The Phenomenon of Fiscal Illusion from Theoretical and Empirical Perspective: The Case of Euro Area Countries

Anna Wildowicz-Giegiel[1], Aneta Kargol-Wasiluk[2]

Abstract:

Purpose: *The aim of the research is to build an index of fiscal illusion to assess the size of the problem in regards to the euro area countries in the period 2004-2016.*
Design/Methodology/Approach: *The analysis of fiscal illusion phenomenon is based on critical analysis of public finance literature which helped in indicating the main sources of fiscal illusion and capturing its different dimensions. In addition, literature analysis enabled the selection of the most appropriate measures related to various aspects of illusion. Initially, the principal component analysis (PCA) was conducted to identify main factors which should be included in the formula of index. The selected factors were built on the basis of different measures and indicators that can be assigned to the selected dimensions of fiscal illusion. This allowed to construct the index of fiscal illusion.*
Findings: *The authors noticed that economies characterized by a relatively high fiscal illusion and low quality of public finance may find it difficult to achieve fiscal sustainability in the long-term. In the analyzed period, the highest average value of the fiscal illusion index was recorded in Italy (the average FII 0,935), while the lowest in Estonia (the average FII 0,07). The results of the study revealed the significance of institutional determinants, which both influence the quality of public finance and the size of fiscal illusion.*
Practical Implications: *The results are important not only for policymakers to understand the consequences of their decisions for public finance sustainability, but also for society, increasing its awareness of current tax burdens paid and benefits received.*
Originality/Value: *The paper discusses the most important issues regarding fiscal illusion* which *seems to be obstacle in achieving public finance sustainability. The results of the research certainly enriched the existing knowledge on the phenomenon of fiscal illusion, its causes and ways of measurement.*

Keywords: *Fiscal illusion, index of fiscal illusion, public finance.*

JEL Code: *H30, H60, H62, H63, H87.*

Paper type: *Research article.*

[1]*Faculty of Economics and Finance, Departament of Finance, University of Bialystok, e-mail: a.wildowicz@uwb.edu.pl*
[2]*Faculty of Economics and Finance, Departament of Finance, University of Bialystok, e-mail: a.kargol@uwb.edu.pl*

1. Introduction

The phenomenon of fiscal illusion is associated with the misperception of the fiscal burden or the amount of tax paid. Taxpayers regard their tax burden smaller than it actually is or adversely perceive their tax burden heavier than it is in fact. The occurrence of the fiscal illusion refers to the most countries in Europe and around the world. The bigger the size of fiscal illusion, the lower the transparency of public finances which in the light of the twenty-first century challenges should be characterized by adequate efficiency and effectiveness.

There are several causes of fiscal illusion. In the literature, different authors indicate various hypotheses of fiscal illusion, e.g.: the complexity of the tax structure; income elasticity of the tax structure; the flypaper effect, renter illusion and debt illusion. Fiscal illusion, caused by opportunism of politicians who conduct the irresponsible fiscal policy relying on increasing public spending, may lead to deepening public debt. Undoubtedly, in the long term, every kind of fiscal illusion negatively affects budgetary outcomes and economic performance. The purpose of this study is to:

- analyze the theoretical basis of the phenomenon of fiscal illusion and propose the method for its measurement,
- identify the main causes of fiscal illusion,
- make some suggestions to different possibilities of measuring the fiscal illusion phenomenon,
- construct the fiscal illusion index for the euro area countries.

The empirical research covered the euro area countries in years 2004-2016 because in the case of these economies the deterioration of public finance quality is observed, which as a result may negatively affect their long-term performance. There is consensus among economists that the lack of transparency in fiscal policy is harmful for fiscal outcomes and it raises the need for implementation of additional control mechanisms, such as fiscal councils, that should contribute to decreasing fiscal illusion between the government and electorate.

The study offers several contributions to the fiscal illusion literature, especially in the empirical dimension through broadening the knowledge on factors which can be used in the process of construction the fiscal illusion index. The intension is to expose the institutional variables that are likely to influence the level of fiscal illusion. In opinion of authors the results of the research certainly enriched the existing knowledge on the phenomenon of fiscal illusion, its causes and ways of measurement.

The discussion is organized as follows. Section II characterizes the fiscal illusion concept from theoretical point of view, providing a short review of theoretical frameworks for different hypotheses of this phenomenon. Section III presents the review of main hypotheses of fiscal illusion and their measurement. Section IV

discusses the rationale for the construction of Fiscal Illusion Index. Section V considers the methodology for the measurement of fiscal illusion and Section VI describes the size of fiscal illusion in the euro area countries**.**

2. Fiscal Illusion Phenomenon from the Theoretical Point of View

Fiscal illusion phenomenon is studied for over a hundred years, however, interest in this area of research has significantly increased in the 60-70 years of the twentieth century. *The notion of fiscal illusion is associated with the misperception of the fiscal burden or the amount of tax paid. (…) Taxpayers regard their tax burden as smaller than it actually is* (positive version – more often). In negative version *taxpayers perceive their tax burden in fact to be heavier* (Määttä, 2006). The general idea of fiscal illusion is that there are certain sources of government revenue that are not observed or not fully observed by citizens. If money from these sources is spent, some or all citizens benefit from these expenditures, and give support for the growth of government. Because the citizens are unaware of the source of these expenditures, they do not perceive the pain of paying higher taxes or resign from tax cuts preferring the growth of public spending. *Thus, spending revenue from sources that are hidden from the citizens' view by fiscal illusion should increase the popularity of the government and thus those in government who seek reelection have an obvious incentive to spend any revenue that is subject to fiscal illusion, and seek revenue that has this characteristic* (Mueller, 2003).

Fundamental contributions to the analysis of the phenomenon of fiscal illusion brought Italian scientist Amilcare Puviani at the turn of the nineteenth and the twentieth century[3] (in 1897/1903), in the book titled *Teoria della illusion finanziaria*. In general, the Puviani's approach to the problem of public finances is based on the assumption that the state is a monopoly, therefore, represents a state institution through which one group of people has the power to impose their will to another group – to those who are governed. Assuming such a concept, fiscal structure is seen as an institutional tool used by policy makers to raise funds from subordinated groups. These funds serve providing or financing public goods which the governed group wants (Buchanan, 1967).

The starting point for considerations of Puviani was the question – how the government decision makers, that want to minimise the resistance of taxpayers to the level of the tax burden, will take to organise the fiscal system? The answer to the above question took the form of a general hypothesis. The governing group tries, whenever possible, to create the fiscal illusion, that the tax burden is smaller than it actually is. It also creates the other illusion which aims to make the governed group think that the value of public goods and services available to them is greater than

---

[3]*Some economists, e.g., Dollery and Worthington (1996) are convinced that the notion/phenomenon of fiscal illusion began to investigate the authors such as J.R. McCullock and J.S. Mill.*

real. Then Puviani proposed to test this hypothesis by examining the reality of the existing fiscal structures. The hypothesis applies to both sides of the budget bill, illusions apply to both taxes and spending programs (Buchanan, 1967).

As noted by Oates since the Puviani and Italian economists, the work of Buchanan (1967) gave the impetus to the development of hypotheses in the field of fiscal illusion (Oates, 1988). Buchanan after analysis of Puviani system took up the study of fiscal illusion in the contemporary tax systems (Buchanan, 1960; 1967). Buchanan noted that less painful for the taxpayer, is the deduction of part of the income for tax purposes - the employer plays a role of tax collector, the employee does not directly receive the total sum of wage or salary which are considered as the basis for taxation. Subsequently, the institution of the progression gives the taxpayer a feeling of excessive tax burden. In the case of social security taxes - the taxpayer accepts regular increases in his own taxes, as well as those imposed on his employer, assuming that they will be accumulated in order to sustain the cost of his own retirement. The taxpayer will put less resistance to such the increases than if he would know that they result from the need to comply with current payments to beneficiaries. In the case of the corporate income tax – there also is some kind of confusion with reference to the person being the final taxpayer (Buchanan, 1967).

The conceptual and empirical work on the theory of fiscal illusion is the paper of Wagner "Revenue structure, fiscal illusion and budgetary choice" (1976). The author stressed, that the institutional manner in which citizens are required to pay for government can effect taxpayer's perception of the price of government, and, hence, the size of the public sector (Wagner, 1976). The Fiscal illusion phenomenon is currently the subject a lot of studies and most of them have an empirical nature. Oates noted, that in discussion on the phenomenon of fiscal illusion it is possible to identify five forms / sources of fiscal illusion (Oates, 1988):

- complexity of the tax structure where the misperception of tax system stems from fragmentation of the revenue system,[4]
- income elasticity of the tax structure where growth in revenue is associated with income elastic forms of taxation,[5]

---

[4]*If we take in to account the complexity of the tax structure (revenue complexity) we have a lot of researches such as: Wagner (1976), Clotfelter (1976), Pommerehne and Schneider (1978), Munley and Greene (1978), Baker (1983), Breeden and Hunter (1985), Cullis and Jones (1987, 2009), Berry and Lowery – 1987, Henrekson (1988), Misiolek and Elder (1988), Martinez-Vazquez, Harwood and Larkins (1992), Heyndels and Smolders (1994, 1995), Dollery and Worthington (1995, 1996), Dollery and Worthington (1999), Franzese (2002), Hendrick (2002), Caroll (2009), Sanandaji and Wallace (2010), Ehrlich (2011), Brogan (2013) Lybeck and Henrekson (2014), Atkinson and Stiglitz 2015 etc.*

[5]*In the case of income elasticity of the tax structure there are the following authors: Oates (1975), Craig and Heins (1980), DiLorenzo (1982), Baker (1983), Feenburgand and Rosen (1987), Hunter and Scott (1987), Misiolek and Elder (1988), Greene and Hawley (1991),*

- the flypaper effect – where lump-sum intergovernmental grants have a stimulatory effect on public expenditure,[6]
- renter illusion with respect to the property taxation which depends on the extent of property ownership in a given jurisdiction,[7]
- debt illusion where public awareness of the extent public expenditure depends more on current taxation than debt financing,[8]

His point of view is shared by many authors, e.g., Dollery and Worthington (1996)[9], Dell'Anno and Dollery (2014) and so on. However, the revenue complexity argument is the dominant theory among the fiscal illusion scholars (Brogan, 2014). It seems to be very obvious, that the side of revenues is more easier to analyze. Such opinion is also shared by many economists. *The empirical analysis of fiscal illusion has been directed almost exclusively at the revenue side of the fiscal equation with a corresponding neglect of the benefits of public sector activity. This asymmetry does not necessarily reflect the increased importance of government expenditure relative to government output* (Dollery and Worthington, 1996).

As Tenreiro de Magalhaes, Jahankhani and Hessami (2010) note, even in the 21st century voters do not pay attention to public accounts and it makes them vulnerable to fiscal illusion. The very comprehensive work on the fiscal illusion is also the Mourão's paper from 2008. The main problem with the application of the fiscal illusion hypothesis is that it is conjectural. Michael J. Brogan (2014) noticed that it is very difficult to verify both theoretically and empirically the fiscal illusion hypothesis because the argument requires multiple criteria to be satisfied. *It may well*

Heyndels and Smolders (1994), Dollery and Worthington (1995), Ellen Schwartz (2004), Crescenzi (2012), Oates (2013), Döring (2015).

[6] *In the case of the flypaper effect: DiLorenzo (1982), Winer 1983, Logan 1986, Hammes and Wills (1987), Marshall (1989; 1991), Grossman (1990), Picur (1991), Oates (1991), Stewart (1993), Heyndels and Smolders (1994), Dollery and Worthington (1995), Hines and Thaler (1995), Ehtisham, Gao, Tanzi (1995), Mueller (1997, 2003), Thompson and Green (1998), Dollery, Wallis (2001), Leyden (2006), Boadway, Anwar and Shah (2007), Cullis and Jones (2009), Kalb (2010), Lee, Johnson and Joyce (2013), Nicholson-Crotty (2015).*

[7] *In the case of the renter illusion: Barr and Davis (1966), Bergstrom and Goodman (1973), Hanushek (1975), Peterson (1975), Lovell (1978), Gronberg (1980), Martinez-Vazquez (1983), Beck (1984), Brazer and McCarty (1987), Schokkaert (1987), Schwab and Zampelli (1987), Schneider (1989), Moomau and Morton (1992), Heyndels and Smolders (1994), Carroll and Yinger (1994), Worthington (1994), Dalamagas (1993), Dollery and Wallis (2001), Crescenzi (2012), Storper (2013), Berger (2016).*

[8] *In the case of debt illusion we have: Oates (1969), Epple and Schipper (1981), Brembeck (1991), Dalamagas (1992, 1993), Peacock (1997), Dollery and Worthington (1999), Landers and Byrnes (2000), Sterling (2010), Montiel (2011), Rizzo (2012), Crescenzi (2012), Dyson (2014).*

[9] *Dollery and Worthington (1996) conducted a very comprehensive analysis of the evolution of the fiscal illusion concept and its measurement in which the views of the above mentioned scientists were taken into consideration.*

be that the assumptions used in past approaches to fiscal illusion lack the theoretical rigour required for empirical analysis (Dollery and Worthington, 1996).

3. The Review of the Main Hypotheses of Fiscal Illusion

The phenomenon of fiscal illusion became the subject of great interest to many scientists trying to capture its different dimensions and find the most appropriate measures related to particular aspects of illusion. In the literature, there are at least five hypotheses which indicate the sources of fiscal illusion. Taking into account its multidimensional nature, a short presentation of the most important hypotheses certainly allows for a better understanding of this concept.

Firstly, the revenue-complexity hypothesis, initially defined by Buchanan (1967) suggests that the more complicated the revenue system, the more difficult it is for the taxpayer to estimate the tax-price of public outputs – and the more likely it is that the taxpayer will underestimate the tax burden associated with public programs (Oates, 1969). The hypothesis also implies that, the more complex the revenue system, the larger will be the public budget. It should be noticed that the complexity of tax revenue system is often identified with the lack of revenue transparency.

Transparency can be interpret as government providing data and information on activity, management, and policies. To put it another way, government revenue is transparent if people understand their total tax burden, including fees and license costs. However, it rarely happens because of fiscal illusion which causes that citizens perceive their tax burden to be lower than it actually is. This misperception leads them to believe that public goods cost less than they do, thereby creating demand for government services to be beyond what is socially optimal (Afonso, 2015). The fiscal illusion literature indicates that the complexity of tax system increases with the number of revenue instruments and this problem is compounded by a reliance on indirect taxes that are less visible. Richard Wagner (1976) undertook the first test of the revenue-complexity hypothesis. The author implemented an index, the Herfindahl index, that is commonly used in the industrial-organisation literature to measure the degree of concentration within an industry. On this basis, the revenue-complexity is measured as:

$$f = \sum_{i=1}^{4} r_i \tag{1}$$

where r_i is the fraction of total city revenue generated from tax source i.

The Herfindahl index achieves its maximum value of unity when a jurisdiction generates all of its own revenues from a single source. It means that, the higher the value of the index, the less complicated tax system. Among the measures presenting fiscal illusion from the revenue-complexity perspective are such as:

- ratio of direct to indirect taxes – Clotfelter (1976), Dell'Anno and Dollery (2012), Buehn, Dell'Anno, Schneider (2015),
- Herfindahl revenue complexity with different visibility weightings – Pommerehne and Schneider (1978),
- Hannah and Kay index (HK index), representing the reciprocal of concentration index (HHC) – Heyndels and Smolders (1994),
- Herfindahl revenue complexity – Munley and Greene (1978), Baker (1983), Ratmanova and Wroblowsky (2012), Dell'Anno and Dollery (2012), Buehn, Dell'Anno, Schneider (2015), Rakow (2016),
- measure of breadth of revenue system (number of different instruments) – Breeden and Hunter (1985), Hendrick (2002), Carroll (2009), Carroll and Johnson (2010),
- Herfindahl revenue complexity (Oates), income elasticity, visible tax concentration ratio – Misołek and Elder (1988),
- proportion owner occupied, (Herfindahl) revenue complexity, dummies for grant and utility reliance, indirectness of revenue system – Worthington (1994),
- ratio of municipal enterprise revenues to total municipal revenues – Haug (2009).

Secondly, the revenue-elasticity hypothesis, tested for the first time by Oates (1975), assumes that high income-elasticities of tax revenue are likely to increase fiscal illusion. Buchanan (1967) argues that: "*In a period of rapidly increasing national product, that tax institution characterised by the highest (income) elasticity will tend, other things equal, to generate the largest volume of public spending".* In the light of this approach, a relatively high income elasticity of revenue system leads to larger increments in general income, and this increase will be "automatically" funneled into increased expenditure (Dollery and Worthington, 1996). The other authors who tested this hypothesis, Craig and Heins (1980) also reported a positive relationship between high income elasticities of tax revenue and high levels of government expenditure. They supported *"... the idea that elasticity drives spending*". In turn, Di Lorenzo (1982) and Feenberg and Rosen (1987) did not find a significant relationship between higher income elasticities of tax revenue and higher levels of public sector spending. The most common measures used to test the revenue-elasticity hypothesis are:

- ACIR revenue elasticity, individual income taxes, corporation income taxes, total income tax receipts as a percentage of total tax receipts – Oates (1975),
- ACIR estimates of elasticity income of state taxes – Craig and Heins (1980),
- Herfindahl revenue complexity (Oates) income elasticity – Baker (1983),
- measure of progressivity of state income tax – Hunter and Scott (1987),

- Herfindahl revenue complexity (Oates), income elasticity, visible tax concentration ratio – Misołek and Elder (1988),
- Herfindahl revenue complexity (Oates) income elasticity, percentage of non-owner, occupied residences, grant income equivalent divided by total income – Heyndels and Smolders (1994),
- Herfindahl revenue complexity (Oates) income elasticity, ratio of direct to indirect taxes, dummy variables for reliance on grant income – Dollery and Worthington (1995), Creedy and Gemmell (2002),
- income elasticities of sales taxes and personal income taxation – Abbott, Jones (2016).

Thirdly, "the flypaper effects" hypothesis was identified by Gramlich and Galper (1973) but many other studies have also reported its existence e.g. Hines and Thaler (1995) or Bailey and Connolly (1998). This source of fiscal illusion appears at the local level when taxpayers do not directly see, hence misperceive, the flows of grants from higher levels of government to their local governments, which, in turn, leads them to systematically underestimate the tax price of local spending. This misperception causes two widely recognised effects. The first, the overspending effect, suggests that public spending is greater under fiscal illusion than under perfect information. The second, the flypaper effect, is the prediction that increases in intergovernmental aid receipts tend to stimulate more local public spending than do comparable increases in voter - taxpayer income (Turnbull, 1998).

The issue of the flypaper effect have been tested empirically by many researchers. Many of them have incorporated grant distortions into studies directed at other forms of fiscal illusion, such as the revenue-complexity hypothesis or the elasticity hypothesis. These include Oates (1975),Wagner (1976), Goetz (1977), Munley and Greene (1978), Craig and Heines (1980), DiLorenzo (1982), Breeden and Hunter (1985). The results of their research proved that intergovernmental grants are the important determinant of the level of public expenditure. Testing the flypaper effect hypothesis, the researchers use the following measures:

- Herfindahl revenue complexity, dummy variable for municipalities practising internal subsidisation (utility profits) – DiLorenzo (1982),
- estimated per capita tax windfall – Marshall (1989, 1991),
- federal and state unconditional grants, state unconditional grants, federal + state categorical grants – Grossman (1990),
- Herfindahl revenue complexity (Oates), income elasticity, percentage non-owner occupied, grant income divided by total income – Dollery and Worthington (1995),
- Herfindahl revenue complexity, (Oates) income elasticity, ratio of direct to indirect taxes, dummy variables for reliance on grant income – Dollery and Worthington (1995),

- total expenditure of municipal authorities *per capita,* total revenues generated by municipalities *per capita,* fiscal or revenue raising capacity of municipal authorities *per capita*, expenditure needs *per capita* – Amusa, Mabunda and Mabugu (2008),
- grants received by local government *per capita* – Haug (2009),
- Herfindahl index of state revenue proportion, percentage of revenue originating locally, the amount of state borrowing and the total stock of debt – Abbot, Jones (2016).

The next hypothesis – renter illusion – occurs when local taxes are levied on the owners of the property and not on their tenants. In this case illusion refers to tenants who do not understand the link between the level of local spending and the level of rent they pay. Renters believe that the costs of government expenditure are low (even if taxes are shifted forward in rent charges). It seems that so long as the actual tax-price is underestimated, rental voters will support higher levels of public expenditure and would therefore bias expenditures upwards. The results of empirical studies devoted to this hypothesis are mixed. Several studies supported the hypothesis of rent illusion (Peterson, 1975; Lovell, 1978; Gronberg 1980; Heyndels and Smolders, 1994; Worthington, 1994). However, most studies have also given either implicit or explicit consideration of the alternate hypothesis of "renter rationality" (Barr and Davis, 1966; Hanushek, 1975; Beck, 1984; Brazer and McCarty, 1987) or criticised the main assumption of rent illusion hypothesis (Martinez-Vazquez, 1983; 1988). Among the measures adopted for the purpose of verification of the rent illusion hypothesis are:

- percentage of electorate owning properties – Barr and Davies (1966),
- percentage of municipal housing owner occupied – Bergstrom and Goodman's (1973),
- percentage of adult renters in school district, Dummy variable for renter status –Peterson (1975),
- percentage of homes owner-occupied in town – Lovell (1978),
- percentage of owner occupied in local area – Gronberg (1980),
- percentage of renters in precinct – Martinez-Vazquez (1983),
- dummy variable for homeownership – Schokkaert (1987),
- Herfindahl revenue complexity (Oates) income elasticity, percentage non-owner occupied, grant income divided by total income – Heyndels and Smolders (1994),
- proportion owner occupied, (Herfindahl) revenue complexity, dummies for grant and utility reliance, indirectness of revenue system – Worthington (1994),
- perception of the land tax system, land tax rate, land tax revenue, tax structure –Blom-Hansen (2005),

- percentage of residential buildings with up two accommodation units, rent of owner occupation – Haug (2009),
- percentage of owners, percentage of renters, tax property per house, fees for public services, tax capitalisation in houses price – Dell'Anno and Martinez-Vazquez (2013).

The last potential source of fiscal illusion is known as debt illusion hypothesis. Vickrey (1961) refers to *"a public debt illusion" ... (when) individuals pay no attention to their share in the liability represented by the public debt ...* (Abbott and Jones, 2016). The argument here is that individuals are more likely to perceive the costs of public goods provision if they pay for them through current taxation than if tax liabilities are deferred through public-sector borrowing. Voters usually ignore future tax liabilities and are more tend to accept government borrowing that appears to reduce the costs of taxation. It has to be simultaneously underlined that the debt illusion hypothesis is contrary to the Ricardian Equivalence Theorem, which holds that individuals recognise the government's intertemporal budget constraint and are thus aware that any change in current taxes must be offset by a change in future taxes.

The phenomenon of fiscal illusion – in the context of public debt – became a subject of many empirical studies: Oates (1969), Epple and Schipper (1981) or Dalamagas (1992; 1993). In the case of this hypothesis the most common measures are:

- degree of capitalisation – Oates (1969), Epple and Schipper (1981),
- consumption expenditures relative to debt levels – Dalamagas (1992; 1993),
- debt *per capita*, ratio of municipal enterprise liabilities to total municipal debts –Haug (2009),
- public debt as a percentage of GDP – Buehn, Dell'Anno, Schneider (2015), Gérard, Ngangnué (2015).

4. The Rationale for the Construction of Fiscal Illusion Index in the Light of Institutional Approach

On the basis of literature devoted to the problem of fiscal illusion it can be said that this phenomenon embraces different dimensions and because of its complexity methodological difficulties arise. Irrespective of them, the construction of index, consisting of different dimensions, is strongly suggested by researchers who are involved in such kind of studies. A useful, albeit nascent, empirical approach to this problem resides in the estimation of Index of Fiscal Illusion which should be appropriate for the purpose of international comparisons, as mentioned in Kaufmann, Kraay and Zoido-Lobatón (1999), Nardo *et al.* (2005), Mourão (2005), and Dell'Anno and Dollery (2012).

Kaufmann, Kraay and Zoido-Lobatón (1999) focused on constructing aggregate indicators of bureaucratic quality, rule of law and corruption for a sample of 160 countries. Their methodology of construction aggregate governance indicators turned out to be useful because it allows the countries to be sorted into broad groupings according to levels of governance, and enables conducting the analysis regarding causes and consequences of fiscal movements in a much larger sample of countries than previously used. Nardo *et al.* (2005) also used composite indicators which can summarise complex and sometimes elusive issues in view of supporting decision makers and have proven useful in benchmarking country performance. Furthrrmore, Mourão (2005) proposed the way of building the Index of Fiscal Illusion in 68 countries since 1960. The results of Fiscal Illusion Index can provide benchmarks for evaluating the comparative performance of different democratic countries, discerning long-term trends, and uncovering good governance practices in minimising fiscal illusion. The equally interesting study was conducted by Dell'Anno and Dollery (2012) who applied structural equation modeling (SEM) in order to estimate the Index of Fiscal Illusion for the European Union countries.

There is lots of studies considering the procedures for constructing the indexes of complex political and economic realities. For example, Alesina and Perotti (1996) elaborated the Index of Budgetary Institutions including ten basic dimensions, such as: constitutional constrains, legal requirement for the approval of a macro program, borrowing constrains, authority of minister of finances, amendments by the Congress, consequences of Congress' rejection of the Budget, opportunity to modify the Budget after Congress' approval, opportunity to cut spending by the Government after Congress' approval, assumption by the Government of other political Agencies' debt, and autonomy of these other Agencies to borrow. On the basis of values returned from the index and the existing budgetary practices of control, the authors classified Latin American countries concluding that transparent procedures go along with more fiscal discipline.

Inspired by the study of Alesina *et al.* (1996), Hameed (2005) focused on the Fiscal Transparency and as a result elaborated indices of fiscal transparency for a broad range of countries based on the IMF's Code of Good Practices on Fiscal Transparency. The author used data derived from published fiscal transparency modules of the Reports on the Observance of Standards and Codes. The indices embrace four clusters of fiscal transparency practices: data assurances, medium-term budgeting, budget execution reporting, and fiscal risk disclosures. The results of the study confirmed that more transparent countries have better credit ratings, better financial discipline, and less corruption.

Alt and Lassen (2006) also constructed transparency index regarding 19 advanced industrialised OECD countries in the 1990s. The index consists of 11 items taken from OECD's Best Practices for Budget Transparency. The authors took into account four distinct categories, such as: independent verification by independently audited financial reports, easy access and monitoring governance practices by

external agents, clear and pre-defined budget syntax, and the presence of more justification of decisions which solidifies the basis for decision making. Their empirical study confirmed that fiscal transparency improves fiscal performance. Similarly, Bernoth and Wolff (2006) investigated governmental international transparency using two measures. One of them – called *Audit* – measures whether governments are financially audited externally, how independent the auditing can be performed and how well the obtained information is disseminated.

The other indicator – called *Transparency* – was introduced by von Hagen (1992), extended in Hallerberg, Strauch, and von Hagen (2001) and updated in Hallerberg, Strauch, and von Hagen (2005). It is a measure of informativeness and transparency of the budget draft, aiming at the assessment of transparency given by government officials, the degree to which special funds are included in the budget draft, the information whether the budget consists of one document, whether it is linked to national accounts and finally whether government loans are included. The empirical results proved the importance of fiscal transparency for the credibility of government.

A growing body of empirical and theoretical literature has dealt with issues related to the quality of institutions. Following the approach von Hagen (1992), the indexes which summarise institutional characteristic of the budget preparation, authorisation and implementation stages were used by Gleich (2003) to study the relation between structure of business processes and fiscal outcomes. The analysis revealed that countries having institutional structures that are more conducive to strengthen coordination and cooperation in budget decision-making have been associated with lower budget deficits and reduced debt levels.

Hallenberg *et al.* (2007) also built an indicator of fiscal governance based on the three phases of budget process *the preparation stage*, in which budget draft is elaborated, *the approval stage,* in which the budget draft is reviewed, approved and formalised, and *the implementation stage*, where the budget is implemented and which may be subjected to modifications and amendments by the minister of finance and/or by the parliament. It is worth stressing that the authors found a strong evidence for a direct relationship between institutional setup and fiscal discipline.

The other index used to describe the quality of institutions in public finance sphere– called *Fiscal Rule Index* – proposed by Deroose, Moulin and Wierts (2005) was calculated on the basis of five criteria: the statutory base of the rule, the room for revising objectives, the mechanism of monitoring compliance and enforcement of the rule, the existence of pre-enforcement mechanisms and media visibility of the rule. The overall Fiscal Rule Index is created from a set of sub-indices. Each sub-index is a simply sum of the above indicated criteria. Similarly, Kumar *et al.* (2009) defined an index of strength of fiscal rules by aggregating the variables obtained in the principal component analysis, such as: enforcement score, coverage score, legal basis score, supranational rules score, index of supporting procedures for monitoring

of compliance and enforcement, flexibility score, average number of fiscal rules, and the ratio of national to total fiscal rules in each country.

Next Schaechter *et al.* (2012) constructed fiscal rules indices for each type of fiscal rules and each key characteristic, which are then combined into an overall index. The authors included into the analysis the four sub-indices for each type of fiscal rules. Moreover, each sub-index defined at the national and supranational level, is a sum of five or six indicators in the following pillars: legal basis, coverage, formal enforcement procedure, expenditure ceilings, fiscal responsibility law, independent body setting, budget assumptions and monitoring the budget implementation. All sub-indices are standardised to vary between zero and five. It should be emphasised that the literature has found statistically significant positive effects of Fiscal Rule Index on fiscal performance (see for example, Debrun *et al.* 2008; Afonso and Hauptmeier, 2009). The conducted analysis by Schaechter *et al.* (2012), which embraced 81 countries from 1985 to end - March 2012, allowed him to conclude that formal institutional setup supports fiscal discipline and is particularly desired in the situation of the recent public finance crisis.

Following the institutional approach, Giosi *et al.* (2014) proposed the overall index of fiscal governance (FG Index). The construction of the index was built on the questions selected by the European Commission to set up a single index for describing fiscal governance in the European Union. The results of the conducted study revealed a positive connection between the level of fiscal governance in the Member States and the financial surplus in the period concerned.

5. The Methodology of Measurement of Fiscal Illusion

In the conducted study "*Taxation trends in European Union. Data for the EU Member States, Island and Norway*", Eurostat Statistics and International Country Risk Guide databases were used. On the basis of the literature review, different dimensions of fiscal illusion, along with their indicators/measures, were taken into consideration. The analysis covered the euro area countries in years 2004-2016.

At the beginning, because fiscal illusion consists of different components representing by indicators which are measured in a different way, one of the methods of normalisation – percentile rank – was implemented. It was also assumed that if the expected effect of the variable on fiscal illusion was negative, then the rank was reordered, considering the difference between 1 and the percentile rank.

For the purpose of measuring the phenomenon of fiscal illusion, the Multiway Principal Components Analysis (MPCA) was conducted using program IBM SPSS Statistics 25. A principal component is defined as a linear combination of optimally weighted observed variables. According to the assumptions of PCA, there are Q variables in a dataset which variance can be explained by a smaller number of variables – principal components $Z_1 Z_{2...} Z_Q$

$$Z_1 = a_{11}x_1 + a_{12}x_{12} + \cdots + a_{1Q}x_Q$$
$$Z_2 = a_{21}x_1 + a_{22}x_{22} + \cdots + a_{2Q}x_Q$$

(2)

$$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$$

$$Z_Q = a_{Q1}x_1 + a_{Q2}x_2 + \cdots + a_{QQ}x_Q$$

The lack of correlation among principal components indicates that they measure different "statistical dimension" in the data. The weights a_{ij} (factor loadings) applied to the variables x_j in the system of equations, which are above presented, and the principal components Z_{ij} should satisfy the following conditions:

- they are uncorrelated (orthogonal),
- the first principal component accounts for the maximum possible proportion of the variance of the set of x's, the second principal component shows the maximum of the remaining variance and so on until the last of the principal component which absorbs all the remaining variance no accounted for by the preceding components.
-

PCA involves finding the eigenvalues λ_j, j=1,…, Q of the sample covariance matrix,

(3)

$$CM = \begin{bmatrix} cm_{11} & cm_{12} \ldots cm_{1Q} \\ cm_{21} & cm_{22} \quad cm_{2Q} \\ \ldots & \\ cm_{Q1} & cm_{Q2} \ cm_{QQ} \end{bmatrix}$$

where the diagonal element cm_{ii} is the variance of x_i and cm_{ij} is the covariance of variables x_i and x_j. The eigenvalues of the above matrix are the variances of the principal components and can be found by solving the equation $CM - \lambda I = 0$, while I is the identity matrix with the same order as CM, and λ is the vector of eigenvalues.

Under the process of MPCA the number of principal components which explain the variation of the observed variables and the matrix with the rotated factor loadings for fiscal illusion variables were obtained. Next in the construction of Fiscal Illusion Index, the approach proposed by Nicoletti et al. (2000) and Mourão (2007) was adopted. On the basis of the selected approach, the sub-indicators with highest factor loadings were grouped in intermediate composite indicators, which number is equal to the number of factors. It was assumed that each intermediate composite indicators with a significant factor loading above 0,7 has a weight equal to the square of the factor loading divided by the explained variation by the factor. Moreover, to calculate Fiscal illusion Index, each intermediate composite indicator should have a weight equal to its proportion of the variance explained by all the factors. The aggregation of them allows us to obtain the overall Index of Fiscal Illusion. The final

value given to each country-year observation was rescaled, using the percentile rank but considering now all weighted values (Mourão, 2007, p. 15).

6. The Size of Fiscal Illusion in the Euro Area Countries

Before starting the PCA procedures, both the Alfa Cronbach and the KMO statistics were checked. The measure of Alfa Cronbach was 0,753, while the KMO achieved the value of 0,721. The obtained results are satisfactory and statistically significant. The Principal Component Analysis showed that only five of eighteen factors (principal components for fiscal illusion) were retained according to Kaiser criterion (with eigenvalues above 1), and it is worth to underline that these factors account for 87% of the total variation.

Table 1. *Components loadings for fiscal illusion variables*

Component	Initial eigen values		
	Total	**% of variance**	**Cumulative %**
1	6,227	34,594	34,594
2	3,928	21,821	56,415
3	2,456	13,644	70,059
4	1,828	10,153	80,212
5	1,198	6,655	86,867

Source: *Own calculations: Extraction Method – Principal Component Analysis done in SPSS.*

The choice of 5 factors which explain most of the variability in the data was additionally confirmed by the screen plot proposed by Cattell (1966). Then through the Principal Components Extraction Method with varimax normalised variation, the rotated factor loadings for fiscal illusion variables were achieved.

On the basis of the rotated component matrix presented in Table 2, it has to be said that the first factor has high positive coefficients (loadings above 0,7) with the following variables: TotalR (0,759), Ltax (0,931), LocCtax (0,740), SSCt (0,915) and PsExpend (0,756). The factor first explains phenomenon of fiscal illusion through the prism of exceeding public revenues (TotalR) and social expenditures (PsExpend), labour taxation consisting of personal income taxes (Ltax) and social security contributions (SSCt), and the level of fiscal federalism (LocCtax) in the EU-19 countries. The second factor is represented by the group of institutional variables, such as: GovEffect (0,934), RQuality (0,899), RLaw (0,956) and CorruptC (0,936). In the case of the second factor, it seems evident that the size of fiscal illusion depends on the quality of formal institutions. Government effectiveness (GovEffect) understood as the quality of public services, regulatory quality (RQuality) perceived as the ability of the government to formulate and implement sound policies and regulations permitting and promoting private sector development, rules of law (RLaw) and control of corruption (CorruptC) are the most important among them.

The third factor builds: Dtax (0,767) and Capitaltax (0,891). It means that fiscal illusion appears along with the increase in direct taxation (Dtax) and especially capital taxation (Capitaltax). The fourth factor is determined by Intax (0,933), Ctax (0,931) and EduExpend (0,760). Taking it into account, we can say that the size of fiscal illusion is determined by indirect tax burdens, including consumption taxes, and what is more by the amounts spend on education. Finally, the fifth factor has high positive loading (above 0,7) only in the case of public debt (0,769).

Table 2. *Rotated component matrix for fiscal illusion variables*

	Components				
	1	**2**	**3**	**4**	**5**
GovEffect	-0,190	**0,934**	-0,095	-0,089	0,058
RQuality	-0,014	**0,899**	0,002	0,075	0,254
RLaw	-0,089	**0,956**	-0,097	-0,104	0,009
CorruptC	-0,200	**0,936**	-0,111	-0,054	0,053
TotalR	**0,759**	-0,238	0,566	0,124	-0,032
InTax	-0,078	-0,035	-0,076	**0,933**	-0,126
Dtax	0,283	-0,445	**0,767**	-0,135	-0,062
Ctax	-0,078	0,077	0,050	**0,931**	-0,058
Ltax	**0,931**	-0,227	0,125	-0,036	-0,021
Capitaltax	0,044	-0,120	**0,891**	-0,204	0,017
LocCtax	**0,740**	0,009	0,047	-0,130	0,045
SSCt	**0,915**	-0,095	-0,084	-0,089	0,037
TGovExpend	0,656	-0,086	0,353	0,135	0,598
GPublServ	0,193	0,160	0,691	0,182	0,550
EduExpen	-0,009	-0,178	-0,161	**0,760**	0,091
PsExpend	**0,756**	-0,180	0,391	-0,017	0,350
Deficit	-0,002	-0,209	0,143	0,102	-0,924
Debt	0,171	0,184	0,532	-0,134	**0,769**

Source: Own calculations: Extraction Method – Principal Component Analysis done in SPSS.

The next step was to calculate the intermediate indicators for factors from F1 to F5 according to the chosen procedure (using data from table 1 and Table 2). Each intermediate indicator is a weighted average of the normalised variables with a significant factor loading (greater than 0,7). For example, the first intermediate indicator is calculated as follows:

$$F1_{it} = \frac{0,759^2}{0,346} TotalR_{it} + \cdots + \frac{0,756^2}{0,346} PsExpend_{it}, \tag{4}$$

and so on until F5.

To measure the Fiscal Illusion Index (FII), the Fiscal Illusion Indicators were weighted in accordance with the formula:

(5)

$$FII_{it} = \frac{0,346}{0,869}F1_{it} + \cdots + \frac{0,067}{0,869}F5_{it}.$$

Table 3 presents the size of FIIs for the EU-19 countries which were divided into four groups depending on the value of index obtained in years 2004 and 2016[10].

Table 3. *The size of Fiscal Illusion Index in the euro area*

Year	2004				2016			
IIF	0-0,25	0,25-0,50	0,50-0,75	0,75-1	0-0,25	0,25-0,5	0,5-0,75	0,75-1
Country	EE	CY	DE	BE	EE	IE	DE	BE
	IE	MT	EL	IT	LT	LT	ES	EL
	LV	NL	FR		LU	MT	CY	FR
	LT	PT	AT			NL	SI	IT
	LU	ES	FI			SK	FI	PT
		SI						CY
		SK						AT

Source: *Own calculations.*

The data presented in Table 3 shows that in 2004 the lowest values of IIF were observed only in two countries of the old 15-E, such as: Ireland (IE) and Luxembourg (LU), as well as in the three Baltic States represented by Lithuania (LT), Latvia (LT) and Estonia (EE). The highest values of IIF were simultaneously noticed in Belgium (BE) and Italy (IT). It should be stressed that the size of the fiscal illusion phenomenon in the euro area countries increased significantly in 2016. This is evidenced by the fact that the group of countries with the lowest size of fiscal illusion has shrunk to three countries: Estonia (EE), Lithuania (LT) and Luxemburg (LU), while the number of countries with the highest values of index increased to seven. The group is mainly represented by Southern European countries, such as: Portugal (PT), Greece (EL), Italy (IT) and Cyprus (CY). In addition, France (FR), Belgium (BE) and Austria (AT) joined them in 2016.

Table 4 presents the comparison of Fiscal Illusion Index in years 2004 and 2016. It has to be emphasized that the estimated level of fiscal illusion increased significantly, except of Malta (MT), in the most of euro area countries.

---

[10]*The Fiscal Illusion Index, as a percentile ranking, shows how a country-year observation performs compared to the other country-year observations at its position. Following the assumptions, higher values of the index indicate higher level of fiscal illusion.*

Table 4. *Fiscal Illusion Index for 19-EU countries*

Countries	Fiscal Illusion Index (FII)			
	2004	2016	2016/2004	average in years 2004-2016
Belgium	0,846	0,915	0,07	0,872
Germany	0,502	0,623	0,12	0,613
Estonia	0,028	0,142	0,11	**0,07**
Ireland	0,07	0,275	0,21	0,302
Greece	0,628	0,999	0,37	0,849
Spain	0,295	0,656	0,36	0,442
France	0,672	0,931	0,26	0,809
Italy	0,831	0,988	0,16	**0,935**
Cyprus	0,36	0,805	**0,45**	0,526
Latvia	0,02	0,299	0,28	0,168
Lithuania	0,02	0,215	0,20	0,141
Luxemburg	0,07	0,19	0,12	0,159
Malta	0,47	0,397	**-0,07**	0,470
Netherlands	0,332	0,494	0,16	0,412
Austria	0,634	0,822	0,19	0,736
Portugal	0,38	0,903	**0,52**	0,701
Slovenia	0,356	0,749	0,39	0,519
Slovakia	0,32	0,34	0,02	0,240
Finland	0,522	0,729	0,21	0,574

Source: Own calculations.

The biggest increase in the value of the index was observed in Portugal (+0,52) and Cyprus (+0,45). In conclusion, the study revealed that in the analyzed period Italy (with the average value of FII at the level of 0,935) had the highest level of fiscal illusion against the background of the group, while the lowest level of fiscal illusion maintained in Estonia (FII reached the average value of 0,07).

7. Conclusions

Fiscal illusion as a multidimensional and not directly observed phenomenon is a subject of numerous theoretical and empirical studies. In the public finance literature, attention has mainly focused on five hypotheses (sources) of fiscal illusion: complexity of tax revenue system, income elasticity of tax structure, flypaper effect, renter illusion and debt illusion. The analysis of the above mentioned hypotheses proved that the misperception of individuals refers to the real amounts of government revenue and expenditure, and these are the consequences of the lack of transparency in public finance. Under the conditions of complicated revenue system it is difficult for taxpayer to estimate the tax-burden associated with public programs.

The literature indicates that the high income-elasticities of tax revenue additionally increase the problem of fiscal illusion and "automatically" lead to the increase in government expenditure. What is more, complex fiscal relations between central and local governments caused by decentralization of public finance are responsible for a new fiscal illusion which in known as flypaper effect. At the local level, another kind of fiscal illusion, identified as renter illusion, appears. It happens because renters are not usually conscious of the link between the level of local spending and the level of rent they pay. Apart from that it should be emphasized that the issue of fiscal illusion is often analyzed in context of increasing debt. If individuals pay no attention to their share in the liability represented by the public debt, debt illusion is a subject of analysis.

The paper highlights both the theoretical and the empirical aspects of fiscal illusion. Despite some methodological limits, which arise during the construction of fiscal illusion, the authors managed to build the index of fiscal illusion (FII) and estimate the size of fiscal illusion in the euro area countries in years 2004-16. For this purpose, a particularly valuable methodology of measurement implemented by Mourão (2007) was adopted. After the identification of the theoretical framework, eighteen variables have been chosen. Thanks to Multiway Principal Component Analysis the number of variables describing the phenomenon of fiscal illusion was reduced to five factors (principal components for fiscal illusion) which explained 87% of the total variation.

These five components were built on the basis of different measures/indicators that can be assigned to the selected dimensions of fiscal illusion that were presented by authors in the theoretical part of the paper. It is worth stressing that high positive loading (above 0,7) also appeared in the case of the variable identified with formal institutions (e.g., rules of law or government effectiveness). The results of the empirical analysis allows to indicate the interesting suggestion for future research. It seems that a special attention should be paid to the issue of the quality of institutions (both formal and informal) and their impact on the size of fiscal illusion. Moreover, the number of indicators characterizing the analyzed dimension should also be broadened. Calculation of the fiscal illusion indicators for five component factors, in line with the adopted formula, allowed the measurement of the Fiscal Illusion Index in the euro area countries. The case of Southern European economies, especially Italy and Greece, confirmed that the problem of fiscal illusion depends on the public finance discipline and is determined by institutional factors.

As a rule, countries with transparent and responsible fiscal policy based on various types of fiscal rules are less willing to increase public expenditure and have lower public debt. However, the study reveals that increasing public revenue caused by particularly high taxation of labour, embracing personal income taxes and social security contributions, as well as the increasing social expenditure are the most decisive factors responsible for the size of fiscal illusion in the euro area.

References:

Abbott, A., Jones, P. 2016. Fiscal illusion and cyclical government expenditure: state government expenditure in the United States. Scottish Journal of Political Economy, 63(2), 177-193.

Afonso, A., Hauptmeier, S. 2009. Fiscal behaviour in the European Union. Rules. Fiscal decentralization and government indebtedness. Working Paper Series, 1054/May, European Central Bank.

Afonso, W. 2015. The challenge of transparency in taxation. Mercatus Center, George Mason University.

Alesina, A., Perotti, R. 1996. Fiscal discipline and the budget process. American Economic Review Papers and Proceedings, 86, 401-407.

Alt, J., Lassen, D. 2006. Fiscal transparency, political parties, and debt in OECD Countries. European Economic Review, 50(6), 1403-1439.

Amusa, H., Mabunda, R., Mabugu, R. 2008. Fiscal illusion at the local sphere: An empirical test of the flypaper effect using South African Municipal Data, Financial and Fiscal Commission. Working Paper, 72.

Atkinson, A.B., Stiglitz, J.E. 2015. Lectures on public economics. Princeton, Princeton University Press.Baker, S.H. 1983. The determinants of median voter tax liability: an empirical test of the fiscal illusion hypothesis, Public Finance Quarterly, 11, 95-108.

Barr, J.L., Davis, O.A. 1966. An elementary political and economic theory of the expenditures of local governments. The Southern Economic Journal, 33, 149-165.

Beck, J.H. 1984. Nonmonotonic demand for municipal services: variation among communities. National Tax Journal, 37, 55-68.

Berger, B.R. 2016. The illusion of fiscal illusion in regulatory takings. American University Law Review, 66(1), 1-49.

Bergstrom, T.C., Goodman, R.P. 1973. Private demands for public goods, American Economic Review, 63, 80-296.

Bernoth, K., Wolff, G. 2006. Fool the markets? Creative accounting, fiscal transparency and sovereign risk premia. Deutsche Bundesbank Discussion Paper, 19.

Berry, W.D., Lowery, D.1987. Understanding U.S. government growth: an empirical analysis of the post-war era. New York, Praeger.

Boadway, R.W., Shah, A. 2007. Intergovernmental fiscal transfers: principles and practices. Washington, The World Bank.

Breeden, Ch.H., Hunter, W.J. 1985. Tax revenue and tax structure. Public Finance Review, 13(2), 216-224.

Brembeck, C.S. 1991. Congress, human nature, and the Federal debt: Essays on the political psychology of deficit spending. New York, Praeger.

Brogan, M. J. 2014. Modern budget forecasting in the American States: precision, uncertainty and politics. Lanham, Lexington Books.

Buchanan, J.M. 1960. Fiscal theory and political economy. Chapel Hill, The University of North Carolina Press.

Buchanan, J.M. 1967. Public finance in democratic process: fiscal institutions and individual choice. Chapel Hill, The University of North Carolina Press.

Buchanan, J.M., Wagner, R.E. 1977. Democracy in deficit: The political legacy of Lord Keynes. Indianapolis, Liberty Fund Inc.

Buehn, A., Dell'Anno, R., Schneider, F. 2015. Exploring the dark side of tax policy: An analysis of the interactions between fiscal illusion. CESifo Working Paper, 5466.

Caroll, D. 2009. Diversifying municipal government revenue structures: fiscal illusion or instability? Public Budgeting and Finance, 29(1), 27-48.

Carroll, D.A., Eger III, R.J., Marlowe, J. 2003. Managing local intergovernmental revenues: the imperative of diversification. International Journal of Public Administration, 26(3), 1495-1518.

Clotfelter, C.T. 1976. Public spending for higher education: an empirical test of two hypotheses. Public Finance, 31, 177-195. Craig, E.D., Heins, A.J. 1980. The effect of tax elasticity on public spending. Public Choice, 35(3), 267-275.

Crane, R. 1990. Price specification and the demand for public goods. Journal of Public Economics, 43, 93-106.

Creedy, J., Gemmell, N. 2002. The built-in flexibility of income and consumption taxes. Journal of Economic Surveys, 14, 509-532.

Creedy, J., Sanz-Sanz, J.F. 2010. Revenue elasticities in complex income tax structure: an application to Spain. Fiscal Studies, 31(4), 535-561.

Crescenzi, A. 2012. Beyond the Keynesian endpoint: crushed by credit and deceived by debt. How to revive the global economy? New Jersey, FT Press.

Cullis, J, Jones, P. 2009. Public finance and public choice: analytical perspectives. New York, Oxford University Press.

Cullis, J.G., Jones, P.R. 1987. Fiscal illusion and excessive budgets: some indirect evidence. Public Finance Quarterly, 15(2), 219-228.

Dalamagas, B.A. 1992. How vival are the Ricardian Equivalence proposition and the fiscal policy potency view? Scottish Journal of Political Economy, 39(4), 457-476.

Dalamagas, B.A. 1993. Fiscal illusion and the level of indebtedness: An International comparison. South African Journal of Economics, 61(1), 45-58.

de Magalhaes, S.T., Jahankhani, H., Hessami, A.G. 2010. Global security, safety, and sustainability. Braga, 6th International Conference ICGS3.

Debrun, X., Moulin, L., Turrini A., Yuso-i-Casals, J. , Kumar, M.S. 2008. Tied to the mast? National fiscal rules in the European Union. Economic Policy, 23, 299-362.

Dell'Anno, R., Mourão, P. 2012. Fiscal illusion around the world. An analysis using the structural equation approach. Public Finance Review, 40(2), 270-299.

Dell'Anno, R., Dollery, B. 2012. Comparative fiscal illusion: A fiscal illusion index for the European Union. MPRA Paper, 42537.

Dell'Anno, R., Martinez-Vazquez, J. 2013. A behavioral local public finance perspective on the renter's illusion hypothesis. International Center for Public Policy. Working Paper, 13-03.

Deroose, S., Moulin, L., Wierts, P. 2006. National expenditure rules and expenditure outcomes: evidence for EU Member States. WirtschaftspolitischeBlätter, 1, 27-42.

DiLorenzo, T.J. 1982. Tax elasticity and the growth of local public expenditure. Public Finance Quarterly, 10, 385-392.

Dollery, B.E.,Wallis, J.L. 2001. The political economy of local government: Market Failure, Reform and Leadership. In W.E. Oates (Ed.). Studies in fiscal federalism and state – local finance. Cheltenham, Edward Elgar.

Dollery, B.E., Wallis, J.L. 2001. Local government failure. UNE Working Paper Series in Economics. Working Paper 2001/11. Armidale, School of Economics, University of New England.

Dollery, B.E.,Worthington, A.C. 1995. State expenditure and fiscal illusion in Australia: A Test of the revenue complexity, revenue elasticity and flypaper hypotheses. Economic Analysis and Policy, 25(2).

Dollery, B.E., Worthington, A. 1996. The empirical analysis of fiscal illusion. Journal of

Economic Surveys, 10(3), 261-297.

Dollery, B.E., Worthington, A. 1999. Fiscal illusion at the local level: An empirical test using Australian municipal data, 75(228), 37-48.

Döring, T. 2015. Öffentliche Finanzen und Verhaltensökonomik: Zur Psychologie der budgetwirksamen Staatstätigkeit. Darmstad, Springer.

Dyson, K. 2014. States, debt, and power: 'saints' and 'sinners' in European history and integration. Oxford, Oxford University Press.

Ehrlich, S.D. 2011. Access points: an institutional theory of policy bias and policy complexity. New York, Oxford University Press.

Epple, D., Schipper, K. 1981. Municipal pension funding: A theory and some evidence. Public Choice, 37, 141-172.

Franzese, R.J. 2002. Macroeconomic policies of developed democracies. Cambridge, Cambridge University Press.

General government expenditure by function (COFOG). 2019. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_10a_exp&lang=en.

Gérard, T., Nngangué, N. 2015. Does fiscal illusion impact budget policy? A panel data analysis. International Journal of Economics and Financial Issues, 5(1), 240-248.

Giosi, A., Testarmata, S., Brunelli, S., Stagliano, B. 2014. The dimensions of fiscal governance as the cornerstone of public finance sustainability: a general framework. Journal of Public Budgeting, Accounting&Financial Management, 26(1), 94-139.

Gleich, H. 2003. Budget institutions and fiscal performance in Central and Eastern European countries. Working Paper, 215, European Central Bank.

Government deficit/surplus, debt and associated data, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_10dd_edpt1&lang=en.

Government revenue, expenditure and main aggregates, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_10a_main&lang=en.

Greene, K.V., Hawley, B.K. 1991. Personal income taxes, elasticities and fiscal illusion. Public Choice, 72, 101-109.

Gronberg, T.J. 1980. The interaction of markets in housing and local public goods: a simultaneous equations approach. Southern Economic Journal, 46, 445-455.

Hallerberg, M., Strauch, R., von Hagen, J. 2005. Fiscal rules in the European Union 1991–2001: Updating the von Hagen Fiscal Index, mimeo.

Hallerberg, M., Strauch, R., von Hagen, J. 2007. The design of fiscal rules and forms of governance in European Union Countries. European Journal of Political Economy, 23(2), 338-359.

Hameed, F. 2005. Fiscal transparency and economic outcomes. IMF Working Paper, WP/05/225.

Hames, D.L., Wills, D.T. 1987. Fiscal illusion and the grantor government in Canada. Economic inquiry, 25, 707-713.

Hanushek, E.A. 1975. The demand for local public services: an exploratory analysis. In J.E. Jackson (Ed.). Public needs and private behavior in Metropolitan areas. Cambridge, Ballinger.

Haug, P. 2009. Shadow budgets, fiscal illusion and municipal spending: the case of Germany. IWH-Discussion Papers, 9.

Hendrick, R. 2002. Revenue diversification: fiscal illusion or flexible financial management. Public Budgeting & Finance, 22(4), 52-72.

Henrekson, M. 1988. Swedish government growth: A disequilibrium analysis. In: J.A. Lybeck, M. Henrekson (Eds.). Explaining the Growth of Government. Amsterdam, North-Holland.

Heyndels, B., Smolders, C. 1994. Fiscal illusion at the local level: empirical evidence for the Flemish municipalities. Public Choice, 80, 325-338.

Heyndels, B., Smolders, C. 1995. Tax complexity and fiscal illusion, Public Choice, 85(1-2), 127-141.

International Country Risk Guide database, http://epub.prsgroup.com/products/international-country-risk-guide-icrg.

Kalb, A. 2010. Public sector efficiency: applications to local governments in Germany. Heidelberg, Gabler Verlag.

Kaufmann, D., Kraay, A., Zoido-Lobatón, P. 1999. Aggregating governance indicators. Policy Research Working Paper, 2195, The World Bank.

Kumar, M., Baldacci, E., Schaechter, A., Caceres, A.C., Kim, D., Debrun, X., Escolano, J., Jonas, J., Karam, P., Yakadina, I., Zymek, R. 2009. Fiscal rules – Anchoring expectations for sustainable public finances. Washington, D.C., Fiscal Affairs Department. International Monetary Fund.

Landers, J.R. and Byrnes P.E. 2000. Debt illusion among local taxpayers: an empirical investigation. The National Tax Association, 93, 187-194.

Lee, R.D., Johnson, R., Joyce, P. 2013. Public budgeting systems. Burlington, Johnes & Bartlett Learning.

Leyden, D.P. 2006. Adequacy, accountability, and the future of public education funding. New York, Springer.

Lovell, M.C. 1978. Spending for education: the exercise of public choice. The Review of Economics and Statistics, 60, 487-495.

Lybeck, J.A., Henrekson, M. (Eds.). 2014. Explaining the growth of government. Amsterdam, Elsevier Science Publishers.

Määttä, K. 2006. Environmental taxes: an introductory analysis. Cheltenham UK and Northampton, MA: Edward Edgar.

Martinez-Vazquez, J. 1983. Renter's illusion or savvy? Public Finance Quarterly, 11, 237-247.

Martinez-Vazquez, J., Harwood, G.B., Larkins, E.R. 1992. Withholding position and income tax compliance: some experimental evidence. Public Finance Review, 20(2), 152-174.

Misiolek, W.S., Elder, H.W. 1988. Tax structure and the size of government: an empirical analysis of the fiscal illusion and fiscal stress arguments. Public Choice, 57(3), 233-245.

Montiel, P.J. 2011. Macroeconomics in Emerging Markets. Cambridge, Cambridge University Press.

Mourão, P. 2008. Towards a Fiscal Illusion Index. MPRA Paper, 9760.

Mueller, D.C. 2003. Public choice III. Cambridge, Cambridge University Press.

Munley, V.G. , Greene, K.V. 1978. Fiscal illusion, the nature of public goods and equations pacification. Public Choice, 33(1), 95-100.

Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffman., A., Giovannini, E. 2005. Handbook on constructing composite indicators: methodology and user guide. OECD Statistics Working Papers, OECD Publishing.

Nicholson-Crotty, S. 2015. Governors, grants, and elections: fiscal federalism in the American States. Baltimore, John Hopkins University Press.

Nicoletti, G., Scarpetta, S., Boylaud, O. 2000. Summary indicators of product market regulation with an extension to employment protection legislation. OECD Economics Department Working Papers, 226.

Oates, W.E. 1988. On the nature and measurement of fiscal illusion. In: G. Brennan, B.

Grewal, P. Groenewagen, (Eds.). Taxation and fiscal federalism: Essays in honour of Russell Mathews. Sydney, Australian National University Press.

Oates, W.E. 2013. Financing the new federalism: revenue sharing, conditional grants, and taxation. New York – London, RFF Press.

Peacock, A.T. 1997. The political economy of economic freedom. Cheltenham, Edward Elgar.

Pommerehne, W.W., Schneider, F. 1978. Fiscal illusion, political institutions, and local public spending. Kyklos, 31(3), 381-408.

Population aged 25-64 by educational attainment level, sex and NUTS 2 regions (%). http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=edat_lfse_04&lang=en.

Puviani, A. 1903. Teoria della illusione Finanziaria. Palermo.

Rakow, C.E. 2016. Empirical advances in the study of the revenue diversification in the U.S. States. Theses and dissertations –public policy and administration, 21, https://doi.org/10.13023/ETD.2016.519.

Ratmanova, I., Wroblowsky, T. 2012. Fragmentation of Czech tax system as a source of tax illusion. Ostrava, 6th International Scientific Conference Managing and Modelling of Financial Risk.

Rizzo, I. 2012. The hidden debt. Dordrecht, Kluwer Academic Publishers.

Sanandaji, T., Wallace, B. 2010. Fiscal illusion and fiscal obfuscation: an empirical study of tax perception in Sweden. IFN Working Paper, 837.

Schaechter., A., Kinda., T., Budina, N., Weber, A. 2012. Fiscal rules in response to the crisis – toward the next generation rules. A new dataset. IMF Working Paper WP, 12/187.

Schokkaert, E. 1988. Fiscal preferences and fiscal knowledge at the local level. Journal of Economic Psychology, 9(1), 29-46.

Schwartz, A.E. 2004. City taxes, city spending: essays in honor of Dick Netzer. Cheltenham, Edward Elgar.Sterling, Ch. 2010. Managing software debt: building for inevitable change. Building for Inevitable Change. Boston, Pearson Education.

Storper, M. 2013. Keys to the city: how economics, institutions, social interaction, and politics shape development. Princeton and Oxford, Princeton University Press. Taxation trends in European Union. Data for the EU Member States, Island and Norway. European Union, Luxembourg 2018, DOI: 10.2778/025314.

Thompson, F., Green, M.T. 1998. Handbook of public finance. New York, Marcel Dekker.

Turnbull, G.K. 1998. The overspending and flypaper effects of fiscal illusion: theory and empirical evidence. Journal of Urban Economics, 44, 1-26.

Vickrey, W. 1961. The burden of the public debt: comment. American Economic Review, 51(1), 45-61.

von Hagen, J. 1992. Budgeting procedures and fiscal performance in the European Communities. Economic Papers, 96.

Wagner, R.E. 1976. Revenue structure, fiscal illusion and budgetary choice. Public Choice, 25(1).

Wallis, J.L., Dollery, B.E. 2002. Social capital and local government capacity. Australian Journal of Public Administration, 61(3), 76-85.

Wallis, J.L., Dollery, B.E. 2002. Wolf's model: government failure, and public sector reform in advanced industrial democracies. Policy Studies Review, 19(1), 177-203.

Winer, S.L. 1983. Some evidence on the effect of the separation of spending and taxing decisions. Journal of Political Economy, 91, 126-140.