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THE ROLE OF IMMOVABLE PROPERTY TAXES IN THE EU COUNTRIES – TAXES ON LAND, BUILDINGS AND OTHER STRUCTURE IN SUB-NATIONAL TAX REVENUES UNDER THE CONDITIONS OF TAX DECENTRALIZATION

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Abstract

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The literature concerned in fiscal federalism and fiscal decentralization promotes the sub-national responsibility for sub-national resources and spending. In this paper sub-national tax revenues are compared to total tax revenues expressing the tax decentralization for the sample of EU 28 countries. Beside it, the main part of sub-national taxes, the immovable property tax – tax on land building or other structure, is compared to total sub-national tax revenues. Using the GMM system estimation determinants of sub-national tax revenues, real estate tax revenues and tax decentralization are investigated on the sample of EU countries. Results show the significant negative relation between GDP per capita growth, population density and inflation rate and all variables in question. In the case of sub-national government real estate tax revenues the positive relation with public debt is observed.

Keywords: Fiscal federalism, fiscal decentralization, tax decentralization, sub-national government, local tax, immovable property tax, GMM dynamic panel model

INTRODUCTION

Taxes on land, building and other structure are considered as property taxes concerning on immovable property. According to report of UN-HABITAT (2013) it encompasses both real property and real estate. In many countries is power to tax of immovable property decentralized to sub-national governments and sub-national governments can tailor them to local conditions (UN-HABITAT, 2013, p.1). The reason emerges from the argument of the Theory of Fiscal Federalism, that taxes on immovable property are a suitable source of revenue for local (or sub-national) government. Immobile tax base of immovable property makes easier to recognize the jurisdiction revenue source. Bird (2015) agrees and mentions that both theory and experience accounts the right kind of fiscal decentralization under the condition of sub-national responsibility for "raising and spending their own resources" (Bird, 2015, p. 21). He confirms certain findings given by related research. The success of political decentralization is influenced by the mode of fiscal decentralization, while the local government must be responsible for own decisions in the sphere of taxation and expenditure considering intergovernmental transfers as additional source. Oates (2005) or Jha (2015) give a review of the fiscal decentralization characteristics and its economic implications. One of the main arguments in favour of fiscal decentralization is explained by the decentralization theorem introduced by Oates (1972). It refers on the loss of welfare in case of centralized provision of public goods caused by the heterogeneity of local preferences. Oates' contribution is based on earlier works of Samuelson (1954, 1955), Tiebout (1956) or Musgrave (1959) in early half of 20th century. The role

of tax decentralization is stressed mainly by the first generation of the Theory of Fiscal Federalism, where it is connected by undesirable tax competition and race-to-the bottom hypothesis. Razin and Sadka (2011, p.2) describe a race-to-the-bottom as a situation, where governments are vying for a mobile tax base through the reduction of tax rates. Such a reduction may cause a decrease of tax revenues resulting in insufficient level of public goods provisioning. Findings of Razin and Sadka (2011) are not refusing certain positive effects of tax competition, which prevail in comparison with tax coordination.

Tax decentralization as the fiscal decentralization indicator is promoted by Stegarescu (2004, 2005). He considers expenditure and revenue decentralization indicator as formal without the ability to express the real rate of fiscal decentralization. He underlines the importance of sub-national taxes, especially of those where sub-national governments can set tax rate and tax base. Here the role of immovable property taxes is crucial. Jílek (2015) searches for tax decentralization determinants in the European countries of OECD. According to him there are just few studies concerning on revenue or tax decentralization determinants. Prevalent part of research focuses on fiscal decentralization which may be influenced by geography and population, level of country development, size of redistribution, income inequality, preference heterogeneity and the federalization. He verifies the influence of these variables on tax decentralization and finds certain similarities with recent studies e.g. geographically larger countries decentralize more taxes, population characteristic behave contrary to expectations about their effect on tax decentralization.

The body of tax decentralization research is extend and covers studies focusing on many components of public sector. Baskaran (2011) investigates the relationship between tax decentralization and public deficit. On the sample of OECD countries he reveals the U-shaped effect of decentralized tax autonomy on primary deficits. The presence of Belgium and Spain (representing the most decentralized countries) in a sample may cause a positive effect of tax decentralization on fiscal stability. Regardless of this, the relationship between tax decentralization and fiscal stability in the average country is invert. Liberati and Sacchi (2013) deliberate on the influence of tax decentralization on local government size measured by local expenditure emerging on the basis of the seminal work of Brennan and Buchanan (1980). They introduce a tax – separation hypothesis "according to which tax decentralization organized on tax bases used only by local governments would facilitate the control of local public expenditure" (Liberati and Sacchi, 2013, p.202). Their results show the importance of tax decentralization in the process of constraining the local expenditure. Bird (2015) stresses the tax decentralization (revenue decentralization) and tax administration, because according to him the tax decentralization does not imply the decentralized tax administration. The intensity of tax decentralization and decentralization of tax administration varies across countries. He mentions that Canada is the most decentralized country, but the main local tax – the property tax has the tax base set by the state government (Bird, 2015, p.4, p.12). In his paper the attention is payed to decentralized states as Canada, China, Germany and Spain (China and Spain are not federal, but are with important position of regions). Blöchliger, Hilber, Schöni and von Ehrlich (2017) provide a survey of the evidence of local fiscal policies in the context with land use. They mention an example (Blöchliger *et al.*, 2017, p.13) where differentiated property tax rates (different types of land use tax rates for commercial use and residential use) has a distortive effect. Local governments are concerning to support the commercial sphere in expense of residents. The residential use of land is generating net loss in local government revenues, because the cost related to local public goods provisioning is higher than local property tax revenues. Additionally taxes on commercial use of land are usually set much higher than in case of residential use. That is why local governments have not incentives to support residential development, although it is desired by citizens.

The importance of local taxes increases, while accentuating the ability of flexible and effective decision-making process at the local government level. It raises the importance of tax decentralization, which comes from the shift of responsibilities and powers in field of revenue seeking and spending from the central level of government to local governments. In this paper revenues from taxes on land, buildings and other structure (immovable property tax) predominantly set by sub-national governments in EU 28 are analysed and compared to sub-national total tax revenue and total tax revenue reached in the economy. The aim of the paper is to investigate the immovable property tax determinants. The research on own tax revenues of local governments may contribute to the rather narrow scope of literature focusing on tax decentralization, while the economic benefits of decentralization are unambiguously described in the related theoretical framework.

The paper is organized as follows. The introduction with a literature review related to the paper object is followed by the chapter focusing on material and methods used in the paper. Then the results are presented and accompanied by the discussion. Conclusions and references are situated on the end of the paper.

MATERIALS AND METHODS

Data on immovable property taxes and tax revenue of central and sub-national government in the 28 EU countries are collected on annual base from

the Eurostat (2017b) database for the period from 1995 to 2015. Data reflecting on the macroeconomic development of the country and demographic data are collected for the period from 1995 to 2015 from the Eurostat (2017a, 2017c). During monitored period some of analysed countries accessed the EU – Austria, Finland and Sweden in 1995, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia in 2004, Bulgaria and Romania in 2007 and finally Croatia in 2011. Data on ethnic and linguistic fragmentation are collected from the CIA's World Factbook (2013–14). Data on government constitution are based on the publication of Provazníková (2015, p. 20). The final dataset creates a panel (longitudinal data). Variables involved to the estimations, their nature and labelling are listed in Appendix. Collected data are involved to the dynamic panel data estimation based on the Generalized Method of Moments (GMM) described by e.g. Cottrell and Lucchetti (2017). GMM estimation is based on the system estimator introduced by the Blundell and Bond (1998) using level equations. The use of GMM system estimator is according to Roodman (2009, p. 128) appropriate in panels with small T and large N (T – time period, N – individuals). As also Cottrell and Lucchetti (2017, p. 168) mention, in case of T < N the GMM system estimator is more effective than first difference GMM estimator introduced by Arellano and Bond (1991).

The general dynamic linear panel data model follows the equation given in many handbooks or papers focusing on econometrics as Greene (2011, p. 384) or Roodman (2009, p.100). For this paper purpose four GMM – system (GMM – SYS) dynamic panel data models are estimated. First, the model is estimated to investigate for the immovable property tax determinants. The results are than compared to estimation of the total sub-national government tax revenue determinants. To complete the image of the degree of decentralization the indicator of tax decentralization is computed and its determinants are investigated and compared to those of adjusted tax decentralization indicator based on the immovable property tax decentralization. For the model of sub-national immovable property tax revenue (1) the equation is expressed in following manner.

$$SubGImPTaxRev_{i,t} = \alpha * SubGImPTaxRev_{i,t-1} + \\ + \beta_1 * infHICP_{i,t} + \beta_2 * d\_pop_{i,t} + \beta_3 * d\_popdensity_{i,t} + \\ + \beta_4 * d\_PubDebtGDP_{i,t} + \beta_5 * GDPpcgrowth_{i,t} + \\ + \beta_6 * DepRat_{i,t} + \beta_7 * EthFrag_{i,t} + \beta_8 * LingFrag_{i,t} + \\ + \beta_9 * Tiers_{i,t} + \beta_{10} * crisis_{i,t} + \varepsilon_{i,t}$$

For sub-national tax revenue (2), for tax decentralization based on revenues from immovable property tax (3) and for tax decentralization (4) are equations similar to this in case of (1), but with alternation of dependent variable and lagged dependent variable.

In this paper, to compute the tax decentralization indicator, the approach of Afonso and Hauptmeier (2009, p. 12) is used and the decentralization indicator based on the Eurostat data (using the ESA 95 structure) is expressed in the following manner. General decentralization indicator can be written as:

$$decentralization = \frac{(S1312 + S1313)}{(S1311 + S1312 + S1313)}$$

Here the S1312 and S1313 represent a sub-national government level. S1311 represent the central government level. As Afonso and Hauptmeier (2009) mention, the S1312 level of government is present in federal states (Austria, Belgium, Germany) and some unitary states with strong role of regions (Spain). Level S1312 represents a state level of government. In many other EU countries the S1313 represents the regional or local level of government and the decentralization indicator can be written as:

$$decentralization = \frac{(S1313)}{(S1311 + S1313)}$$

Tax decentralization indicator is calculated as share of sub-national tax revenues on total government tax revenues:

$$tax\ decentralization = \frac{tax\ revenues\ of\ S1312 + S1313}{tax\ revenues\ of\ S1311 + S1312 + S1313}$$

Or in case of unitary states it becomes

$$tax\ decentralization = \frac{tax\ revenues\ of\ S1313}{tax\ revenues\ of\ S1311 + S1313}$$

The literature suggests certain derogation from the standard fiscal decentralization indicators. Stegarescu (2004, 2005) uses adjusted fiscal decentralization indicators which are based on sub-national own revenues (including tax revenues). That has inspired the use of fiscal decentralization indicator expressed as Eq. 3 or Eq. 4 with counting the sub-national own-tax revenue (excluding the shared tax revenues). Immovable property tax satisfies the condition of own source.

The vector of variables involved to the GMM – SYS estimation contains the choice of variables according to the related literature, consequently the basic assumptions about their significance and effect are formulated. GDP per capita growth is reflecting the level of economic development of the country. Expected is its positive sign (according to Jílek, 2015 or Panizza, 1999) expressing the positive relationship between economic development and sub-national tax revenues and its share on total government tax revenues as the tax decentralization indicator. The influence of demographic variables as size of population, population density is expected to have a positive sign. Countries with higher size of population decentralize more (Oates, 1972; Canavire – Bacarreza and Martinez – Vazquez, 2012). The expected influence of redistribution need (expressed as the dependency ratio – the share of non-productive population on productive) is positive following the assumption that the increase redistribution activities requires the increase of sources on sub-national level. The increase of public

I: *Distribution of property tax revenues (in %) among government levels in EU and reliance (*) of EU countries on immovable property tax revenues*

Divided Distribution among Levels of Government				Total or Prevalent Revenue of Local Government				Total or Prevalent Revenue of Central government			
	CG	SG/RG	LG		CG	SG/RG	LG		CG	SG/RG	LG
BE* **	11.3	51.6	37.1	**BG****	0.0	0.0	100.0	**MT**	100.0	0.0	0.0
CZ*	67.1	0.0	32.9	**EST****	0.0	0.0	100.0	**LUX****	92.2	0.0	7.8
DN**	50.7	0.0	49.3	**LAT****	0.0	0.0	100.0	**CY****	91.7	0.0	8.3
GER**	0.0	52.3	47.7	**LIT****	0.0	0.0	100.0	**GR***	87.8	0.0	12.2
ESP* **	0.7	58.9	40.4	**PL*** **	0.0	0.0	100.0				
CRO*	51.7	0.0	48.3	**SL****	0.0	0.0	100.0				
HU**	37.6	0.0	62.4	**PT****	0.4	0.0	99.6				
NED**	69.3	0.0	30.7	**SK****	0.6	0.0	99.4				
FIN**	55.4	0.0	44.6	**RO*** **	2.8	0.0	97.2				
SWE**	60.8	0.0	39.2	**IT****	4.5	0.0	95.9				
UK* **	68.7	0.0	31.3	**FRA*** **	19.3	0.0	80.7				
AUT*	14.4	4.4	81.2	**IRE*** **	19.4	0.0	80.6				

Note: CG – Central Government, SG – State Government, RG – Regional government, LG – Local Government
AUT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czech Republic, CRO – Croatia, CY – Cyprus, DN – Denmark, EST – Estonia, ESP – Spain, FIN – Finland, FRA – France, GE – Germany, GR – Greece, HU – Hungary, IRE – Ireland, IT – Italy, LAT – Latvia, LIT – Lithuania, LUX – Luxembourg, MT – Malta, NED – Netherlands, PL – Poland, PT – Portugal, RO – Romania, SL – Slovenia, SK – Slovakia, SWE – Sweden, UK – United Kingdom, * expresses the reliance on revenues from the immovable property tax where ( ) denotes no reliance, (*) denotes the reliance that does not exceed the 25th percentile of a reported country, (**) reliance does not exceeds the 75th percentile, (***) denotes reliance above 75th percentile, reliance is expressed as the percentage of immovable property tax revenues on total tax revenues
Source: revised according to UN-HABITAT (2013)

deficit (mainly the central government deficit) or public debt may increase the need of central macroeconomic problem solution in expense of the decentralization (Oates, 2005). Impact of an inflation rate is similar. Expected sign in case of the number of government tiers is positive, when federations or unitary states with a multi-level government are in general more decentralized (Jílek, 2015). Diverse ethnic and linguistic composition of the population augments the heterogeneity of the population preferences (Oates, 1972; Panizza, 1999), so expected is the increase of decentralized provision of public goods. Expected effect of financial crisis on sub-national tax revenue, sub-national immovable property tax revenue and tax decentralization indicators is negative regarding the undesirable impact on economic environment.

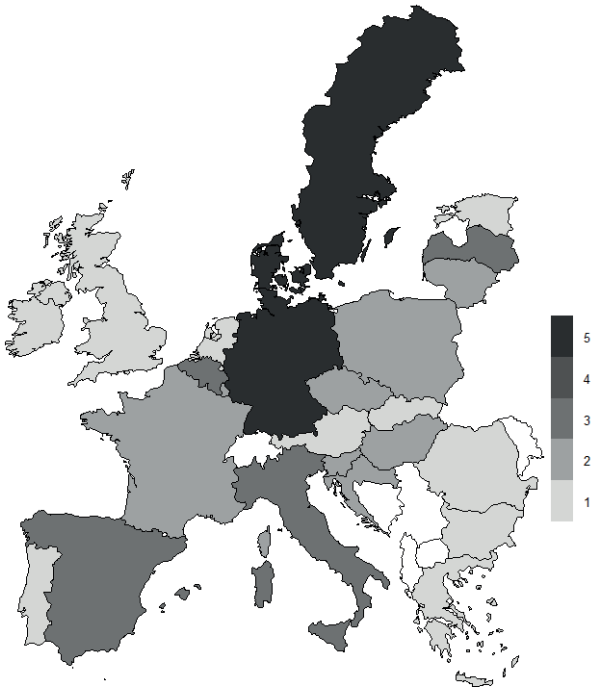
RESULTS AND DISCUSSION

The distribution of the property tax in EU countries including recurrent immovable property tax, recurrent net wealth tax, tax on estates, inheritances and gifts, tax on financial and capital transfers, other recurrent property tax and other non-recurrent property tax is shown in Tab. I. As the distribution of property tax including the immovable property tax differs across EU countries, also the reliance on revenues from immovable property tax differs.

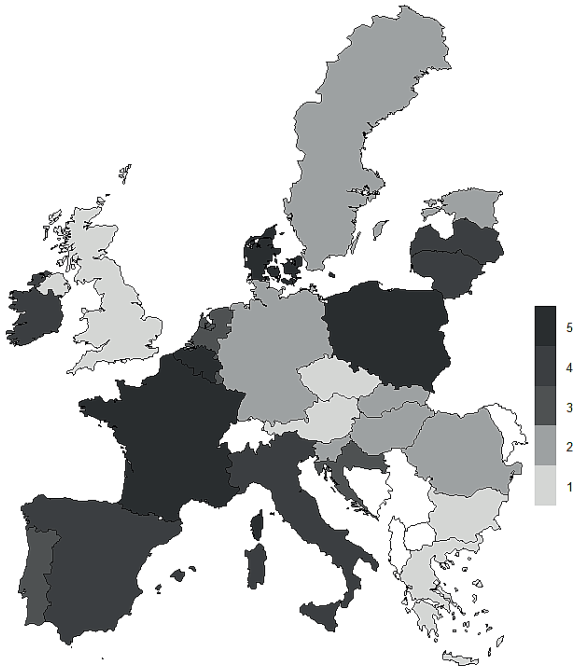
As the Tab. I shows, revenues from immovable property taxes are most important in Belgium, Spain, United Kingdom, Poland, Romania, France and Ireland. UN-HABITAT (2013, p.14) provides a computation supporting the importance and predominance of immovable property taxes, where the immovable property tax creates 58.9% of total revenues from taxes on property. Taxes on financial and capital transfers creates 21.6%, taxes on estates, inheritances and gifts 8.1%, recurrent taxes on net wealth 6.6% (based on GFS data 2010). As was mentioned thereinafter, different tax rates are usually set on commercial use and residential use of immovable property (Blöchliger *et al.* 2017). The commercial use of immovable property is taxed by higher tax rates in comparison with residential use. Malta has no recurrent tax on immovable property (UN-HABITAT, 2013, p. 6).

Fig. 1 displays an intensity of sub-national tax revenues as % of GDP in EU countries. The highest average value of sub-national tax revenues-to-GDP is observable in Germany, Denmark and Sweden. They are followed by Belgium, Spain, Italy and Latvia. Germany and Belgium are federations, Spain and Italy have fortified the regional level of government and their regions are regarded as autonomous (Provazníková, 2015). The lowest average values are observable in 10 countries situated mostly in the eastern part of the EU.

Fig. 2 displays sub-national immovable property tax revenue as % of GDP of the corresponding EU country. In comparison with Tab. I(where the reliance is expressed as the percentage of immovable property tax revenues on total tax



1: *Sub-national tax revenues as % of GDP in EU countries*
Note: 1 (the lightest shadow of grey) represents the average value of sub-national tax revenue-to-GDP in interval from 0 to 2.5% of GDP(including), 2 – 2.5% – 5.0%, 3 – 5.0% – 7.5%, 4 – 7.5% – 10%, 5 (the darkest shadow of grey) represents averages up to 10% of GDP. Averages are computed for period of 1995 – 2015, in case of Croatia from 2000 to 2015.
Source: own, Eurostat 2017



2: *Sub-national immovable property tax revenue as % of GDP in EU countries*
Note: 1 (the lightest shadow of grey) represents the average value of sub-national tax revenue-to-GDP in interval from 0 to 0.2% (including), 2 – 0.2% – 0.4%, 3 – 0.4% – 0.6%, 4 – 0.6% – 0.8%, 5 (the darkest shadow of grey) represents averages up to 0.8%. Averages are computed for period of 1995 – 2015, in case of Croatia from 2000 to 2015.
Source: own, Eurostat 2017

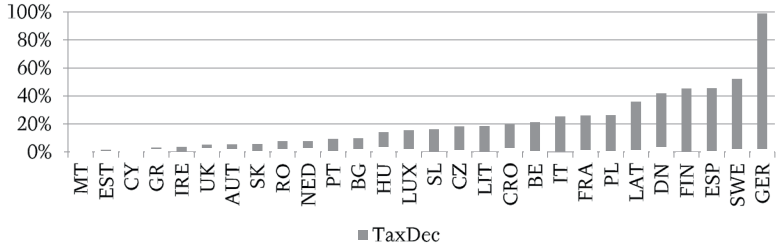
revenues), there are certain similarities (although in Tab. I data are linked to 2010 and on Fig. 3 average values of 1995–2015 are displayed and expressed as % of GDP). In Belgium, Spain, France, Ireland and Poland, the sub-national revenue from immovable property tax (as % of GDP, see Fig. 2) is high in comparison with other countries and revenue from immovable property tax represents also a high share on total tax revenue (see Tab. I). In Denmark, Latvia, Lithuania, Italy, Netherland, Luxembourg and Portugal is the percentage of GDP somewhere near the top of the scale and the reliance is mid. In Greece revenues from immovable property tax create a mid-value as % of GDP in comparison with other EU countries, but the reliance on this type of tax revenue is low. This may be explained by the decrease of GDP in Greece in period of financial crisis.

Fig. 3 and Fig. 4 displays a degree of tax decentralization and decentralization of the immovable property tax in EU countries.

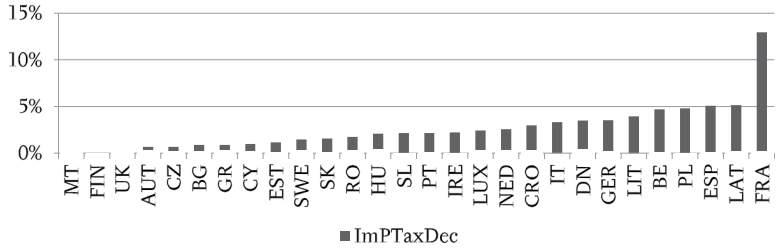
The highest degree of the tax decentralization is observable again in countries Germany, followed by Sweden, Spain, Finland, Denmark, and Latvia. It corresponds with findings of Jílek (2015p. 39–40). The low degree of tax decentralization is observable in Hungary, Austria, Netherland or United Kingdom again in accordance with Jílek (2015).

The highest degree of Immovable property tax decentralization is observable in France, Latvia, Spain, Poland, Belgium etc. similarly to results presented in Tab. I (** or *** reliance). The low rate is characteristic for Malta, Austria, Czech Republic, Bulgaria, Cyprus or Greece matching the findings of Tab. I (* reliance or not reliance).

In prevalent part of EU countries, sub-national tax revenues include the immovable property tax revenue. In the literature the main body is concerned to explain the factors which determine the tax decentralization. Here both determinants of sub-national tax revenue including immovable property tax revenue and tax decentralization are investigated. According to the related literature a set of variables mentioned in chapter describing material and methods is involved to the GMM – SYS estimation. Finally, four GMM – SYS models are estimated; in 1st determinants of sub-national immovable property tax revenue are investigated and compared to 2nd where the determinants of sub-national tax revenue are searched. Similarly in the 3rd estimation determinants of tax decentralization based on revenues from immovable property tax are investigated and compared to those of 4th estimation investigating the determinants of tax decentralization. Their results are shown in Tab. II and Tab. III. Due to missing values in Eurostat, panel is unbalanced. According to Im-Pesaran-Shin



3: *Degree of the tax decentralization in EU countries*
Note: TaxDec is indicator of tax decentralization computed as share of sub-national tax revenue on total tax revenue. Averages are computed for period of 1995 – 2015, in case of CRO from 2000 to 2015, MT no sub-national tax revenue (set as 0).
Source: own, Eurostat 2017



4: *Degree of the immovable property tax decentralization in EU countries*
Note: ImPTaxDec is computed as share of revenue from sub-national immovable property tax to total tax revenue. Averages are computed for period of 1995 – 2015, for CRO 2000–2015, MT no immovable property tax (revenue set as 0), UK ImPTaxDec close to 0, FIN no data on immovable property tax revenue.
Source: own, Eurostat 2017

II: *Determinants of sub –national immovable property tax revenues and sub-national tax revenues in EU countries*

	2-step GMM-SYS dynamic panel, (498 observations) Dependent variable: Sub-national Government Immovable Property Tax-to-GDP			2-step GMM-SYS dynamic panel, (503 observations) Dependent variable: Sub-national Government Tax Revenue –to-GDP		
	Coefficient	**p-value**	**significance**	**Coefficient**	**p-value**	**significance**
Dependent variable (t-1)	0.9370	<0.0001	***	0.9356	<0.0001	***
const	0.0378	0.0401	**	0.2981	0.0070	**
infHICP	–0.0005	0.0193	**	–0.0023	0.0017	*
d_popdensity	–0.0015	0.0273	**	–0.0073	0.0156	**
GDPpcgrowth	–0.0007	0.0802	*	–0.0068	0.0007	**
d_PubDebtGDP	0.0015	0.0061	***	-		
Test for AR(1) errors (p-value)		0.2000			0.0018	
Test for AR(2) errors (p-value)		0.2902			0.9251	
Sargan test (p-value)		1.0000			1.0000	
Wald (joint) test (p-value)		0.0000			0.0000	

*** denotes significance at 0.01 level, ** at 0.05 level and * at 0.1 level.
Source: own computation

unit-root test all the panels do not contain a unit root (Im, Pesaran and Shin, 2003). Result estimations present only significant variables.

Results presented in Tab. II show similar composition of determinants in case of sub-national tax revenues as % of GDP and sub-national immovable property tax revenues as % of GDP. Moreover the determinants of tax decentralization (see Tab. III) and "immovable property tax" decentralization are the same and copy the results of Tab. II.

The relation between inflation rate and dependent variable is in all models negative. The increase of inflation rate causes the decrease of revenues from sub-national taxes, decrease of revenues from sub-national immovable property taxes. It matches the expectation given hereinbefore and corresponds to a situation when the increasing inflation in an economy may be constrained by the macroeconomic stabilization function of public finance (Musgrave, 1959, Oates 2005). Here the central coordination is desired in expense of decentralization. Similarly behaves the central government in case of increasing public debt contrary to observed results. The relation between public debt and sub-national government immovable property tax revenues is positive (see Tab. II, column 2). In other cases the public debt becomes insignificant.

From the variables characterizing the country size the variable population density is the only one significant. Its negative sign is observed in all estimations similarly to findings of Jílek (2015, p.44) and contrary to given expectations about the objective need of more decentralization in larger countries. Mentioned author also expresses

III: *Determinants of immovable property tax decentralization and tax decentralization in EU countries*

	2-step GMM-SYS dynamic panel, (503 observations) Dependent variable: Immovable Property Tax Decentralization			2-step GMM-SYS dynamic panel, (503 observations) Dependent variable: Tax Decentralization		
	Coefficient	**p-value**	**significance**	**Coefficient**	**p-value**	**significance**
Dependent variable (t-1)	0.8614	<0.0001	***	0.8990	<0.0001	***
const	0.0041	0.0125	**	0.0243	0.0070	***
infHICP	–3.6e-05	0.0201	**	–0.0002	0.0017	***
d_popdensity	–0.0001	0.0285	**	–0.0007	0.0156	**
GDPpcgrowth	–0.0001	0.0216	**	–0.0006	0.0007	***
Test for AR(1) errors (p-value)		0.2161			0.0101	
Test for AR(2) errors (p-value)		0.3197			0.7975	
Sargan test (p-value)		1.0000			1.0000	
Wald (joint) test (p-value)		0.0000			0.0000	

*** denotes significance at 0.01 level, ** at 0.05 level and * at 0.1 level.
Source: own computation

the surprise above this result and concludes that countries with higher population or population density decentralize less tax to sub-national governments. It could be explained by the effort of central government to avoid the distortive impact of different sub-national tax polities provided by sub-national governments. On the other hand the savings in public resources connected with administration costs are obtained by the centrally governed tax system.

The expectation about the relationship between GDP per capita growth and all dependent variables is not supported by results obtained in estimations. Negative impact of GDP per capita growth on all dependent variables is observed in disaccord with the related literature findings. While the research of Panizza (1999), Canavire – Bacarreza and Martinez – Vazquez (2012) or Jílek (2015) mentions its positive impact, in the literature the example of so called "Russian paradox" is given (Freinkman and Plekhanov, 2005) and explains the negative impact of GDP per capita on decentralization. They explain it as increased propensity to finance large scale development projects at higher levels of income (Freinkman and Plekhanov, 2005, p.18).

Oppositely to results of many mentioned authors, the variable expressing the redistribution need is insignificant. Similarly, the numbers of government tiers representing the country constitution, the heterogeneity of preferences expressed as ethnic and linguistic fragmentation of the population are insignificant. The effect of the financial crisis is not present in the estimation and also other time effects are insignificant.

CONCLUSION

The role of sub-national taxation is important for the sub-national activity in the field of self-governing of own resources and consequently influences the whole economic development of the country. On the sub-national level of government the immovable property tax is important and revenues from this tax except of shared tax revenues create a dominant part of sub-national tax revenue. The assessment of tax power among government levels bounds in general the rate of fiscal decentralization; rather bounds the rate of tax decentralization.

In this paper the revenue from immovable property tax in EU countries set mostly by the sub-national governments is examined and compared to subnational total tax revenue. Correspondingly the indicator of tax decentralization is quantified by two modes. First it is expressed as the share of sub-national tax revenue on total tax revenue, second, modified indicator of tax decentralization is quantified as share of immovable property tax revenue on total tax revenue. After, determinants of all hereinbefore mentioned variables separately are investigated using the GMM-SYS estimation. Results show similar factors influencing sub –national tax revenues in the question and the rate of tax decentralization indicators. Observable is negative relation between inflation rate, population density and GDP per capita growth and all dependent variables. While expectations about the inflation rate are satisfied, signs of population density and GDP per capita growth behave oppositely to assumptions. The reason may consist in the aim of central government to coordinate tax policies of sub-national governments avoid undesirable loss of effectiveness when population density rises. In the case of economic growth central government accumulates sources to realize certain development projects.

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Appendix: List of variables

Variable	Labelling	Nature	Source
Sub-national government tax revenues	SubGTaxRev	Sum of state and local government tax revenues (S1312+S1313) as % of GDP	Eurostat (2017b)
Total government tax revenues	TGTaxRev	Sum of central, state and local government tax revenues (S1311+S1312+S1313) as % of GDP	Eurostat (2017b)
Tax decentralization	Tax Dec	The share of sub-national government tax revenues on total government tax revenues	Eurostat (2017b)
Sub-national government immovable property tax revenues	SubGImPTaxRev	Sum of state and local government immovable property tax revenues (S1312+S1313) as % of GDP	Eurostat (2017b)
Total government immovable property tax revenues	TGImPTaxRev	Sum of central, state and local government immovable property tax revenues (S1311+S1312+S1313) as % of GDP	Eurostat (2017b)

Variable	Labelling	Nature	Source
Immovable property tax decentralization	ImPTaxDec	The share of sub-national government immovable property tax revenues on total government immovable property tax revenues	Eurostat (2017b)
Inflation rate	infHICP	HICP, annual average rate of change	Eurostat (2017a)
Population size	d_pop	Population on 1st January – total, first differences	Eurostat (2017c)
Population density	d_popdensity	Population density, first differences	Eurostat (2017c)
GDP per capita growth	GDPpcgrowth	GDP per capita growth based on gross domestic product at market prices	Eurostat (2017a)
Public debt	d_PubDebtGDP	Government consolidated gross debt as % of GDP, first differences	Eurostat (2017b)
Dependency ratio	DepRat	Share of population aged 0-14 and 65 and more on productive population	Eurostat (2017c)
Ethnic fragmentation	EthFrag	Number of nations living in country, constant variable	The World FactBook (2013-14) CIA
Linguistic fragmentation	LingFrag	Number of languages spoken in country, constant variable	The World FactBook (2013-14) CIA
Government constitution	Tiers	Number of government tiers, constant variable	Provazníková (2015, p.20)
Financial crisis	Crisis	In period of financial crisis value 1, otherwise 0, dummy variable	own

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