social security contributions), administer them, and enjoy a broad regulatory capacity over their essential elements. The payment they make through the quota does not include any concept of equalization with the rest of the ARs of the State<sup>8</sup>.

	Millions of euros	%
Revenues from the financial model	12,806.92	88.0%
Agreed taxes	14,309.27	98.3%
<ul> <li>Quota/contribution</li> </ul>	-1,502.35	-10.3%
Off-model income	1,753.15	12.0%
Fees and public prices	397.16	2.7%
Off-model transfers <sup>(*)</sup>	215.05	1.5%
Property income	12.20	0.1%
Disposal of real investments	1.05	0.0%
Financial assets	42.53	0.3%
Financial liabilities	1,085.16	7.5%
Total	14,560.07	100.0%

 Table 2

 ORIGIN OF THE REVENUE OF THE ARs WITH A FORAL REGIME. 2019

(\*) These are transfers from the state administration, from abroad and from other entities.

Source: Compilation based on information supplied by the Ministry of Finance.

As for resources from outside the financial model, financial liabilities (accounting for 7.5% of the total), fees and public prices (2.7%) and transfers (1.5%) should be highlighted. In this case, these are mainly transfers from central government (120.31 million euros) and from the European Union (83.16 million euros).

## 3. A measure of the extent of inter-territorial redistribution

#### 3.1. Description of the methodology used

Graph 1 shows the index of resources per capita of the regional governments before (tax revenue) and after the action of the transfer systems (tax revenue+transfers), for the year 2018. As can be seen, tax revenue per capita ranges from 84% above the average (Navarre) to 42% below it (Canary Islands). Once the different transfer systems described in the previous section have been implemented, the resources per capita range from 59% above average (Navarre) to 17% below average (Valencia).





<sup>(\*)</sup> VAT plus IIEE included in transfers. Compilation based on data from annex 1.

These data allow us to analyse to what extent the resources of the regional governments depend on their own fiscal capacity, rather than the transfers they receive from other governments, whether from the central government, from the regional governments themselves (for example, through the horizontal sub-fund of the current FPSGF), or from the European Union.

If all the resources of the regional governments came from the taxes paid by their citizens and none from transfers from other entities, the degree of inter-territorial redistribution produced through the sources of regional funding would be zero. In this section, we measure to what extent the resources of regional governments depend on their own fiscal capacity, i.e., their tax revenues. To do so, we start from the following expression:

$$T_i = A Y_i^{\alpha}$$

where  $T_i$  is the tax revenue of a government *i*, and  $Y_i$  is the GDP for that government. Both are in per capita terms. The coefficient  $\alpha$  indicates the elasticity of tax revenues with respect to GDP. Expressed in logarithmic terms, this implies our first regression equation:

$$lnT_i = lnA_1 + \alpha lnY_i \tag{1}$$

Running this regression on data for a cross-section of regions will give an estimate of the elasticity  $\alpha$ .

Taxes are not the only way for regional governments to obtain resources. We therefore also analyse the relationship between the total resources a regional government has at its disposal to GDP. To this end, we estimate

$$lnR_i = lnA_2 + \beta lnY_i, \tag{2}$$

where  $R_i$  is the total resources of government *i* (tax revenue + transfers), per capita. Here,  $\beta$  measures the elasticity between total regional government revenues and GDP per capita.

In a progressive system, we expect to find an elasticity between 0 and 1. An elasticity of zero would indicate the highest possible degree of redistribution (equalization). In this case, an increase in the fiscal capacity of a regional government (as measured through GDP per capita) does not translate into any increase in its total resources, as resources are equalized across regions, regardless of GDP. Conversely, an elasticity of one would indicate the lowest possible degree of redistribution (equalization). In this case, an increase in GDP per capita translates into an increase in government resources by the same proportion, so that resources are not equalized at all, and are proportional to regional GDP. Thus, the closer the value of  $\beta$  to 0, the more progressive the system of redistribution across regions. Actually  $1 - \beta$  measures the degree of equalization and thus the existing redistribution.

Finally, we run the third regression

$$ln(R_i/T_i) = lnA_3 + \gamma lnY_i \tag{3}$$

Note that by construction, the  $\gamma = \beta - \alpha$ . Nevertheless, the estimate of  $\gamma$  is informative: it indicates how resources available (*R*) relative to resources raised (*T*) vary with GDP per capita. The discrepancy between *R* and *T* reflects transfers. With no systematic redistribution,  $\gamma$  is zero, as transfers do not reflect differences in GDP per capita. With progressive redistribution,  $\gamma$  is negative, as more transfers flow to poorer regions.

## 3.2. Data used in estimation

To obtain the most recent snapshot of redistribution, the estimation uses data for the three latest available years, 2016 to 2018, for all countries. To minimize the effect of year-to-year

fluctuations, we run regressions on data averaged across these three years. (Results are similar when pooling all years.)

Our main results cover the fifteen ARs under the common regime and exclude the two regions under the *foral* regime, since this different regime reflects historical factors in addition to considerations of redistribution across regions. For completeness, we also report results including them. Similarly, we explore the robustness of our results to the inclusion of the Canary Islands, which has a special financing regime.

## 3.3. Estimation results

Table 3 contains the regression coefficients of the three equations estimated by Ordinary Least Squares (OLS). We run the regressions for two measures of taxes. The left part of the table contains results including only taxes of type (a) and 50% of personal income tax (IRPF) of type (b) in note 3, i. e. those over which regional governments have some control. The right part of the table shows results for taxes of type (a) and (b). Resources are not affected by this choice, so results for resources are identical in the two parts of the table. Further, in each part of the table, the first column shows the regression coefficients for the main sample, including only the common-regime ARs, and the second column shows results for the sample that also includes the *foral* regions.

Results for taxes of type (a) are as follows:<sup>9</sup>

i. There is a positive relationship between GDP per capita and the per capita tax resources of the regional governments. The coefficient is 1.215, indicating that a 1% increase in a region's GDP per capita translates into an increase in per capita tax revenues of roughly 1.2%.

When the *foral* ARs are added, this coefficient increases (1.983). This reflects the fact that the tax revenue relative to GDP is higher in the foral communities than it is in the rest of Spain. This is due to the composition of the tax basket of the *foral* governments, which is made up of taxes that, both in terms of their nature and their weight, have a high degree of elasticity (more than that of the common-regime ARs) with respect to GDP.

These results are similar for taxes of type (a)+(b), as shown in the right part of the table. In this case, the coefficients are slightly (but not significantly) smaller, and estimated more precisely.

ii. Equation 2 shows that the relationship between GDP per capita and the total resources that end up being available to the common-regime regional governments, including not only tax revenues but also transfers, essentially flat, since the regression coefficient  $\beta$  is not statistically significantly different from zero. This means that an increase in the tax capacity of common-regime governments implies almost no increase in their total resources. This implies that higher tax revenues in regions with higher GDP do not translate into higher government resources in these regions,

but end up being transferred to other regions, though transfer flows both within and outside the regional financial model. The degree of equalization (redistribution) of the system  $(1 - \beta)$  therefore essentially is 100%.

When the *foral* ARs are introduced, a significant change occurs: the coefficient  $\beta$  increases to 0.287, which means that the degree of redistribution decreases. In this case, considering the *foral* ARs, a 1% increase in GDP per capita translates into an increase of 0.287% in the total resources of the regional governments as a whole. The rest, 0.713%, is distributed through transfer flows, which allows us to affirm that the degree of equalization (redistribution) that occurs is 71.3% ( $1-\beta=1-0.287=0.713$ ). This finding reflects the characteristics of the *foral* financial model, specifically, the way in which the "quota" is calculated and the non-participation in the mechanisms for equalization out resources (Castells *et al.*, 2005; Monasterio, 2018; Zubiri, 2015).

iii. Finally, equation 3 shows that when the fiscal capacity of a regional government increases, the ratio between its total resources (including transfers) and its taxes decreases. Considering only the common-regime ARs,  $\gamma$  is -1.225, which indicates that the decrease is more than proportional: a 1% increase in GDP per capita translates into a decrease in the ratio of total resources to taxes by 1.2%, due to the high redistributive effect of transfers. This coefficient is -1.696 when the *foral* regime ARs are included. This reflects the fact that these regions raise more tax revenue (*T*) relative to their GDP, but also have higher total government resources (*R*) relative to GDP, so that including them does not affect results for the pattern of transfers. The effect is also similar when the equation is estimated using taxes of type (a)+(b).

		VA1 included	Γ + IIEE l in transfers	VA] includ	Γ + IIEE ed in taxes
		Common- regime ARs	Common- regime ARs + <i>foral</i> -regime ARs	Common- regime ARs	Common- regime ARs + <i>foral</i> -regime ARs
Equation 1:		1.215***	1.983***	1.067***	1.336***
Tax resources $(T)$ and GDP	α	(0.484)	(0.617)	(0.137)	(0.222)
$ln(T_i) = lnA_1 + \alpha ln(Y_i)$		[0.181]	[0.354]	[0.746]	[0.749]
Equation 2:		0.010	0.287	0.010	0.287
Total resources $(R)$ and GDP	β	(0.187)	(0.270)	(0.187)	(0.270)
$ln(R_i) = lnA_2 + \beta ln(Y_i)$		[0.001]	[0.114]	[0.001]	[0.114]
Equation 3:		-1.225***	-1.696***	-1.078***	-1.105***
R/T and GDP $ln(R_i/T_i) = lnA_3 + \gamma ln(Y_i)$	γ	(0.549)	(0.513)	(0.187)	(0.164)
		[0.175]	[0.318]	[0.610]	[0.658]
Number of observations		15	17	15	17

 Table 3

 ESTIMATION RESULTS FOR THE SPANISH ARs

*Notes:* Results obtained from OLS estimation of the equations shown on the table. Data: averages for years 2016-2018. Robust standard errors are reported in parenthesis.  $(^{**})(^{***})$  indicates that the coefficient is statistically significant at the 10% (5%) (1%) level. In [] is the R<sup>2</sup> of the corresponding regression.

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## 4. A comparison by way of example

#### 4.1. Brief description of other models: Switzerland and USA

This section analyses the degree of territorial redistribution of the financial systems of the intermediate governments of the two federal countries Switzerland and the USA, by applying the same methodology as the one used for the Spanish case.

The reason for this analysis is to place the results obtained previously on the degree of redistribution of regional funding in the framework of what happens in other countries with a long federal tradition. There are several countries that can be taken as a reference. By way of example, two countries have been chosen that have different territorial redistribution mechanisms. On the one hand, there is the case of the USA, where there is no explicit equalization mechanism to correct the differences in the level of resources of the states of the federation. In any case, redistribution is achieved through other types of transfers from the central government. On the other hand, the case of Switzerland is analysed, where there is an explicit mechanism of equalization out the resources of the different cantons.

## **4.1.1.** The financial model of the Swiss cantons<sup>10</sup>

In Switzerland, both the cantons (intermediate governments) and the federation have original fiscal sovereignty. However, due to its confederal origin, the federation only holds the sovereignty attributed to it by the federal constitution, which is that sovereignty transferred to it by the cantons. Thus, the cantons can levy any taxes they wish, being limited only by Article 3 of the federal constitution and their own cantonal constitutions. The federation, on the other hand, can only levy those taxes that are listed in the federal constitution.

The reality is that both the federation and the cantons enjoy a great deal of independence, which has led to a system of overlapping taxation, in which the federation and the cantons use the same tax sources. The cantons can levy any tax, except for VAT, which is restricted to the federation. However, the tax harmonisation law, which was passed in 1990 but not fully implemented until 2001, harmonised the structure of some federal and cantonal taxes. This law sets limits on the definition of the tax base and deductions in several taxes (personal income tax, corporate income tax and wealth and transfer tax). For the remaining taxes, there is full autonomy. In addition, tax rates are freely set by the cantons without any restrictions.

In Switzerland, the cantons administer their own taxes and at the same time have the legal obligation to collect federal personal income tax and corporate income tax.

The cantons' mechanism of resource equalization is also provided by the constitution, which states that "the confederal government shall promote financial compensation between cantons through a system of subsidies which shall take into consideration their financial capacity and the particular situation of the mountain regions [...]". In this case, equalization is carried out through two mechanisms: an explicit equalization fund which is implement-

ed through a combination of two funds, one horizontal and the other vertical. The second mechanism complements the previous one and consists of a set of compensations coming from the central government, destined to those cantons that have specific needs given their geo-topographical and socio-economic characteristics, considering geo-topographical factors (altitude, slope of the terrain, etc.) and socio-demographic factors (age structure of the population, relative poverty, etc.).

As for the horizontal fund, cantons with an above-average per capita tax capacity contribute resources to those with a lower per capita tax capacity. The per capita contribution of each canton depends on the difference between its resource ratio and the resource ratio of the cantonal average, which is, by definition, 100. The fiscal capacity is determined by the so-called standardized tax revenues (STR). Thus, the STR of a canton corresponds to the tax revenue it would obtain if it were to exploit its resource potential by applying a proportional and uniform tax rate for all cantons.

The cantons that contribute, do so in proportion to their ratio of resources per capita to the average. On the other hand, the amount received by the recipients is progressive as it increases with each point of deviation from the cantonal average. As a result, the per capita (standardised) tax revenue of cantons with below-average fiscal capacity is at least 85% of the Swiss average. This does not mean that the degree of equalization is 85%. Instead, it ensures that all the cantons have at least 85% of the average. The vertical fund is intended only for cantons with a per capita tax capacity below the cantonal average.

It follows from the above that the basic needs variable used by the explicit equalization fund is population, but other variables are also used as we have seen, so that one could speak of an adjusted population indicator. It should also be said that the equalization effects of the funds described above are partial, meaning that the equalization mechanism manages to reduce the initial differences in the fiscal capacity of the cantonal governments without eliminating them.





Compilation based on data from annex 2.

The confederal government draws up the financial equalization plan every four years. The variables used to calculate the funds (horizontal and vertical) and the vertical compensatory transfers are updated every year.

Graph 2 shows the index resources per capita, of the Swiss cantons before (tax revenues) and after the operation of the transfer systems (tax revenues + transfers), for the year 2018. As can be seen, the per capita tax revenues range from 151% above average (Basel Stadt) to 79% below average (Appenzell Innerrhoden). And once the various transfer systems described in the previous section are in place, the resources per capita range from 172% above average (Appenzell Ausserrhoden) to 75% below average (Appenzell Ausserrhoden).

#### **4.1.2.** The US state financial model<sup>11</sup>

In the USA, as in Switzerland, both the federation and the states have original sovereignty. The federal constitution states explicitly the powers of the federation, so that those not assigned to the federation or prohibited to the states are reserved to the states. The states thus have a taxation power of their own that is not delegated from the federation, although it is subject to limitations. However, these limitations are relatively weak, which in practice has led to a system of overlapping taxes because of the high degree of tax sovereignty enjoyed by both the federation and the states. The latter have full tax autonomy, including the decision to impose taxes. Thus, personal income tax is used in 43 states and corporate income tax in 44. Other relevant state taxes are sales taxes, excise taxes and inheritance and gift taxes.

In recent years, however, co-ordination measures between the different governmental levels have increased. For harmonisation reasons, most have adopted the federal definition of the tax base for personal income tax and corporate income tax.

With regards to tax administration, each level of government has its own administration, but federal and state tax administrations are coordinated through information exchange agreements.

The described tax system with overlapping taxation and separate tax administrations between the levels of government, together with the strong tax autonomy enjoyed by the states, leads to a very heterogeneous reality among the states. Thus, for example, the general sales tax does not exist in five states, the personal income tax does not exist in seven states, and the corporate income tax does not exist in six states. The consequence is a large difference in per capita tax revenue and tax burden between the states, and yet there is no explicit equalization mechanism to correct it. Even so, there are some transfers to the states from the federal government that help to reduce existing fiscal disparities. For example, *Medicaid* is a programme designed to provide health coverage; the amount that each state receives varies in inverse relation to the state's per capita income. This amount can be significant, ranging from 50% to 77% of state spending (Blöchliger *et al.*, 2007).

From an economic point of view, one might think that the system described above leads to a poor allocation of resources, affecting business location decisions and income distribution. However, many studies conclude that tax diversity and tax competition are not major problems either for economic development or for the very articulation of federalism. The reasons are, firstly, that these aspects have historically been part of the system, which has progressively assimilated them by adjusting to this situation. Secondly, there are tax coordination mechanisms that mitigate the negative effects (exchange of information between the states and the federation, existence of tax deductions or credits, which imply that citizens deduct part of the federal quotas from the state tax, etc.).

Graph 3 shows the index resources per capita of US state governments before (tax revenues) and after the operation of transfer systems (tax revenues + transfers), corresponding to the year 2018. As can be seen, per capita tax revenues range from 76% above average (North Dakota) to 34% below average (South Carolina). And once the various transfer systems described in the previous section are in place, resources per capita range from 64% above average (Vermont) to 34% below average (Florida).





Compilation based on data from annex 3.

#### 4.2. Comparison of estimation results

The three equations that have been estimated in the previous section for the Spanish case have also been estimated for the Swiss cantons and the US state governments. In this case, the data corresponding to 2016, 2017 and 2018 have also been used. In the case of the USA we excluded Alaska from the analysis because of the Alaska permanent oil fund. For Switzerland all regions are included.

Comparing the data in graphs 1, 2 and 3 corresponding to the ARs of Spain, the Swiss cantons, and the US states, based on the tables in the appendices section, significantly different behaviour can be observed, as shown in table 4.

In the three countries analysed, the transfers received contribute to reducing the standard deviation that exists if only tax revenue per capita is considered. But while in Spain the rate

of variation between the two deviations is -75.1% (from 74.8 to 18.6), in the US it is -19.6% (from 30.2 to 24.3) and in Switzerland -13.6% (from 58.7 to 50.7).

Table 4
COMPARATIVE DATA ON THE REVENUES OF THE REGIONAL GOVERNMENTS OF
SPAIN, THE USA AND SWITZERLAND (ARs, States and Cantons).
INDEX PER CAPITA, 2018.

	Spain <sup>(*)</sup>		USA		Switzerland	
-	Tax revenues	Tax revenues + transfers	Tax revenues	Tax revenues + transfers	Tax revenues	Tax revenues +transfers
Maximum value	317	160	176	164	251	272
Minimum value	55	83	66	66	21	25
Standard deviation	74.8	18.6	30.2	24.3	58.7	50.7
Rate of change (%)		-75.1%		-19.6%		-13.6%
Max. value/Min. value	5.8	1.9	2.7	2.5	12.0	10.9
Rate of change (%)		-66.6%		-8.0%		-8.8%

(\*) Includes the *foral* ARs and VAT plus IIEE included in transfers.

Compilation based on Graphs 1, 2 and 3.

In Spain, the ratio between the maximum and the minimum values corresponding to the tax revenue per capita index of the ARs is 5.8 (2.7 in the USA and 12.0 in Switzerland), and once the transfer systems have been implemented, this ratio becomes 1.9 (2.5 in the USA and 10.9 in Switzerland), so that the rate of change between the two is -66.6% (-8.0% in the USA and -8.8% in Switzerland). Thus, the initial distance between the maximum and minimum values is reduced in the case of the Autonomous Regions by almost 67% once the transfers have been received, whereas in the USA and Switzerland this reduction is only around 8%.

These data show that in Spain the effect of transfers on the initial situation is much greater than in these two countries. In other words, transfers have a greater impact on the initial distribution, i.e., the one that depends mainly on the tax capacity of governments.

Table 5 contains not only the regression coefficients of the three equations estimated for the Spanish case (the two first columns of the table 3), but also those for the Swiss and US cases. The results are as follows:

Table 5	
ESTIMATION RESULTS FOR THE SPANISH ARS, THE SWISS CA	ANTONS AND
THE USA STATES	

		Common- regime ARs	Common- regime ARs + <i>foral</i> - regime ARs	Swiss Cantons	USA States
Equation 1:		1.215***	$1.983^{***}$	1.049***	0.832***
Tax resources $(T)$ and GDP	α	(0.484)	(0.617)	(0.172)	(0.157)
$ln(T_i) = lnA_1 + \alpha ln(Y_i)$		[0.181]	[0.354]	[0.604]	[0.316]

		Common- regime ARs	Common- regime ARs + <i>foral</i> - regime ARs	Swiss Cantons	USA States
Equation 2:		0.010	0.287	0.617***	0.436***
Total resources (R) and GDP	β	(0.187)	(0.270)	(0.190)	(0.156)
$ln(R_i) = lnA_2 + \beta ln(Y_i)$		[0.001]	[0.114]	[0.406]	[0.132]
Equation 3:		-1.225***	-1.696***	-0.432***	-0.396***
R/T and GDP	γ	(0.549)	(0.513)	(0.099)	(0.0717)
$ln(R_i/T_i) = lnA_3 + \gamma ln(Y_i)$		[0.175]	[0.318]	[0.395]	[0.396]
Number of observations		15	17	26	49

(Continued)

*Notes:* Results obtained from OLS estimation of the indicated equations. Data: Averages for the years 2016-2018 for Spain and Switzerland and 2017-2019 for the US. Robust standard errors in parenthesis. <sup>(\*\*) (\*\*\*)</sup> indicate that the coefficients are statistically significant at the 10% level (5%) (1%). In [] is the R<sup>2</sup> of the corresponding regression.





i. Equation 1, graphs 4 (the Spanish case contains only the common-regime ARs) and 4a (the Spanish case includes all the ARs, the common-regime ones and the *foral* ones), show that there is a positive relationship between GDP per capita and per capita tax resources of the regional governments of the three countries analysed. In the case of the Autonomous Regions and the Swiss cantons the coefficient  $\alpha$  is higher than 1, while in the USA it is lower (0.832). This indicates that, in all cases, an increase in governments' per capita GDP translates into an increase in their per capita tax revenues, so that there is a positive relationship between these and their

fiscal capacity. The highest value of  $\alpha$  is observed precisely in the Spanish case with the inclusion of all ARs (common and *foral* regime).





•Snain •Switzerland •U.S. •Snain. foral regions.

ii. Equation 2 and graphs 5 (the Spanish case contains only the common-regime ARs) and 5a (the Spanish case includes all the ARs, those under the common regime and those under the *foral* regime) show that there is a positive relationship between the GDP per capita and the total resources (tax revenues+transfers) that end up being available to the regional governments of the three countries analysed. This indicates that an increase in fiscal capacity translates, in all cases, into an increase in total resources (tax revenue + transfers). However, the differences are significant. The highest value of  $\beta$  is observed in the Swiss cantons ( $\beta$ =0.617), which means that this is where the lowest equalization (redistribution) is about 39% ( $1-\beta$ =0.383). In the US, the value of  $\beta$  is 0.436, so that the degree of equalization that occurs between state governments is approximately 56% ( $1-\beta$ =0.564). As we pointed out in the previous section, in the case of the ARs this degree of equalization was approximately 99% ( $1-\beta$ =0.990) without considering the *foral* ARs, and approximately 71% when they are considered ( $1-\beta$ =0.713).

This indicates that the resources that the ARs end up with are more inelastic with respect to GDP (with respect to their fiscal capacity) than those of the Swiss cantons and the US state governments. Without considering the *foral* ARs, it can be affirmed that they are totally inelastic. An improvement in their fiscal capacity does not translate into practically any improvement in their resources.



Graph 5 RATIO OF TOTAL RESOURCES (tax + transfers) TO GDP OF THE COMMON-REGIME ARs, SWISS CANTONS AND US STATES

Graph 5a

RATIO BETWEEN TOTAL RESOURCES (taxation + transfers) TO GDP OF THE ARS UNDER THE COMMON AND *FORAL* REGIME, THE SWISS CANTONS, AND THE US STATES



●Spain ●Switzerland ●U.S. ●Spain, foral regions

Note: The regression line for Spain includes the foral regions.



Graph 6a RATIO OF TOTAL RESOURCES/TAX RESOURCES TO GDP OF THE COMMON-REGIME AND FORAL-REGIME ARs, THE SWISS CANTONS, AND THE US STATES



●Spain ●Switzerland ●U.S. ●Spain, foral regions

Note: The regression line for Spain includes the foral regions.

iii. Finally, equation 3 in graphs 6 (the Spanish case contains only the common- regime ARs) and 6a (the Spanish case includes all the ARs, the common- regime ARs and the *foral* ARs), shows the relationship between total resources (including transfers) and taxes. As we pointed out earlier, in the case of the ARs, an increase in GDP per capita translates into a more than proportional decrease in this ratio (the coefficient is -1.225 for the common- regime ARs and -1.696 when the *foral* ones are included); in contrast, in Switzerland and the USA, although the coefficient is also negative, the variation is less than proportional (-0.432 in Switzerland and -0.396 in the USA). This means that, if an autonomous region increases its fiscal capacity (its GDP per capita), the ratio between the transfers it receives, and its taxes will decrease more significantly than if it were a Swiss canton or a US state.

## 5. Summary of the main results

This article has analysed the degree of inter-territorial redistribution that occurs in Spain through the ARs' financial model and through the flow of current and capital transfers that the regional governments receive outside the financial system, i.e., from other entities and administrations, mainly from the central government. The analysis has been carried out considering the two existing financial models: the common regime and the *foral* regime. For the common-regime ARs, resources from the financial model account for 72.5% of their total revenue, and transfers received outside the model account for 4.7%, while for those under the *foral* regime, the resources provided through their model account for 88.0% of the total and transfers outside the model account for 1.5%.

After a brief description of both financial models, we have proceeded to analyse the extent to which the resources of the regional governments are or are not related to their fiscal capacity, measured by their GDP per capita. To this end, a first equation has been estimated which has provided a measure of the elasticity of regional governments' tax revenues per capita with respect to their GDP per capita. The result shows a positive elasticity greater than one. This means that given the current tax basket of the ARs, an increase in the GDP per capita of an Autonomous Region translates into a slightly more than proportional increase in the tax resources of its regional government, in the case of the common-regime ARs, and clearly more than proportional when the *foral* ARs are added (the elasticities are 1.215 and 1.983, respectively). This allows us to conclude that there is a clear relationship between the tax revenue in the hands of a regional government and its fiscal capacity. The greater the capacity (more GDP per capita), the higher the tax revenue per capita, especially when the *foral* ARs are included in the calculation.

Afterwards, a second equation was estimated to provide a measure of the elasticity regarding the total resources received by the regional governments (which, in addition to tax revenues, also include the funds from the model and other transfers received), and their fiscal capacity (GDP per capita). In this case, the values obtained continue to be positive, but less than unity. In other words, the total resources available to a regional government increase as

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its fiscal capacity (the GDP per capita of its region) increases, but less than proportionally. And in this case, the result obtained for the common-regime ARs and that obtained when the *foral* ARs are added is significantly different. In the first case, the elasticity is 0.010, which allows us to point out that the degree of equalization that takes place, once the different transfer flows have acted, is 99.0%. When the *foral* ARs are added, the elasticity increases to 0.287, so that the degree of equalization drops to 71,3%. This indicates the high degree of redistribution that occurs through the systems of allocation of transfers to the various regional governments. This means that once they have acted, the resources available to them have almost nothing to do with their fiscal capacity. The increase in GDP per capita of a common-regime autonomous region does not translate into almost any increase in the total resources available to the governments of other territories.

Finally, to further strengthen the conclusions, a third equation has been estimated which shows the elasticity of the relationship between the total resources and tax revenues of the ARs and their fiscal capacity in per capita terms. In this case, a negative value greater than one is obtained, indicating that an increase in the GDP per capita of an autonomous region produces a more than proportional decrease in the ratio between the total resources to their tax revenues of its regional government, which again indicates the redistributive effect of the transfers.

Just as an example, the same equations have been estimated for the case of Switzerland and the USA. In the former, there is an explicit mechanism of resource equalization between cantons, while in the latter there is not. Also in these two countries, as in Spain, state government tax revenues have a positive elasticity with respect to GDP per capita. However, in these two cases, they are more inelastic (the elasticity is less than unity), largely due to their lower tax burden. The most significant differences are observed in the results of both equation 2 and equation 3. The total resources of the Swiss cantons, which include transfers, are the most elastic with respect to their fiscal capacity (GDP per capita) as this is where the lowest degree of redistribution occurs (a degree of equalisation of 39%). In the case of the USA, this percentage is 56%. Both percentages being significantly lower than those in Spain (99% without the foral ARs and 71% including them). This indicates that the impact of transfers on the initial allocation of regional governments' tax resources is much greater in Spain than in these two countries. In Switzerland, as in Spain, redistribution occurs through two channels, that of the explicit equalization mechanism and that of other transfers; and in the US, since there is no explicit equalization mechanism, it occurs only through the distribution of transfers, most of which are conditional. The result is greater redistribution in the US than in Switzerland.

## 6. Concluding remarks

In one way or another, transfers alter the initial distribution of governments' tax resources, making it more equal. This is undoubtedly one of the main objectives among others, of intergovernmental transfers in a composite state, to help make tax autonomy compatible with

a principle of equity. The question is to be able to decide how much tax autonomy desired and what degree of equity is to be achieved. This is undoubtedly one of the main aspects that must be discussed and agreed upon when designing the fiscal decentralisation model and its operation. The fact that governments' resources depend on their fiscal capacity has many advantages, which are mainly related to efficiency and fiscal co-responsibility. But it generates inequality. This issue can be addressed by implementing a well-designed equalization mechanism that ensures compatibility between autonomy and equity as objectives. Specifically, the accuracy of the fiscal capacity indicator used in the equalization formula is crucial. This indicator has the potential to influence the decision-making of regional governments concerning the taxes under their fiscal autonomy. It determines the level of fiscal effort required from their citizens, which in turn directly impacts the revenue of these governments. The redistributive effects resulting from equalization funds can complicate the justification of potential tax increases by respective governments to their citizens. For instance, a government may face challenges in justifying tax hikes if, despite having an above-average fiscal capacity per capita (or per unit of needs), it ultimately receives per capita resources below the average due to subsidies from the system. In such a scenario, the government might opt not to exercise its upward taxing capacity, not because it lacks the need for resources or believes it shouldn't do so, but simply because it deems it incredibly difficult to justify to its citizens. Conversely, it is also possible for a government with below-average fiscal capacity to receive a volume of resources above the average once the system's subsidies are factored in. In this case, the government may not utilize its normative capacity to increase revenue, as a significant portion of its revenue is already obtained without the need for additional effort through the funds<sup>12</sup>.

Thus, deciding to what extent it should be corrected is a matter that can only be resolved in the realm of politics, of values. It may be that preferences in relation to these aspects are different according to the territories of the national government, or it may be, as is the case in Spain, that there is a certain homogeneity in almost the entire territory, despite some discrepancies that are concentrated in only some territory/s, in which case mechanisms must be activated to facilitate consensus and allow for the accommodation of minorities, as occurs in other countries where this type of problem also occurs (Bosch *et al.*, 2022). The scope of the ARs' tax autonomy and the degree of equity to be achieved are undoubtedly aspects that remain open and need to be addressed (Lago and Martínez-Vázquez, 2010).

It is precisely these aspects that should be addressed when the current financial model for the common-regime ARs is revised. It is important to note that redistribution occurs not only through the explicit equalization mechanism (the FPSGF) but also through the other funds in the model and transfers outside the model. In view of the results obtained in this paper, it would be advisable to take into consideration the situation of the *foral* ARs as well. The essence of the problem does not lie in the existence of two different financial models, but in the very different results provided by the two models, the solution to which would partly involve rethinking the role and amount of transfers in the *foral* territories.

The data and results obtained and analysed in this paper provide information that can be used to accompany and enrich the necessary debate on regional financing and contribute

after its political agreement to the design of technical mechanisms that allow the objectives to be met.

This paper has only analysed the redistributive role played by the transfers received/supported by the regional governments. A more complete analysis of the degree of inter-territorial redistribution would involve adding to the study the analysis of the degree of redistribution produced through other channels. For example, through the direct investments made by the central government in the different territories of the country, or through certain expenses or benefits provided by the central government to the citizens of the different territories. This required another methodological approach that could provide continuity to the study in a future line of research.

	Euros p	opulation	In	ndex
_	Tax	Revenue	Tax	Revenue
	Revenues <sup>(*)</sup>	Tax + Transfers	Revenues <sup>(*)</sup>	Tax + Transfers
Andalusia	1,871.59	2,841.91	72.5	92.1
Aragon	2,795.61	3,374.11	108.3	109.3
Asturias	2,452.96	3,458.51	95.0	112.0
Valencian Community	2,309.83	2,560.38	89.5	82.9
Canary Islands	1,503.82	3,532.02	58.2	114.4
Cantabria	2,493.98	3,670.52	96.6	118.9
Castile Leon	2,329.46	3,171.16	90.2	102.7
Castile Mancha	1,933.69	2,913.33	74.9	94.4
Catalonia	3,019.40	3,138.68	116.9	101.7
Estremadura	1,841.35	3,639.05	71.3	117.9
Galicia	2,177.70	3,334.51	84.3	108.0
Balearic Islands	3,677.81	3,367.51	142.4	109.1
Madrid	3,323.93	2,702.88	128.7	87.6
Murcia	2,009.33	2,811.76	77.8	91.1
Rioja	2,438.29	3,467.91	94.4	112.3
Navarre	4,756.93	4,922.50	184.2	159.5
Basque Country	4,109.72	4,194.90	159.2	135.9
Total	2,582.06	3,087.15	100.0	100.0

Annex 1. Resources of the ARs from taxes and transfers. Settlement 2018

<sup>(\*)</sup> VAT plus IIEE included in taxes.

_	Euros p	opulation	Ir	ndex
-	Tax	Revenue	Tax	Revenue
	Revenues <sup>(*)</sup>	Tax + Transfers	Revenues <sup>(*)</sup>	Tax + Transfers
Andalusia	870.43	2,841.91	58.1	92.1
Aragon	1,473.01	3,374.11	98.3	109.3
Asturias	1,233.69	3,458.51	82.3	112.0
Valencian Community	1,166.76	2,560.38	7.,8	82.9
Canary Islands	1,403.12	3,532.02	93.6	114.4
Cantabria	1,255.99	3,670.52	83.8	118.9
Castile Leon	1,051.53	3,171.16	70.1	102.7
Castile Mancha	822,41	2,913.33	54.9	94.4
Catalonia	1,686.22	3,138.68	112.5	101.7
Estremadura	793,97	3,639.05	53.0	117.9
Galicia	1,023.67	3,334.51	68.3	108.0
Balearic Islands	2,011.50	3,367.51	134.2	109.1
Madrid	1,983.20	2,702.88	132.3	87.6
Murcia	899,56	2,811.76	60.0	91.1
Rioja	1,220.45	3,467.91	81.4	112.3
Navarre	4,756.93	4,922.50	317.3	159.5
Basque Country	4,109.72	4,194.90	274.2	135.9
Total	1,499.04	3,087.15	100.0	100.0

<sup>(\*)</sup> VAT plus IIEE included in transfers.

*Source:* Authors' calculations based on information from the Ministry of Finance and the INE (Spanish National Institute of Statistics).

	Francs	population	Index		
	Tax Revenues	Revenue Tax + Transfers	Tax Revenues	Revenue Tax + Transfers	
Aargau	4,127	6,492	65.8	69.1	
Appenzell Innerrhoden	1,309	2,339	20.9	24.9	
Appenzell Ausserrhoden	15,086	25,573	240.5	272.2	
Bern	5,721	10,259	91.2	109.2	
Basel Landschaft	7,040	8,712	112.2	92.7	
Basel Stadt	15,722	20,036	250.7	213.3	
Fribourg	4,740	9,506	75.6	101.2	
Geneva	14,753	17,149	235.2	182.6	
Glarus	3,279	6,781	52.3	72.2	
Graubünden	4,945	9,531	78.8	101.5	
Jura	5,041	11,157	80.4	118.8	
Luzern	3,772	6,792	60.1	72.3	
Neuchâtel	6,731	10,334	107.3	110.0	
Nidwalden	5,432	7,125	86.6	75.8	
Obwalden	3,341	5,483	53.3	58.4	
St, Gallen	5,067	7,987	80.8	85.0	
Schaffhausen	5,186	7,446	82.7	79.3	
Solothurn	4,027	6,994	64.2	74.5	
Schwyz	5,968	7,960	95.1	84.7	
Thurgau	3,727	6,202	59.4	66.0	
Ticino	6,494	8,794	103.5	93.6	
Uri	3,288	8,284	52.4	88.2	
Vaud	8,766	11,923	139.8	126.9	
Valais	4,484	8,984	71.5	95.6	
Zug	8,580	10,237	136.8	109.0	
Zurich	5,181	7,695	82.6	81.9	
Total	6,272	9,394	100.0	100.0	

Annex 2. Revenues of the Swiss cantons (taxes and transfers). Settlement 2018

*Source:* Population and GDP data: Federal Statistics Office. https://www,bfs,admin,ch/bfs/en/home/statistics/regional-statistics/regional-portraits-key-figures/cantons,assetdetail,1922815,html.

*Fiscal data:* Federal Finance Administration. https://www,efv,admin,ch/efv/en/home/themen/finanzstatistik/berich terstattung,html.

	<b>Dollars population</b>		Index	
	Tax	Revenue	Tax	Revenue
	Revenues	Tax + Transfers	Revenues	Tax + Transfers
Alabama	2,261.93	4,369.97	71.8	83.1
Alaska	2,253.11	6,956.12	71.5	132.3
Arizona	2,276.31	4,529.41	72.2	86.1
Arkansas	3,262.51	5,879.80	103.5	111.8
California	4,521.79	7,108.12	143.5	135.2
Colorado	2,622.40	4,274.53	83.2	81.3
Connecticut	5,301.39	7,384.62	168.3	140.4
Delaware	4,370.58	7,083.51	138.7	134.7
Florida	2,163.46	3,495.51	68.7	66.5
Georgia	2,245.48	3,699.56	71.3	70.3
Hawaii	5,430.44	7,551.89	172.4	143.6
Idaho	2,769.64	4,380.39	87.9	83.3
Illinois	3,132.66	4,877.85	99.4	92.7
Indiana	2,897.15	5,148.74	92.0	97.9
Iowa	3,204.10	5,133.78	101.7	97.6
Kansas	3,279.15	4,678.02	104.1	88.9
Kentucky	2,703.33	5,386.62	85.8	102.4
Louisiana	2,437.43	5,366.42	77.4	102.0
Maine	3,293.83	5,543.56	104.5	105.4
Maryland	3,715.67	5,856.81	117.9	111.4
Massachusetts	4,308.64	6,805.43	136.8	129.4
Michigan	3,009.47	5,149.45	95.5	97.9
Minnesota	4,762.09	6,862.20	151.1	130.5
Mississippi	2,646.94	5,421.76	84.0	103.1
Missouri	2,127.72	4,081.01	67.5	77.6
Montana	2,832.17	5,778.14	89.9	109.9
Nebraska	2,800.71	4,495.88	88.9	85.5
Nevada	3,024.78	4,826.38	96.0	91.8
New Hampshire	2,158.08	4,226.26	68.5	80.4
New Jersey	3,979.85	6,016.10	126.3	114.4
New Mexico	2,646.93	6,247.24	84.0	118.8
New York	4,533.51	7,840.55	143.9	149.1
North Carolina	2,683.19	4,484.52	85.2	85.3
North Dakota	5,547.15	7,845.24	176.1	149.2
Ohio	2,489.50	4,578.23	79.0	87.0
Oklahoma	2,393.07	4,195.23	76.0	79.8
Oregon	3,022.63	5,526.51	95.9	105.1
Pennsylvania	3,180.20	5,478.39	100.9	104.2

Annex 3. Revenues of the US states (tax and transfers). Settlement 2018

	<b>Dollars population</b>		Index	
	Tax Revenues	Revenue Tax + Transfers	Tax Revenues	Revenue Tax + Transfers
Rhode Island	3,299.39	6,023.90	104.7	114.5
South Carolina	2,071.18	4,021.72	65.7	76.5
South Dakota	2,182.26	3,893.94	69.3	74.0
Tennessee	2,107.18	3,871.91	66.9	73.6
Texas	2,107.29	3,756.05	66.9	71.4
Utah	2,985.23	4,474.22	94.7	85.1
Vermont	5,260.17	8,609.55	167.0	163.7
Virginia	2,762.52	4,051.47	87.7	77.0
Washington	3,532.67	5,452.74	112.1	103.7
West Virginia	3,016.49	5,765.45	95.7	109.6
Wisconsin	3,228.35	4,863.19	102.5	92.5
Wyoming	3,181.09	7,273.87	101.0	138.3
Total	3,150.70	5,259.34	100.0	100.0

(Continued)

Sources: Population: Census Bureau, Population Division. https://www,census,gov/data/tables/2017/demo/popest/state-total,html.

*GDP data:* Bureau of Economic Analysis. https://www,bea,gov/itable/iTable,cfm?ReqID=70&step=1#reqid=70&step=1&signi=1.

*Fiscal data:* U,S, Census Bureau, 2015 Annual Surveys of State and Local Government Finance. https://www.census, gov//govs/local/historical\_data\_2014,html.

## Notes

- 1. In Spain there are two models of regional financing: the *foral* regime, which applies to the Basque Country and Navarre, and the common regime, which applies to the remaining 15 ARs. The existence of these models derives from the Spanish constitution itself.
- 2. For a more detailed description of the current model see Bassols et al. (2010).
- 3. Comprising: (a) Taxes whose yield has been fully ceded (wealth tax, inheritance and gift tax, tax on capital transfers and documented legal acts, taxes on gambling, excise tax on certain means of transport, online gambling, tax on bank deposits and the tax on electricity) and over which they have "certain" regulatory powers (except for the tax on bank deposits and the tax on electricity), as well as their management and administration (except for the tax on certain means of transport, online gambling, the tax on bank deposits and the tax on electricity), by Taxes whose yield has been partially transferred to them. These are 50% of personal income tax (IRPF), 50% of value added tax (VAT), and 58% of excise taxes on alcohol, tobacco, and hydrocarbons (IIEE). In this case, the regional governments only have regulatory powers over personal income tax (none over the rest) and all of them are managed by the State tax administration.
- 4. The adjusted population of each AR is obtained from the following variables and weights: jure population (30.0%); weighted protected population by coefficients according to 7 age brackets (38.0%); population over 65 (8.5%); population aged 0-16 (20.5%); surface area (1.8%); dispersion (0.6%); insularity (0.6%). For more details on the calculation of needs, see De la Fuente (2017).
- 5. For a more detailed definition and calculation of the normative tax revenues of each regional government, see article 8 of Law 22/2009 from December 18<sup>th</sup>, which regulates the financial system of the common-regime ARs and Cities with an Autonomy Statute.
- 6. For more detail on the functioning and analysis of the FPSGF, see Zabalza (2018).
- 7. It should be noted that this fund has been used over time to compensate the ARs for tax increases unilaterally decided by the State. This distorts the main objective of the fund, which is to maintain the status quo and it, means that part of the tax capacity has been generated by the State itself and, therefore, should not be computed as autonomous tax capacity. This practice makes this fund negative for some ARs.
- 8. See Monasterio (2010 and 2018).
- 9. All results reported here are very similar when the Canary Islands are excluded. Specifically, we find  $\alpha = 1.283 (0.746)$ ,  $\beta = 0.008 (0.180)$  and  $\gamma = -1.275 (0.773)$  (standard errors in parentheses).
- 10. See Bosch and Vilalta (2021), pp. 223-224 y 237-248, Zubiri (2010) and Widner (2008).
- 11. See Bosch and Vilalta (2021), pp. 224-227 y 237-248, Zubiri (2010) and Martínez-Vázquez and Timofeev (2005).
- 12. See Blöchliger (2015), Vilalta (2020), and Solé Ollé (2015).

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## Resumen

Este artículo analiza el grado de redistribución interterritorial que se produce en España a través del modelo financiación de las Comunidades Autónomas y a través del flujo de transferencias corrientes y de capital que los gobiernos regionales reciben fuera de dicho modelo. Los resultados indican un alto grado de redistribución que se produce a través de los sistemas de asignación de transferencias a los diversos gobiernos regionales. En el caso de las comunidades autónomas de régimen común, la elasticidad de los recursos totales recibidos por los gobiernos regionales con respecto a su propia capacidad fiscal (PIB per cápita) es de 0.010. Esto significa que los recursos disponibles para ellos están casi no relacionados con su propia capacidad fiscal.

Palabras clave: financiación regional, redistribución territorial.

Clasificación JEL: H71, H73.

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