Size of taxation and tax decentralization

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Abstract: The paper deals with a mutual relationship between the size of taxation and the tax decentralization ratio. The size of taxation in an economy is approximated using a simple tax-to-GDP ratio, a tax decentralization ratio by share of subnational government tax revenue on general government tax revenue. Due to a lack of data, the subnational government's real decision-making power over taxation is not considered. The aim of the paper is the evaluation of a mutual relationship of both variables and a discussion of the economic background of the relationship. The paper departs from the normative theory of fiscal federalism and also from the positive approach to the problem. Quantitative analysis is based on panel data from countries of Europe from 2005 to 2020, taken from the IMF GFS database.

Keywords: tax burden, tax decentralization, fiscal consolidation, Europe
JEL Classification: H71, H77

1 Introduction

Fiscal consolidation, in principle, relies on increasing taxation, expenditure cuts, or a combination of both methods. The paper deals with the issue of changing the tax-to-GDP ratio and sharing these changes among levels of government. There is a vast body of literature on fiscal consolidation and the deficit bias of public finances (Alesina et al., 2002; Bayar & Smeets, 2009; Jilek & Lacina, 2011). Another stream of literature covers tax decentralization issue (Aristovnik, 2012; Arzaghi & Henderson, 2005; Bodman, 2011; Bojanic, 2020; Canavire-Bacarreza et al., 2017; Cibik, 2016; Jilek, 2015, 2018; D. Stegarescu, 2005; Stegarescu, 2006). Few articles deal with the mutual relationship between tax burden changes and its sharing among government levels (Baskaran, 2012).

The fiscal imbalance is usually most significantly demonstrated at the central government level. If a responsible, i.e., the central government, opts to increase the tax-to-GDP ratio, the issue of tax revenue distribution among government levels arises. The critical factor is the system of tax assignment. Unitary countries use prevailingly tax-sharing arrangements with limited levels of tax autonomy.

Richer and larger countries are usually more decentralized than smaller and poorer ones, and the presence of ethnic, religious and linguistic differences is usually associated with a larger decen-tralization (Bakke & Wibbels, 2006). In almost all countries, subnational governments' share in total general government expenditure exceeds the same share in total revenue, suggesting that grants from higher levels of government are an essential part of local financing. Federal countries in Europe rely heavily on income and profit taxation (Belgium, Switzerland, Germany), while others (Austria, Spain) have a more balanced structure involving property tax and consumption tax as well. The UK is exceptional in employing exclusively property taxation to finance local governments. Nordic countries are exceptional in the sense of relying exclusively on income taxation. Italy and France use local business taxes, which rely on a broader definition of the tax base than profits (labour cost, imputed rents for industrial buildings, etc.). As these different sources of taxation possess a different elasticity to national income, this may have affected the evolution of the tax decentralization share.

The tax decentralization ratio offers only a very rough indicator of the actual taxing power of subnational governments, as it mixes different tax assignment methods, especially tax sharing and autonomous decentralized taxes. OECD performed numerous studies to reveal information about the vertical structure of decision-making in taxation. There is a considerable variation among countries in the level of taxation autonomy.

2 Methods

Choice of fiscal decentralization indicators is difficult (Blöchliger, 2013; Blöchliger & King, 2006; Dan Stegarescu, 2005). This study emphasizes the width of the sample and, therefore, uses the IMF decentralization dataset instead of Eurostat or OECD data. The IMF Decentralization database covers all European countries, but there are missing data for some of them. The best coverage is from 2005 to 2020. On the expense side, the use of goods and services (USG, subnational government to consolidated general government ratio) is used as a good proxy for decentralizing the allocation function. Even though the expenditure side of the budget is not a major concern in this paper, it is well-known

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that tax decentralization should follow expenditure decentralization (McLure, 1998, 2001). On the revenue side, which is the primary focus of the paper, the decentralization ratio (TAXD) is used, with no missing data.

The tax decentralization ratio (TAXD, IMF GFS) is the dependent variable in this research. The central hypothesis is that increases in taxation (TAX, IMF GFS, general government tax revenue to GDP) are not shared proportionately towards subnational governments. As an overall measure of tax burden, the tax-to-GDP ratio is calculated with the exclusion of social security contribution. The reason is, reflecting normative recommendations of economic theory (Oates, 1999), the prevailing centralization of redistributive policies. The fiscal consolidations, under the responsibility of central governments, usually deal with the problem of unsustainable fiscal imbalances. It is expected that the central governments, executing the highest power to tax in all European countries, would prefer not to share the increase in the tax-to-GDP ratio with the subnational governments. It is expected that this behaviour is stronger with larger fiscal deficits of the general government sector (BB_GG, AMECO). Also, the possible explanatory power intergovernmental transfers to subnational governments are considered (GR, % of GDP, IMF GFS). The model controls for other expected factors of tax decentralization, see (Jilek, 2015), such as land area (AREA, sq. km, WB WDI [AG.LND.TOTL.K2]), total population (POP, WB WDI [SP.POP.TOTL]), urban population (URBPOP, WB WDI, % of total population) [SP.URB.TOTL.IN.ZS], level of economic development (GDPPCPPP, GDP per capita, PPP, constant 2017 international $, WB WDI [NY.GDP.PCAP.PP.KD]), federalization dummy (FED, Spain among federations), language heterogeneity (LANG, (Alesina et al., 2003).

The hypothesis is tested on the panel dataset of European countries (table 1) from 2005 to 2020. Since there are presumably numerous factors of time-invariant character, the model of dependent tax decentralization ratio variable (TAXD) and explanatory general government tax to GDP ratio (TAX) is estimated with cross-section random effects. Moreover, the Hausman test suggests that the use of random effect is appropriate. The cross-section country effect may result from random causes. This approach allows us to focus on the slope parameter, capturing the influence of the tax burden size on the tax decentralization ratio, while the amount of variability of TAXD explained by the model is not a major concern in this study. All the continuous explanatory variables (AREA, POP, GDPPCPPP) enter the model in natural logarithm specification.

The model specification follows:

$$TAXD_{it} = \alpha + \beta_1 TAX_{it} + \beta_2 Other_{it} + v_{it} \quad (1)$$

where
- $TAXD$ … *dependent tax decentralization variable*
- i *country*
- t *period*
- TAX … *general government tax to GDP ratio*
- $Other$ … *control variables*
- v_{it} … *residual*

$$v_{it} = \mu_i + u_{it} \quad (2)$$

where
- μ_i, … *is the unobservable individual effect of i*
- u_{it} … *unidentifiable effects*

Table 1 Analyzed countries' regional classification

Austria	CENTRAL	FED	Albania	SOUTHEAST	
Czech Republic	CENTRAL		Bosnia and Herzegovina	SOUTHEAST	FED
Germany	CENTRAL	FED	Bulgaria	SOUTHEAST	
Hungary	CENTRAL		Croatia	SOUTHEAST	
Poland	CENTRAL		North-Macedonia	SOUTHEAST	
Slovak Republic	CENTRAL		Romania	SOUTHEAST	
Switzerland	CENTRAL	FED	Serbia	SOUTHEAST	
Denmark	NORTH		Slovenia	SOUTHEAST	
Estonia	NORTH		Belgium	WEST	FED
Finland	NORTH		France	WEST	
Iceland	NORTH		Ireland	WEST	
Latvia	NORTH		Luxembourg	WEST	
Lithuania	NORTH		Netherlands	WEST	
Norway	NORTH		United Kingdom	WEST	
Sweden	NORTH				
Cyprus	SOUTH				
Greece	SOUTH				
Italy	SOUTH				
Malta	SOUTH				
Portugal	SOUTH				
Spain	SOUTH	(FED)			

Classification according to Anděl et al. (2019)

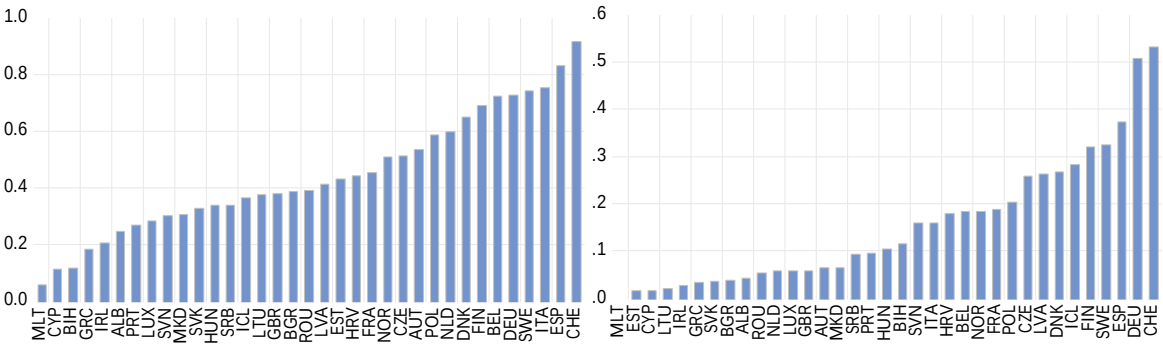
3 Research results

Before the econometric estimation of the model, a short overview of the data is appropriate.

3.1 Stylized data

There is a high variability of expenses on the use of goods and services decentralization (USG) to subnational governments among European countries (Figure 1). Since revenue, especially tax decentralization, should follow expenditure decentralization, a similar picture can be expected on the revenue side.

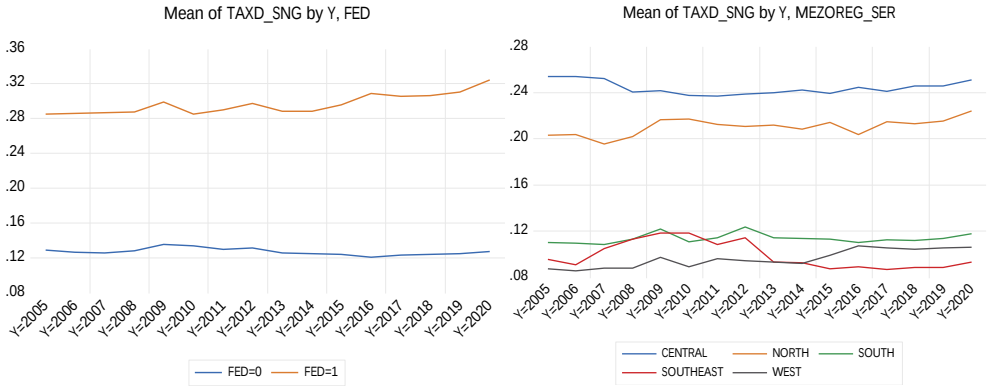
Figure 1 Use of goods and services decentralization (left) and tax decentralization ratios (right)



Government sector use of goods and services decentralization to subnational governments (left),
Tax revenue decentralization ratio to subnational governments (right).
Mean values 2005 to 2020. Source: IMF GFS

Higher tax decentralization ratios can be observed in federated countries (Figure 2), and the ratio has much evident positive growth. Central and northern European countries decentralize more taxes than other European mesoregions.

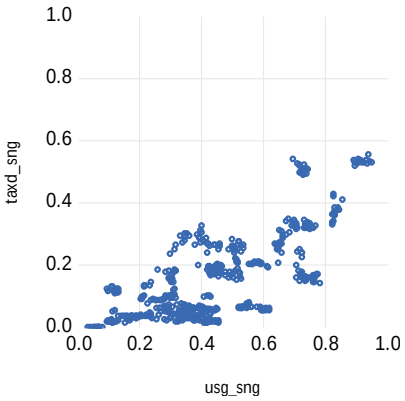
Figure 2 Tax decentralization ratio in federated and unitary countries and in European mesoregions



TAXD_SNG…Tax revenue decentralization ratio to subnational governments. FED…federation dummy. MEZOREG…mesoregions classification (Anděl et al., 2019). Source: IMF GFS

The tax decentralization lags behind the expenditure decentralization (Figure 3). This suggests a relatively high reliance on intergovernmental transfers to finance subnational governments.

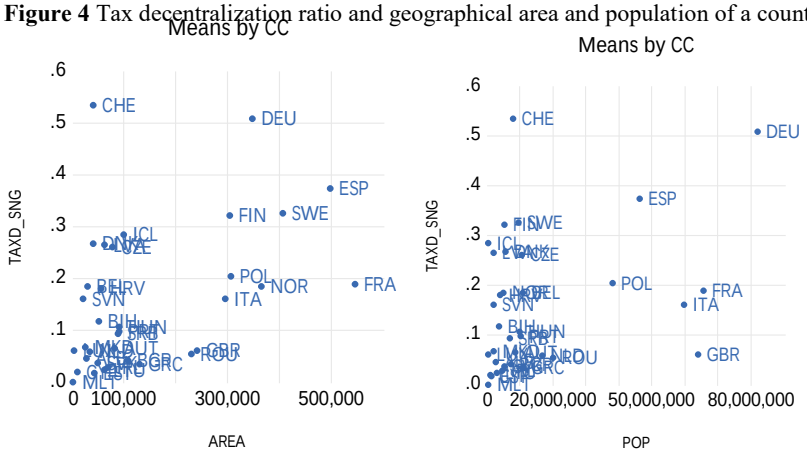
Figure 3 Tax decentralization ratio (TAXD) and use of goods and services decentralization (USG)



USG_SNG…Government sector use of goods and services decentralization to subnational governments, TAXD_SNG…Tax revenue decentralization ratio to subnational governments, 2005 to 2020. Source: IMF GFS

Some small countries (especially federated Switzerland and Belgium), but also unitary Denmark and the Netherlands, decentralized far more tax revenue than the linear relationship would suggest (figure 4).

Figure 4 Tax decentralization ratio and geographical area and population of a country



TAXD_SNG…Tax revenue decentralization ratio to subnational governments, Mean values from 2005 to 2020. AREA in sq. km. Source: IMF GFS, WB Development indicators.

3.2 Estimation results

The model is estimated with various specifications (Table 2). It consistently shows a high statistical significance of tax burden in all specifications, with the expected negative sign. The last specification (11) uses difference-in-difference estimation of the relationship between tax burden (explanatory variable, TAX) and tax decentralization (dependent variable, TAXD). From the variables controlling for other usual factors of decentralization, the population size and federalization dummy turned out to be highly statistically significant with the expected coefficient sign. The heterogeneity of population (LANG) was not statistically significant, but close to that. In European countries, the language heterogeneity is probably better captured by the federalization dummy. The population size was not statistically significant in the last specification (11). It was an expected result because there is no reason why the changes in the tax decentralization ratio should respond to the size of the population. The lagged general government budget balance to GDP ratio (BB) is highly statistically significant in all specifications except 11th, where the p-value is 0,15.

Table 2 Results of TAXD dependent variable model estimation

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
TAX	-0,003*** (0,000)	-0,002*** (0,000)	-0,002*** (0,000)	-0,003*** (0,000)	-0,003*** (0,000)	-0,003*** (0,000)	-0,002*** (0,000)	-0,002*** (0,000)	-0,002*** (0,000)	-0,002*** (0,001)	-0,004*** (0,000)
LOG(POP)		0,050*** (0,000)	0049*** (0,014)		0,049*** (0,012)	0,041*** (0,011)	0,049*** (0,012)	0,037*** (0,000)	0,039*** (0,011)	0,039*** (0,012)	0,000 (0,000)
LOG(AREA)			0,003 (0,107)								
URBPOP				0,001** (0,001)							
LOG(GDPPCPPP)					-0,013* (0,007)	-0,013* (0,007)	-0,006 ((0,006)	-0,004 (0,008)	-0,003 (0,008)	-0,003 (0,008)	0,000 (0,000)
FED						0,131** (0,053)		0,161*** (0,057)	0,156*** (0,058)	0,156*** (0,058)	0,002 (0,002)
LANG							0,116 (0,111)				
BB(-1)								-001*** (0,000)	-0,001*** (0,002)	-0,001*** (0,000)	0,000 (0,000)
GR									-0,001 (0,001)	-0,001 (0,001)	-0,000 (0,000)
C	0,219*** (0,026)	-0,575*** (0,190)	-0,588*** (0,201)	0,142*** (0,046)	-0,419** (0,207)	-0,321 (0,200)	-0,519** (0,207)	-0,358* (0,206)	-0,385* (0,206)	-0,396* (0,202)	-0,002 (0,016)
Adj. R-squared	0,053	0,081	0,079	0,058	0,084	0,090	0,081	0,106	0,108	0,098	0,189
No. of observations	546	546	546	546	546	546	532	530	530	530	526
No. of periods	16	16	16	16	16	16	16	16	16	16	16
No. of countries	35	35	35	35	35	35	34	34	34	34	34

*Note: p-values ***...1%, **...5%, *...10%. Std. errors in brackets.*
Specification 11 shows results of difference-in-differences estimation of TAX and TAXD
Source: Author´s computation based on data (GFS IMF, AMECO, WB WDI)

4 Conclusions

The paper aimed to evaluate a mutual relationship between tax decentralization and overall tax burden and discuss the economic background of the relationship. From the geographical point of view, the study covered 35 European countries for the period 2005 to 2020. First, stylized data on fiscal decentralization in European countries and its relation to geographical mezzo-regions of Europe were presented, showing amazing variability of fiscal decentralization schemes. The central focus was on the reaction of the tax decentralization ratio as the dependent variable on the overall tax burden changes while controlling for major and mostly consensual factors of fiscal decentralization covered by cited works. While there is such a high variability among European countries, is there similar behaviour of central governments in response to tax burden changes? The study also controlled for the amount of intergovernmental grants provided from central to subnational governments as an alternative way of tax sharing. The hypothesis was that the central government, responsible for fiscal sustainability and executing most of the taxing power in European countries, would prefer increasing the tax-to-GDP ratio without increasing the tax decentralization ratio. Such behaviour, in fact, should even decrease the tax decentralization ratio, i.e. the regression coefficient should have a negative sign. The negative impact on the tax decentralization ratio should be stronger with the size of general government fiscal deficits. The result confirmed the preference for increasing the overall tax burden without sharing it with the subnational governments, especially when the fiscal deficits of the previous year were high. Finally, as expected, the estimation confirmed the positive impact of the population size and federalization on the tax decentralization ratio.

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