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The Mill Hypothesis Examination on the EU Sample*

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ABSTRACT

In this paper, the examination of the specific type of fiscal illusion, known as Mill hypothesis, is provided. The source of this type of fiscal illusion originates in tax invisibility, when in comparison with direct taxes, indirect taxes are less visible to taxpayers. Feeding the fiscal illusion through the increase of tax rates of invisible taxes, governments are able to increase their expenditure. The relationship between taxes differing in their visibility and government expenditure is estimated on the sample of EU 28 countries in the period of 1995–2017. Estimated dynamic panel models using the GMM system estimator employ different groups of taxes imposed on taxpayers (indirect, direct, invisible and visible). Primarily, the impact of indirect and invisible taxes on government expenditure is examined and the positive relationship is expected. In the next step, specular estimation employing direct and visible taxes are provided, supposing the negative relationship between them and government expenditure. Obtained results do not confirm the Mill hypothesis. The estimated relationships between both indirect and invisible taxes and government expenditure are negative. The explanation of obtained results might resist in the structural break present in the monitored period, which is mirrored in formally antagonistic movements of investigated variables. The estimated relationship between the direct and visible taxes and government expenditure is positive, but not statistically significant.

INTRODUCTION

Generally, taxation induces negative associations among citizens-taxpayers. Beside it, citizens-taxpayers are not capable to evaluate all aspects of taxation imposed by the government. Hidden sides of taxation in forms of real tax incidences and real tax costs evade the understanding of total tax burden.

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Additionally, fiscal ignorance of taxpayers, described in Downs (1960) and Buchanan (1967), might lead to overall incorrect perception of taxation. This phenomenon is defined as fiscal illusion. Tax misperceptions present the origin of all types of fiscal illusion. On the other hand, tax misperceptions create a separate part of the theory on fiscal illusions. Tax illusion as form of tax misperception, is related to the revenue complexity hypothesis (or complexity of tax system - Oates, 1988). Higher the complexity of the tax system, higher the probability, that tax burden is underestimated by taxpayers. Tax misperception at the base of the Mill hypothesis (named after the famous British philosopher and economist J.S. Mill, who's scientific interest i.a. was concerned on the comparison between direct and indirect taxation) describes a situation, when tax burden from indirect taxation is underestimated. Thus, the illusion is born at the base of tax invisibility (Sausgruber and Tyran, 2005). In comparison with direct taxes, indirect taxes are less visible to taxpayers (Dell'Anno and Mourão, 2012).

The misunderstanding and underestimation of taxpayers' tax burden and costs of public goods is under the scrutiny of many empirical researches. However, the Mill hypothesis is on the edge of interest in favor of other types of fiscal illusions, e.g. the flypaper effect or debt illusion. The paper's goal is to examine the tax misperceptions in accordance with the Mill hypothesis on the sample of 28 EU countries in the period of 1995–2017. The motivation originates from the limited real tax burden awareness of citizens-taxpayers (and of the whole society) in times, when the continuously increasing supply and access to information does not indispensably lead to better decision-making in many aspect of the real life. Additionally, the rational fiscal ignorance, defined in the early work of Downs (1960), persists among citizens-taxpayers-voters in relation to elected political incumbent. In fact, it is difficult to measure the misperception of the taxation extension at the level of taxpayers. This is the reason, why the research based on data aggregated e.g. at the national or local level is preferred to research based on questionnaires and microdata. In this research, the potential impact of indirect and invisible taxes on government expenditure in terms of fiscal illusion is estimated using the dynamic panel model employing the GMM system estimator. The paper is organized in a following manner. The chapter focusing on the literature review is listed after the Introduction. Next chapter describes the nature of data and methods employed in the research. It is followed by presentation of obtained results and discussion. Paper ends with conclusion and with list of preferences.

1. THEORETICAL BACKGROUND

The problem covered by the Mill hypothesis belongs to the literature on fiscal illusion. According to prevalent part of related literature, the seminal work on fiscal illusion is provided in Puviani (1903). However, the phenomenon of fiscal illusion was perceived much earlier. McCulloch (1845) and Mill (1848) deliberate over the perception of directly and indirectly spent money on taxation. The tax misperception occurs in the case of reduced tax visibility; thus the invisibility of indirect taxation is discussed. The term of fiscal illusion is introduced in Puviani (1903). Fiscal illusions are created by government to break through the tax resistance of citizens. Later, the problem of fiscal illusions is revived in Buchanan (1967). Since then, fiscal illusions were repeatedly discussed. Oates (1988) distinguished among five types of fiscal illusions. He describes the principles of revenue-complexity hypothesis (or tax illusion), revenue-elasticity hypothesis, the flypaper effect, renter illusion and debt illusion. Tax illusion is concerned to the complexity of revenue system in the country. Higher revenue (or tax system) complexity induces fiscal illusion. Revenue-elasticity hypothesis or income elasticity of the tax structure is related to the misunderstanding of the tax burden when the source of taxation (income) changes through the time. Usually, progressive taxation elements are involved in the tax system. The renter illusion is created at the base of renters' misperception of taxes levied on homeowners. Thus, renters vote for higher expenditure levels. Debt illusion origins in a situation, when taxpayers prefer funding the government expenditure via debt operations to avoid the increase of current taxation. The flypaper effect is explained as misunderstanding of public costs due to the transfer financing of public goods by lump-sum grants. Beside Oates (1988), the empirical evidence on all types of fiscal illusions is given in Dollery and Worthington (1996).

It is obvious, that a huge body of literature on fiscal illusion is dated around 1990s' (Oates, 1988; Dollery and Worthington, 1996). The research proceeded continually and in the current literature further empirical evidence is on disposal. In a brief excursion, various researches on fiscal illusion are presented.

Shi and Tao (2018) are focusing on tax illusions during various economic cycle phases. Their findings point to tax revenue diversification during the economic recession. Insufficient transparency of the tax system as a source of fiscal illusion at the state and local level is investigated in Afonso (2014). The attention model presented in Baekgaard et al. (2016) focuses on fiscal illusion rather driven by lack of voters' attention than their lack of information. The tax illusion evidence is stressed at the local level of government, when the local tax mix is examined. The flypaper effect, as other type of fiscal illusion, is also frequently investigated at the local level of government. The reason emerges in the arrangements of fiscal federalism, where financial resources are shifted to lower government levels in form of transfers and grants through the intergovernmental transfer scheme. The renter illusion, similarly to the flypaper effect, is mostly relied to local government level. Immovable property taxes are usually levied at the local level, in accordance with the theory of fiscal federalism. Dell'Anno and Martinez-Vazquez (2017) accentuate the behavioral side of the renters' decision-making. Banzhaf and Oates (2013) or England (2016) seek also for the renter illusion. The one of the questions remains on how much will be the local budget reduced, if the homeowners are the only taxpayers. Debt illusion in connection with local taxpayers is investigated in Landers and Byrnes (2000).

In connection with fiscal illusion, other related topics are also frequently discussed. The tax-expenditure hypothesis is examined in Maddah and Farahati (2014). The relationship between the fiscal illusion and cyclicity of government expenditure is analyzed in Abbott and Jones (2016). Mourão and Cabral (2015) seek for duration of public finance cycles employing the computation of fiscal illusion levels. Unfortunately, less attention is paid to the Mill hypothesis in the empirical evidence. However, certain elements of it are partially involved in several researches. Directly focusing on Mill hypothesis are Sausgruber and Tyran (2005). They consider the arrangement of the tax system as the origin of fiscal illusion. Direct and indirect taxes differ in their visibility to citizens-taxpayers. The invisibility or visibility of taxes is examined in Gemmell et al. (1999). According to them, personal income taxes are visible, while less visible or invisible taxes are corporate income tax, social security contributions and taxes on expenditure (eventually non-tax revenues). The visibility of tax burden is discussed in Dell'Anno and Mourão (2012). According to them, movements towards the increase of fiscal illusion by government consist in existing higher tax visibility. To increase the fiscal extraction, the government increases a share of indirect taxes. Thus, it feeds the fiscal illusion.

2. RESEARCH METHODOLOGY

Basic type of data employed in the research are data on various taxes. As it was mentioned in the part of Introduction, according to Gemmell et al. (1999) and Dell'Anno and Mourão (2012), taxes differ in their visibility and invisible taxes are the appropriate instrument of government how to increase fiscal illusions. In the research following taxes, derived from the Eurostat database (Eurostat, 2019a), are employed:

- Value added type taxes (VAT),
- Excise duties and consumption taxes (ED),
- Taxes on the income or profits of corporations including holding gains (corporate income tax, CIT),
- Compulsory employers' actual social contributions (social security contributions, SSC),
- Taxes on individual or household income including holding gains (personal income tax, PIT),
- Taxes on land, buildings and other structures (immovable property taxes, IPT).

Data are collected for the general government sector (S13) in units of percentage of gross domestic product (GDP) (Eurostat, 2019a). Following the division of taxes according to Gemmell et al. (1999), invisible taxes are VAT, ED, CIT and SSC. Visible taxes are PIT and IPT. Not all from invisible taxes are indirect taxes, e.g. CIT is direct tax and SSC is direct parafiscal tax. VAT and ED are indirect taxes. PIT and IPT are direct taxes. Building up at two main arguments about the source of the increase of fiscal illusion in the sense of Mill hypothesis, impact of two groups of taxes on government expenditure is examined. First, the group of indirect taxes is created. Second, a group of invisible taxes is derived according to the related literature. Presented division of taxes mirrors two basic approaches found in the empirical evi-

dence. Sausgruber and Tyran (2005) mention the effect of indirect taxes, Gemmell et al. (1999) and Dell'Anno and Mourão (2012) mention the effect of invisible taxes. These two groups of taxes are involved in the empirical examination of the Mill hypothesis based on econometric modelling. All taxes are expressed in relation to general government total revenue (e.g. VAT/TR, CIT/TR, etc. emulating the approach of Gemmell et al., 1999).

On the sample of 28 EU countries in the period of 1995–2017 (unbalanced panel due to missing values in source database) primarily the relationship between indirect/invisible taxes (explanatory variable) and total general government expenditure as % of GDP (TE, dependent variable) is estimated using the econometric modelling. To mirror the effect of direct/visible taxes on TE, other two analogic models are estimated. A two-step dynamic panel model based on the GMM system estimator (or Blundell-Bond estimator, defined in Blundell and Bond, 1998) is employed. GMM system estimator includes equations in levels and it is an extension of the first difference estimator of Arellano and Bond (1991). Here the influence of lagged dependent variable on dependent variable in current period is captured. In case of the public budget creation process, it is probable that the expenditure persistence might appear. The volume of public expenditure of previous period is often taken into account by the executive body responsible for the budget assembly. Additionally, the use of GMM system estimator helps to deal with the endogeneity in the model. This method seems to be the appropriate choice when the number of periods is lower than number of cross-section units. Equation of the estimated relationship is following:

$$y_{it} = \sum_{j=1}^p \alpha_j y_{it-1} + \sum_{k=1}^L \beta_k X_{k,it} + \gamma Taxes + v_i + \varepsilon_{it} \quad (1)$$

where y_{it} is a dependent variable of cross-sectional unit i at the time t , y_{it-1} is lagged dependent variable, $X_{k,it}$ is a vector of control variables, $Taxes$ is an independent explanatory variable capturing the effect of indirect or invisible taxes (after direct and visible taxes), v_i presents an unobserved specific effects and ε_{it} is an error term. In dynamic panel model using the GMM system estimator, the validity of instruments used in estimations is evaluated by two statistics. Sargan over-identification test serves to examine whether instruments are not correlated with residuals. The test proposed by Arellano and Bond (1991) serves to examine whether residuals from the first-differenced estimating equation are not second-order correlated. Finally, the Wald join test of significance serves to evaluate the model validity.

The basic assumption about the relationship between the explanatory and dependent variable is positive in accordance with the Mill hypothesis. The increase of invisible or indirect taxation induces the increase of government expenditure (TE). To control for TE, certain additional variables are involved in estimations. The macroeconomic situation is captured by the growth of GDP per capita (g_GDPpc). Fiscal imbalance is expressed by the public deficit/surplus variable (PubDef). The structural break present in the monitored period is covered by the dummy variable for financial crisis (2008-2011). According to the Wagner's Law, expected relate of the GDP to the government expenditure is positive in developed countries (see e.g. Lamartina and Zaghini (2008). The increase of GDP per capita is accompanied by the increase of public expenditures (or public sector size) in developed countries. This assumption is supported also by Gemmell et al. (1999) when using the log of GDP. Contrary, in case of the growth of GDP per capita, Fiva (2006) obtains the negative sign of estimated coefficient. The expected impact of public deficit on government expenditure is negative, as mention Gemmell et al. (1999). It corresponds to the theoretical background of the debt illusion, when government expenditure is mainly financed through the deficit and in minor part through tax revenues. In fact, the variable of public deficit is defined as surplus or deficit (Eurostat, 2019b). The increase of the variable's value (positive difference between public revenue and expenditure) expresses the increase of surplus. The increase of negative difference between public revenue and expenditure stays for the increase of deficit. Negative sign of coefficient stays for the situation when diminishing surplus (in other terms an increasing deficit) influences TE inversely. Finally, the investigated period's heterogeneity emerges mainly from the former financial crisis, which worsened economic conditions in almost all EU countries. Expectations about its effect on government expenditure are positive.

The literature focusing on determinants of government expenditure employs a variety of other control variables. Usually, the effect of increased redistribution need on government expenditure is discussed, when the redistribution need is concerned on increased unemployment and dependency ratio. Beside it, the effect of population size on demand for government expenditure is examined (e.g. Fiva, 2006; Gemmell et al., 1999). In countries, where the economic growth is driven by the export (mostly in countries of Northern and Western Europe the export exceeds the import), the government is not compelled to stimulate the economic growth by government expenditure. Thus the expected relation between export and government expenditure is negative. The openness variable is employed also in Fiva (2006). To conclude, variables mentioned in this paragraph are not statistically significant in provided estimations. Thus, final estimations include only statistically significant control variables.

3. RESEARCH RESULTS

For the purpose of the preliminary investigation of relations between different types of taxes involved in the research and government expenditure as % of the GDP (TE), the Tab. 1 and Fig. 1 are projected. As mentioned hereinbefore, all tax items are expressed as share on total government revenue (TR). In Table 1, the correlation coefficients among investigated variables are presented. Correspondently, in Figure 1, relations between the VATTR, EDTR, CITTR, SSCTR, PITTR and IPTTR and TE are displayed. The negative correlation between invisible taxes (VATTR, EDTR, CITTR and SSCTR) and TE is observable. Contrary, positive relation between visible taxes (PITTR and IPTTR) and TE is observable. The evident relationship between TE and taxes (higher correlation coefficients) is observable in case of the most voluminous taxes VAT, CIT and PIT.

Table 1. Correlation coefficients among TE and invisible/visible and indirect/direct taxes

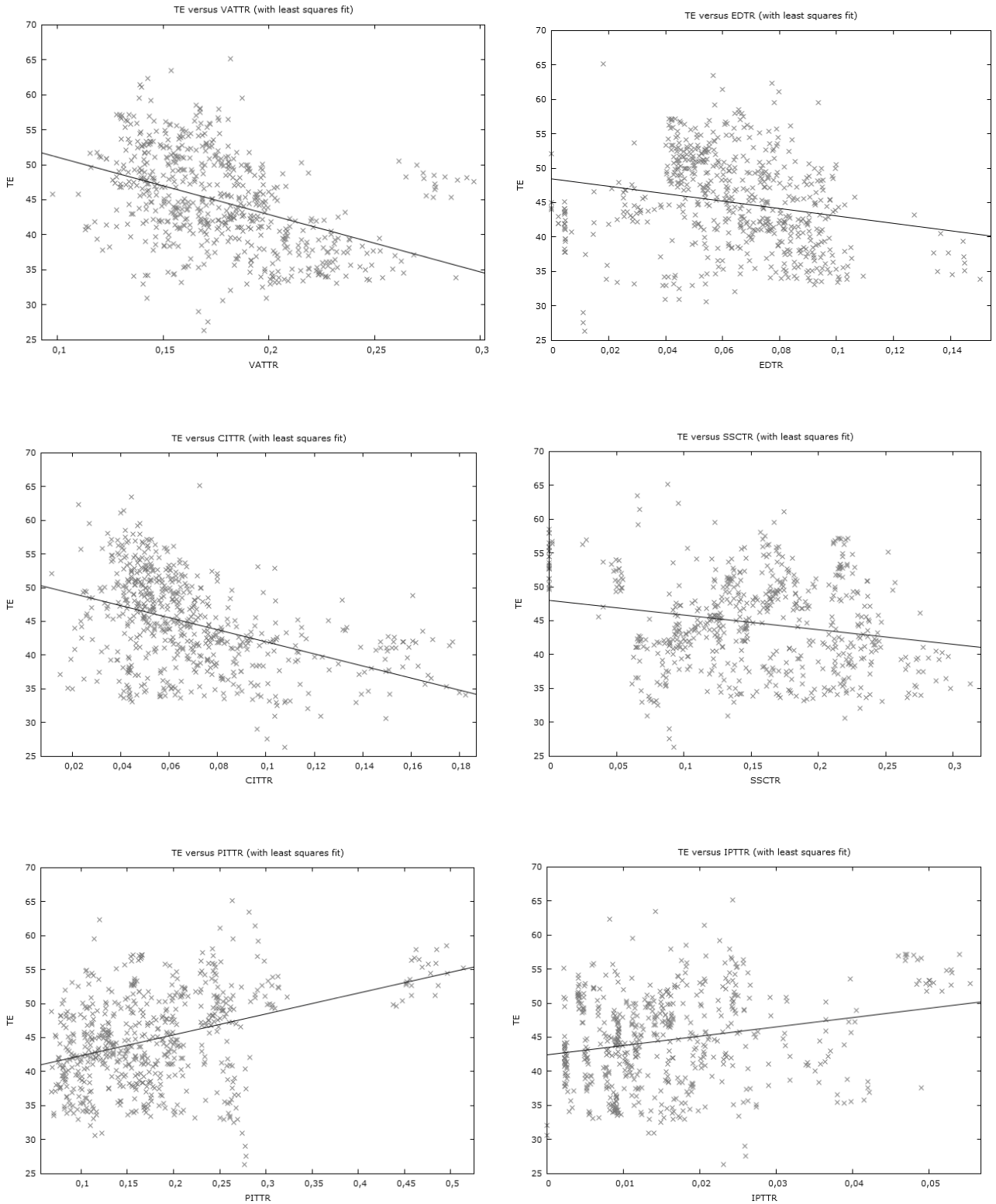
	TE	Invisible taxes				Visible taxes	
		Indirect taxes		Direct taxes		PITTR	IPTTR
		VATTR	EDTR	CITTR	SSCTR		
TE	1	-0.4280	-0.2081	-0.4213	-0.2054	0.3787	0.2301
VATTR		1	0.6137	-0.0823	0.1067	-0.3604	-0.2054
EDTR			1	-0.2038	0.1323	-0.2653	0.0417
CITTR				1	-0.1813	-0.1763	-0.1272
SSCTR					1	-0.5177	-0.1393
PITTR						1	0.2714
IPTTR							1

Source: own research

Results shown in Table 1 refer on results displayed in Fig. 1. Regarding results of preliminary investigation of relations between different types of taxes involved in the research and TE (Figure 1 and Table 1), the anticipation of the Mill hypothesis confirmation weakens. Furthermore, opposite results come to be achieved.

Indeed, results displayed in Figure 1 and Table 1 are mirrored in the estimation results. Table 2 shows results of dynamic panel estimation of the relationship between: 1, indirect taxes and TE; 2, invisible taxes and TE. Results show negative effect of indirect taxes on TE. Analogically, negative effect of invisible taxes on TE is observed. These results do not support the Mill hypothesis, that increase of indirect/invisible taxes creates the fiscal illusion through which government expenditures could be raised. To conclude, fiscal illusions usually created at the base of extension of indirect/invisible taxation are not present in the sample of EU 28 countries in the period of 1995–2017.

Figure 1. Relations between different types of taxes and government expenditure



Source: own research

Table 2. Impact of indirect and invisible taxes on government expenditure

1, Impact of indirect taxes on TE			2, Impact of invisible taxes on TE		
variable	coefficient	significance	variable	coefficient	significance
TE(-1)	0.3499	***	TE(-1)	0.3513	***
const	40.8416	***	const	38.1942	***
Indirect tax/TR	-44.9416	***	Invisible tax/TR	-21.6723	*
crisis	0.3330	*	crisis	0.5880	**
g_GDPpc	-7.6374	*	g_GDPpc	-12.0782	**
PubDef	-0.5533	***	PubDef	-0.5064	***
adjR2			adjR2		
p-values			p-values		
Test for AR(1) errors	0.0139		Test for AR(1) errors	0.0207	
Test for AR(2) errors	0.2601		Test for AR(2) errors	0.2662	
Wald (join) test	0.0000		Wald (join) test	0.0000	
Sargan over-identification test	1.0000		Sargan over-identification test	1.0000	
Note: 2-step dynamic panel 28*21 Including equations in levels (GMM- sys) *** expresses the 0.01 significance level, ** 0.05 and * 0.1.					

Source: own research

Lagged TE is statistically significant and its influence on the TE in current period is positive, as expected. Fiscal (expenditure) persistence causes, that the volume of government expenditure in previous period is mirrored in the budget proposal for next period. The positive and statistically significant effect of financial crisis on TE supports the assumption about the fortified need of use of fiscal instrument of government expenditure in times of financial crisis. Statistically significant negative impact of growth of GDP per capita on TE might be explained by the structure of the sample. Especially, new EU member states (accessing the EU in 2004 and later, 13 countries) in the monitored period of 1995–2017 belonged to economies in transition to market-oriented after the regime break. In accordance with assumptions given Lamartina and Zaghini (2008) about the Wagner’s Law, the increase of GDP stimulates the increase of government expenditure in developed countries. Thus, in developing countries the relationship might be opposite to the relationship defined by the Wagner’s Law. Statistically significant negative relationship between public deficit and TE is observed in accordance with expectation given e.g. in Gemmell et al. (1999).

Table 3. Impact of direct and visible taxes on government expenditure

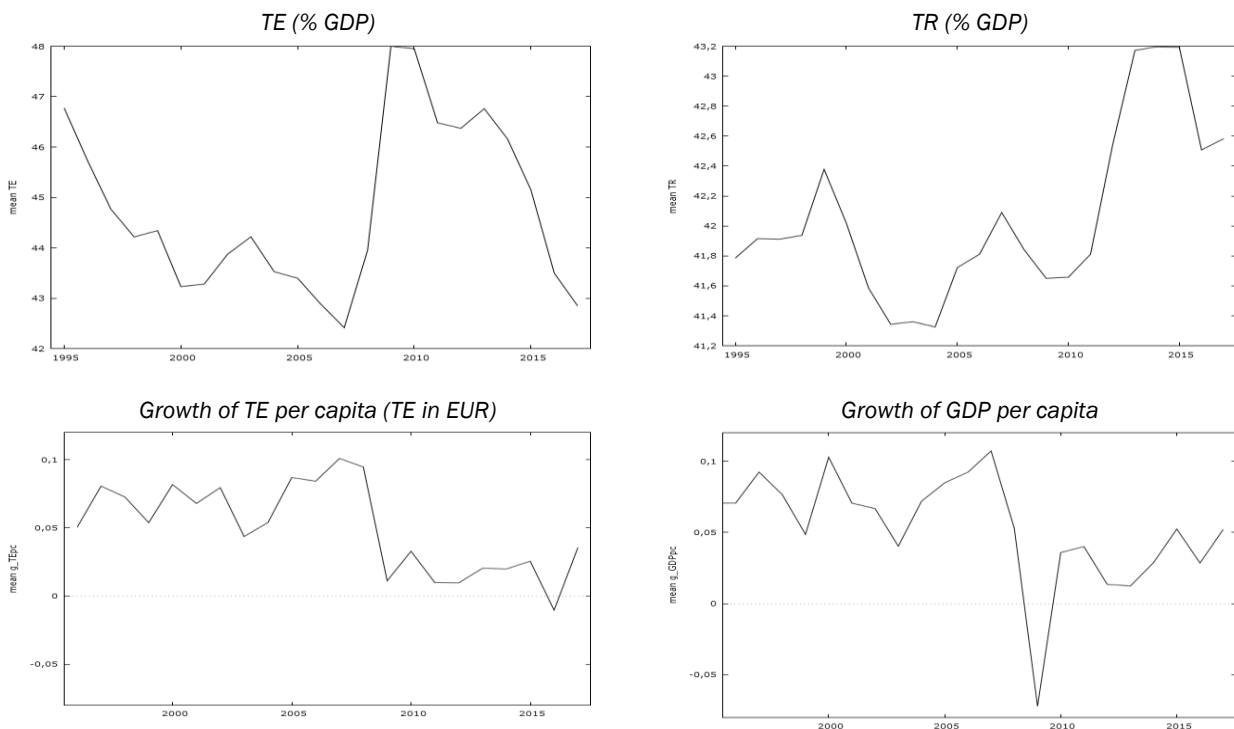
1, Impact of direct taxes on TE			2, Impact of visible taxes on TE		
variable	coefficient	significance	variable	coefficient	significance
TE(-1)	0.4301	***	TE(-1)	0.4244	***
const	20.8678	***	const	21.3592	***
Direct tax/TR	14.3329		Visible tax/TR	18.3032	
crisis	0.4767	**	crisis	0.5072	**
g_GDPpc	-12.0756	***	g_GDPpc	-11.1785	**
PubDef	-0.5557	***	PubDef	-0.5617	***
adjR2			adjR2		
p-values			p-values		
Test for AR(1) errors	0.0059		Test for AR(1) errors	0.0080	
Test for AR(2) errors	0.3865		Test for AR(2) errors	0.3834	
Wald (join) test	0.0000		Wald (join) test	0.0000	
Sargan over-identification test	1.0000		Sargan over-identification test	1.0000	
Note: 2-step dynamic panel 28*21 Including equations in levels (GMM- sys) *** expresses the 0.01 significance level, ** 0.05 and * 0.1.					

Source: own research

To confront and compare the results presented in Figure 1, Table 1 and primarily in Table 2 with the effect of direct or visible taxes, additional analogical specular estimations are provided. Table 3 shows results of dynamic panel estimation of the relationship between 1, direct taxes and TE; 2, visible taxes and TE. The impact of direct and visible taxes on TE is positive, as insinuated results of Figure 1 and Table 1. Unfortunately, its impact on TE is not statistically significant. Beside it, these results are again in discordance with the Mill hypothesis. Coefficients and statistical significance of control variables emulates results obtained in previous estimations. However, the question remains on what has caused that the Mill hypothesis was not supported by the results obtained in this research. Did EU countries decrease government expenditure with concomitant increase of tax revenues from indirect/invisible taxes? In this case, is the effect of the financial crisis decisive? To answer these questions, the Figure 2 and Figure 3 are constructed.

They present time-series plots of key variables (country means in the period of 1995–2017). It is observable, that in the case of the TE variable, there is a structural break in times of financial crisis (in 2008, it was confirmed also by the statistically significant appearance of the dummy for crisis in estimations). Since the beginning of the financial crisis, TE (as % of GDP) increased dramatically. After the economic recovery up to current period, TE decreases and returns to the level observed before the crisis. In the case of TR (as % of GDP), a decrease is observed in 2008, but since 2010 the trend turned to increasing one. In aim to explain the observed decrease of the TE (as % of GDP), the annual growth rate of TE per capita (in EUR) and annual growth rate of the GDP per capita in the period of 1995–2017 is presented in the down part of the Figure 2. Deep break is evident in both projections in the period, when the financial crisis started. The decline in the growth rate per capita is lower in the case of TE per capita variable. Additionally, the overall deceleration of the GDP per capita growth rate was fortified with its negative growth rate in 2009. Beside it, the TE per capita growth rate deceleration is observable in the period immediate to the financial crisis and it turns to negative in 2016. That might result in the quasi dramatic increase of TE in % of GDP (see the top of the Fig. 2) during the financial crisis. However, the GDP per capita growth rate before the financial crisis is higher than the TE per capita growth rate in the same period. That might cause the observed decrease of TE as % of GDP.

Figure 2. Country means of TE, TR, growth of TE per capita and GDP per capita

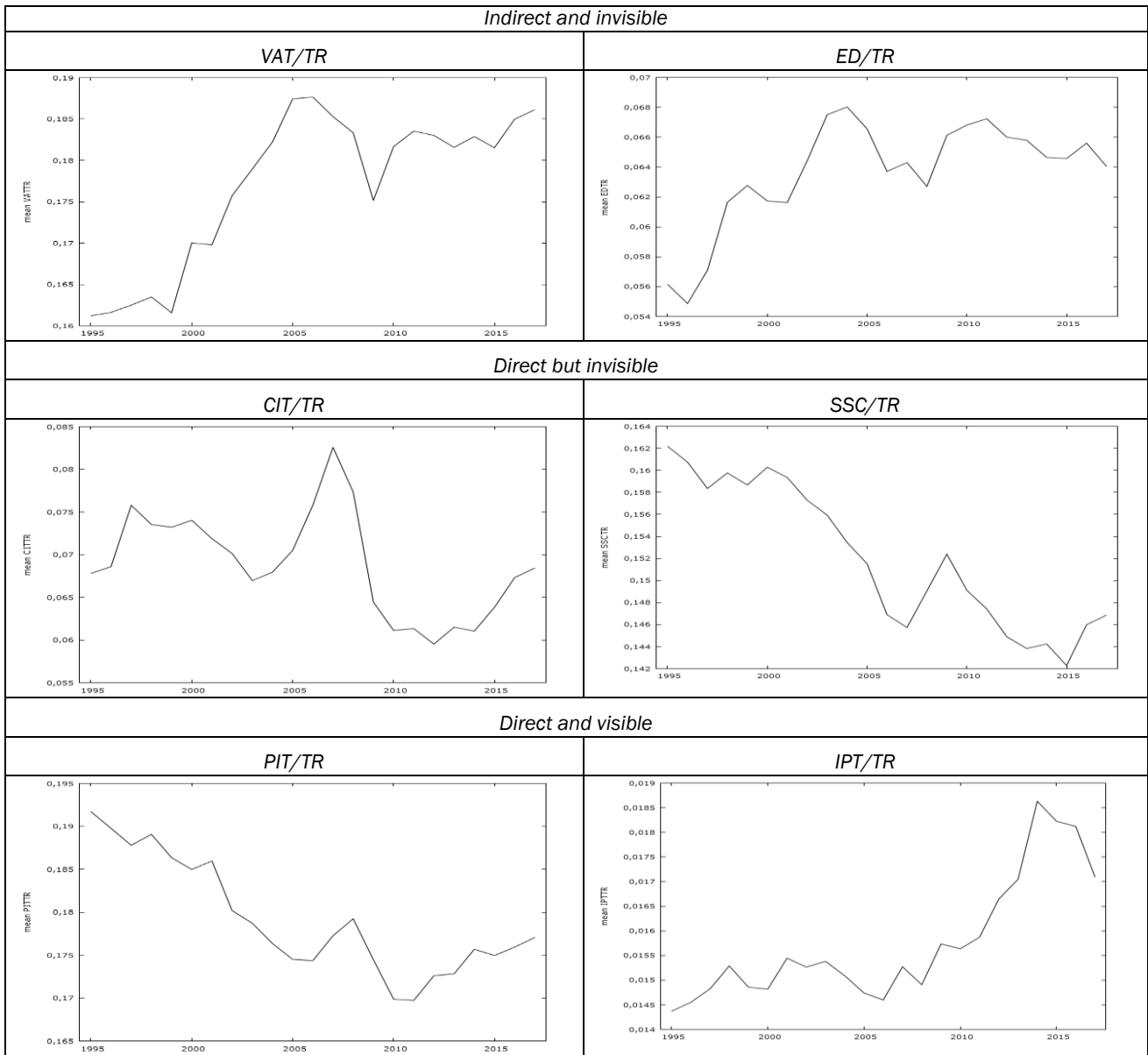


Source: own research

In the case of all monitored tax revenues, the effect of financial crisis is more or less evident, but it is visible. Revenues received from VAT as share on TR mostly increase with accent on the period before the financial crisis. In times of financial crisis, sudden decline is evident (see Figure 3). ED behaves similarly in times of financial crisis. Serious decline is observable in the case of receipts from CIT, which comes with the beginning of the financial crisis. High level of the CIT (as share on TR) before the critic period mirrors the overheated economy of the EU member states. SSC as share on TR decreased in the monitored period with obvious derogation from the decreasing trend in times of financial crisis.

In the case of PIT, the EU member states obviously lowered the tax burden. Thus the decrease of the PIT (as share on TR) is observed. However, the overheating of the economy before the financial crisis brought the mild increase (an increase is smoothed by the simultaneous increase of the GDP and TR in this period). In times of financial crisis, the cuts in the PIT occurred, as it is projected in Figure 3. The only one tax, the IPT tax, seems to be resistant to the worsening of economic conditions. The IPT as share on TR increases massively after the financial crisis.

Figure 3. Country means of VAT, ED, CIT, SSC, PIT and IPT revenues as share on TR



Source: own research

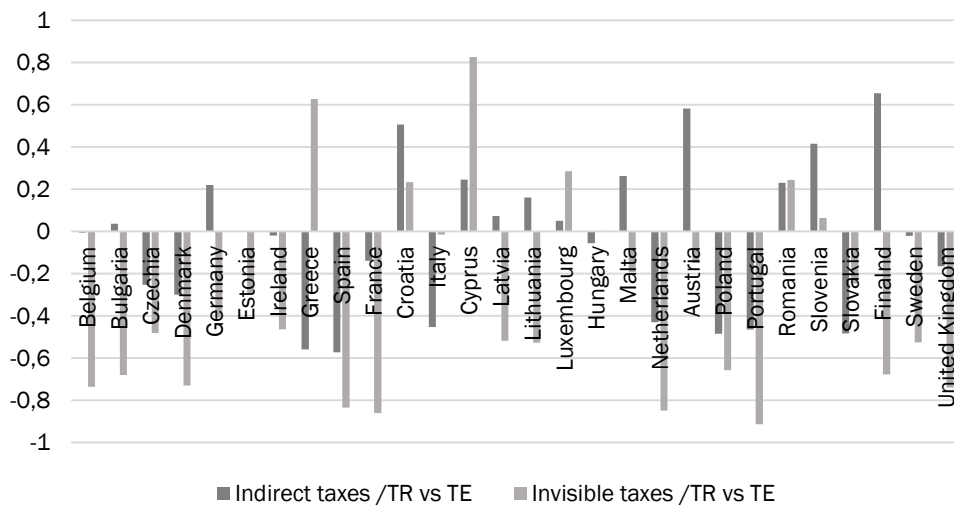
Conspicuously, the financial crisis caused certain changes in the fiscal behavior of the EU member states. However, the antagonistic movements of TE (% of GDP) and indirect and invisible taxes (as share on TR) before the financial crisis are replaced by further antagonistic movements after the break. If accentuating the point of break, it is necessary to remark, that observed antagonistic movements causes, that the eventual additional divide of the sample at the point of break might not bring opposite results.

At the end of the discussion, it should be stated, that according to results obtained in provided estimations, the Mill hypothesis has not support in the overall sample. Beside it, at the level of separate EU countries, the Mill hypothesis might be confirmed in certain cases (see Fig. 4).

Correlation coefficients between both indirect and invisible taxes and TE are positive in Croatia, Cyprus, Luxembourg, Romania and Slovenia. In these countries, the further investigation of Mill hypothesis at the national level might reveal the appearance of the fiscal illusion defined by the Mill hypothesis.

In Bulgaria, Germany, Latvia, Lithuania, Austria and Finland the correlation between indirect taxes and TE is positive. In Greece the correlation between invisible taxes defined in Gemmell et al. (1999) is positive. Also in these countries (with almost one observed positive correlation coefficient) the validity of the Mill hypothesis could not be denied.

Figure 4. Correlation coefficients between indirect taxes/TR and TE and invisible taxes/TR and TE in EU countries



Source: own research

CONCLUSIONS

The Mill hypothesis is beside the most common types of fiscal illusions, e.g. debt illusion, revenue-complexity hypothesis or flypaper effect, on the edge of the interest. It consists of different perception of different types of taxes according to their visibility. While direct taxes are usually visible to taxpayers, indirect taxes contribute to increase of tax misperception and underestimation of real tax burden of the taxpayer. Limited visibility of indirect taxes feeds the fiscal illusion. If government competes for additional resources to increase the fiscal extraction, it might increase tax rates exactly on indirect taxes. In comparison with direct taxes, taxpayers are less tax resistant in the case of indirect and less visible taxes. To conclude, the increase of fiscal extraction through increase of invisible taxation enables the government to increase its spending. According to Gemmell et al. (1999), personal income taxes are visible, while less visible or invisible taxes are corporate income tax, social security contributions and taxes on expenditure (eventually non-tax revenues). The visibility of tax burden is also discussed in Sausgruber and Tyran (2005) and Dell'Anno and Mourão (2012). In fact, not all from invisible taxes are indirect taxes,

e.g. corporate income tax is direct tax, and social security contributions are direct parafiscal taxes. Based on mentioned arguments, the tax source of fiscal illusion in terms of Mill hypothesis resists on both direct and indirect taxes, but regarding their visibility.

In this paper, the examination of the Mill hypothesis is provided on the sample of EU 28 countries in the period of 1995–2017. Technically, the relationship between taxes differing in their visibility and government expenditure is estimated. Estimated dynamic panel model employing the GMM system estimator takes several forms. Primarily, the impact of two groups of taxes on government expenditure is examined. First, the group of indirect taxes is created. Second, a group of invisible taxes is derived according to the related literature. In case of groups of indirect and invisible taxes, supposed relationship is positive. In the next step, specular estimation employing direct and visible taxes are provided, supposing the negative relationship between them and government expenditure. Obtained results do not confirm the Mill hypothesis. The estimated relationship between the indirect /invisible taxes and government expenditure is negative.

Further investigation partially reveals the origin of the disconfirmation of the Mill hypothesis on the sample EU 28 countries in the period of 1995–2017. Antagonistic behavior of variables involved in the research is evident. The receipt from invisible taxes as share on government revenue increases (except of receipt from social security contributions) up to the period of financial crisis and its increase continues after the absorption of the structural break's effect. The government expenditure as % of GDP mostly decreases in the times before crisis and escalates in the period of crisis. After it diminishes again. The declared decrease of the dependent variable before the financial crisis and its escalation in the times of crisis is caused by the higher rate of the GDP growth (in per capita terms) before the crisis and its dramatic decline in times of financial crisis. In fact, in absolute volumes, the government expenditure increased during the monitored period in all EU countries.

According to obtained results, one might guess that governments behave responsibly to their citizens-taxpayers-voters, thus the fiscal illusion in terms of Mill hypothesis is not present. To conclude, certain relevant factors might cause the obtained results. It is necessary to mention the monitored period's heterogeneity. It covers the stage of economic depression in countries in transformation e.g. new member states, stage of economic expansion, overheating of the economy, financial crisis and economic recovery of almost all EU countries.

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