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Fiscal decentralization in Central and Eastern Europe

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Abstract

The paper analyses the level of fiscal decentralization (FD) in selected countries of European Union for 2014 year. The empirical analysis was based on the method of multicriteria decision-making. Method of Simple Additive Weighting (SAW) was used as framework for the analysis. In order to evaluate the different level of fiscal decentralization, the same analysis was applied to subsets of countries categorized into two groups - Central and Eastern Countries. The empirical results show that developed countries of European Union has higher degree of fiscal decentralization than countries of Eastern and Central Europe. These results show that local government of developed countries (such like Sweden or Denmark) has more power for financial solutions then developing countries (Estonia or Poland). Fiscal decentralization index in Lithuania is the lowest among 14 countries of European Union. Originality of this article that was used new fiscal decentralization index, which consists of 26 indicators.

Keywords: local government, index of fiscal decentralization, multicriteria method.

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1. Introduction

The decentralization of public services and their financing is high on the economic agenda and has triggered a growing interest in measurement issues. Fiscal decentralization has become an interesting topic until today because researches about fiscal decentralization are not only considered from the economic perspective, but also from other perspectives such as politic, geographic, other subjects. Appropriate indicators can help governments compare, diagnose and reform intergovernmental fiscal frameworks as well as assess the outcome of past reforms. They can help assess whether and to what extent decentralization fosters economic growth, raises the public sector efficiency or contributes to macroeconomic stability. The issue has attracted the attention of both academics and international institutions such as OECD(2013) andthe World Bank. Most of the research works were evaluated only some parts of fiscal decentralization (revenue or/and expenditure), but in this research work was used Multiple Criteria Decision Making (MCDM) method - SAW, was evaluated all fundamental principles of fiscal decentralization and be calculated the index of fiscal decentralization.

In recent years, multicriteria decision-making methods were widely used in solving theoretical and practical problems in social sciences. Multicriteria decision-making methods are universal because they allow evaluating any complicated object described by a set of criteria. Another advantage of multicriteria decision-making methods are their ability to combine both - maximizing and minimizing criteria expressed in various dimensions into the index. The criteria of maximizing implies that, if values are growing, the situation is getting better, while for criteria of minimizing means situation of worsening. The combination is achieved by normalization which helps to convert all the values of criteria into non-dimensional, i.e. comparable quantities (Ginevicius & Podvezko, 2007). Many similar evaluations, involving various technical, social, economic and other problems have been solved: construction contracts evaluation (Podvezko, Mitkus & Trinkuniene, 2010), evaluation of enterprise marketing activities (Ginevicius, Povezko & Ginevicius, 2013), evaluation of financial stability of Lithuanian banks (Brauers, Ginevicius & Podviezko, 2014), the effect evaluation of the state subsidies on business (Gineviciu &Bruzge, 2013),evaluation of the critical success factors for construction projects (Gudiene, Banaitis, Podvezko & Banaitiene,2014); strategic evaluation of networking of a higher education institution (Nugaras & Ginevicius, 2015), quantitative evaluation of quality management systems' processes (Ginevicius et al., 2015), evaluation implementation of electric rail transportin Vilnius city (Bureika & Steisunas, 2015), evaluation of commercial industrial zone development (Komarovska, Ustinovicius, Sevcenko & Nazarko,2015), evaluation business project sustainability in the construction industry (Dabrovolskiene & Tamosiuniene, 2016), evaluation of electricity generation technologies (Streimikiene, Sliogeriene & Turskis, 2016). Evaluation of fiscal decentralization is a new object for using Multiple Criteria Decision Making method.

The purpose of this article is to analyze literature of fiscal decentralization and evaluate with multicriteria decision-making method the fiscal decentralization level in Central and Eastern Europe and compare with other Europe countries.

The following goals have been set to achieve stated object:

- to review the literature of fiscal decentralization and choice of criteria of evaluation of fiscal decentralization;
- to evaluate with multicriteria decision-making method (Saw) the level of fiscal decentralization in Central and Eastern Europe and compare with other Europe countries.

Research methods. Review of scientific literature, introduces the methodology of evaluation of fiscal decentralization, analyze of statistical data.

2. Theoretical concept of fiscal decentralization

The fiscal decentralization concept could be understood in several terms. Understanding the concept of fiscal decentralization is depends on the context of using the fiscal decentralizationterminology. Some scholarly concepts have defined a fiscally decentralized system which means that central government delegates authorities and responsibilities or transfer functions to local government regarding to financial aspects. The aspects are how to share responsibilities and revenue sources between the central government and local government (provincial and district level). Another aspect is related to the decision of the amount of authorities and responsibilities transferred to local government in order determine local expenditure and revenue (Davey, 2003). In line with Bocshman (2009) also argue that authorities given to local government are intended to make a proper decision in allocating financial resources. Reviewing the relevant literature, 1 Table provide the variety of definitions of fiscal decentralization.

Table 1. Variety of Definitions of Fiscal Decentralization (source: compiled by author)

Author	Definition
Akai and Sakata (2002)	define fiscal decentralization as devolution of the authority associated with decision making has been allocated on the basis of legal to a lower-level government. To measure fiscal decentralization, it is necessary to know the degree of devolution or the level of authority of the lower-level government. Authority associated with decision-making relationships between higher and lower-levels government. However, it is difficult to measure the allocation of authority quantitatively.
Yulinda (2012)	fiscal decentralization considers a transfer of responsibility associated with accountability to local governments. He maintains that fiscal decentralization is considered as the potential of local governments to increase tax revenues, and make a decision how to allocate their monetary resources on various projects within the legal boundary.
Albonoz, Cabrales (2013)	fiscal decentralization is the devolution by the central government to local governments (states, regions, municipalities) of specific functions with the administrative authority and fiscal revenue to perform those functions.
Szarowska (2014)	fiscal decentralization is linked to sharing of fiscal responsibilities and power among central, state and local governments.

Furthermore to expand the concept of fiscal decentralization, it was explained by Beer-Toth (2009) that fiscal decentralization including three elements namely local expenditure, revenue, and budgetary autonomy. There are three forms of fiscal decentralization that can be undertaken by a particular government; deconcentration is the transfer of responsibilities within a central government to regional branch offices or local administrative units, delegation is when local governments act as agents of the central government and devolution occurs when implementation and the authority of decision-making are transferred to local governments (Bird & Vaillancourt, 1998). In the case of Bolivia, a fiscal authority has been a combination of delegation and devolution from the central government to local governments. Implementation and evaluation of fiscal decentralization within a country must take into consideration numerous areas. Boex (2001) has defined the four main “pillars” of fiscal decentralization as an assignment of expenditure responsibilities, assignment of tax resources, intergovernmental fiscal transfers and subnational deficits, borrowing and debt financing. Within assignment of expenditures, it is critical to establish whether a local government can determine expenditures for itself or if the central government**.** Those of elements interacts each other, so the main problem - how to evaluate the level of fiscal decentralization. In the second part will be a present measurement of fiscal decentralization and methodology of evaluation of fiscal decentralization.

3. Measurement of fiscal decentralization and methodology

In attempt to examine the level of fiscal decentralization, it is needed the measurable indicators which can explain the degree of fiscal decentralization. Unfortunately, since fiscal decentralization has varying dimensions with complicated characteristic, it requires effort to quantify the measure of fiscal decentralization. To capture the magnitude of fiscal decentralization degree, fiscal instruments such as expenditure and revenue are considered in calculation rather than fiscal policy. Schneider (2003) pointes out a reason why expenditure and revenue are decided to quantify fiscal decentralization. He stated that the primary part of fiscal activities is formed by expenditure and revenue. In addition to, when fiscal policy is considered to use in measuring fiscal decentralization, it is more complicated. This is because fiscal policy is resulted from both formal and informal institutions. Therefore, it is appropriate to involve both of them as component in measuring of fiscal decentralization. In short, standard measurement of fiscal decentralization is based on expenditure and revenue ratio. The measurement fiscal decentralization from expenditure is defined share of local government expenditure to total government expenditure. While from revenue, the indicator is determined as share of local government revenue to total government expenditure. Akai and Sakata (2002) clarified both measurements. Indicator which is calculated from expenditure represents the authority of local government in order to make a decision related to type of expenditure. However, revenue indicator explains the right of local government for collecting own revenue (tax collection). The most widely used statistics in the empirical studies of fiscal decentralization are the shares of local government revenue and expenditure in total revenue and spending. In the early study of fiscal decentralization, Zhang and Zou (1998) used the ratio of provincial spending to central spending in per capita terms in measuring the degree of fiscal decentralization. Likewise, Davoodi and Zou (1998), Xie, Zou and Davood(1999), and Iimi (2005) have used the local government share of total government spending to measure fiscal decentralization. Akai and Sakata (2002) also used fiscal decentralization indices such as the shares of local government revenue and expenditure in a total state budget. Reviewing the relevant literature (see Table 2.) provide the variety of measurement of fiscal decentralization.

Table 2. The variety of measurement of fiscal decentralization (source: compiled by authors)

Authors	Formula	Measure
Eyraud, Lusinyan (2011); Escolado et al. (2012)	SNG own revenue/GG revenue	Revenue Decentralization indicator (RDI)
Eyraud, Lusinyan (2011);Escolado et al. (2012)	SNG expenditure/GG expenditure	Expenditure Decentralization indicator (EDI)
Stegarescu (2005)	SNG own revenue/SNG revenue	Revenue Autonomy I
Martinez-Vazquez, Tomofeed (2009)	SNG own revenue/SNG expenditure	Revenue Autonomy II
OECD (2013)	OECD database	Local Tax autonomy
Akai, Sakata (2002)	Arithmetic mean of RDI and EDI	Production Revenue Indicator
Vo (2008)	Geometric mean of fiscal autonomy and fiscal importance	Fiscal Decentralization Index
Martinez-Vazquez, Timofeev (2009)	RDI/(1-EDI)	Composite Ratio
Rao, Singh (2002)	Transfer/GG revenue	Intergovernmental fiscal transfer indicator (I)
Rao, Singh (2002)	Transfer/GG expenditure	Intergovernmental fiscal transfer indicator (II)
Bahl, Wallace (2007)	Transfer/CG expenditure	Intergovernmental fiscal transfer indicator (III)
Rodden (2002),Baskaran (2011)	Transfer/SNG revenue	Intergovernmental fiscal transfer indicator (IV)
Jin, Zou (2005),Eyraud, Lusinyan (2011)	Transfer/SNG expenditure	Intergovernmental fiscal transfer indicator (V)
Rodden (2002),Octavian (2012),Hooghe et al. (2015)	Questionnaire	Borrowing autonomy index

Note: GG – government; SNG – local government

The first step of multicriteria decision-making method evaluation is to do hierarchically structured framework of fiscal decentralization. Reviewing the relevant literature, 1 figure provide hierarchically structured framework of fiscal decentralization indicators of a country.

The evaluation model of fiscal decentralization can be shown in this way:

$$I = \omega_1 V_1 + \omega_2 V_2 + \omega_3 V_3 + \omega_4 V_4, \quad (1)$$

Quantitative multicriteria decision-making methods are based on the criteria matrix, describing the compared object, statistical data or estimates of experts R = $||r_{ij}||$ and the weights of criteria ω_i, i =1,...,m; j =1,...,n, where m is the criteria number, n – the objects number (alternatives) compared.

Methods differ in their complexity. SAW (Simple Additive Weighting) is the most widely used method. Simple Additive Weighting method is one of the most understandable and the simplest method. The quantitative assessment of the country of fiscal decentralization may also be done by applying a multicriteria decision-making method model based on the SAW (Simple Additive Weighting) method (Hwang, Yoon, 1981):

$$E_j^{SAW} = \sum_{i=1}^{n} w_i \tilde{q}_i \quad (2)$$

where E_j^{SAW} - the value of the quantitative assessment applying the SAW method of the country of fiscal decentralization of an analysed phenomenon j (region, country, country's region, etc.); w_i - the indicator I weight; $\tilde{q}_i$ - the normalized value of indicator.

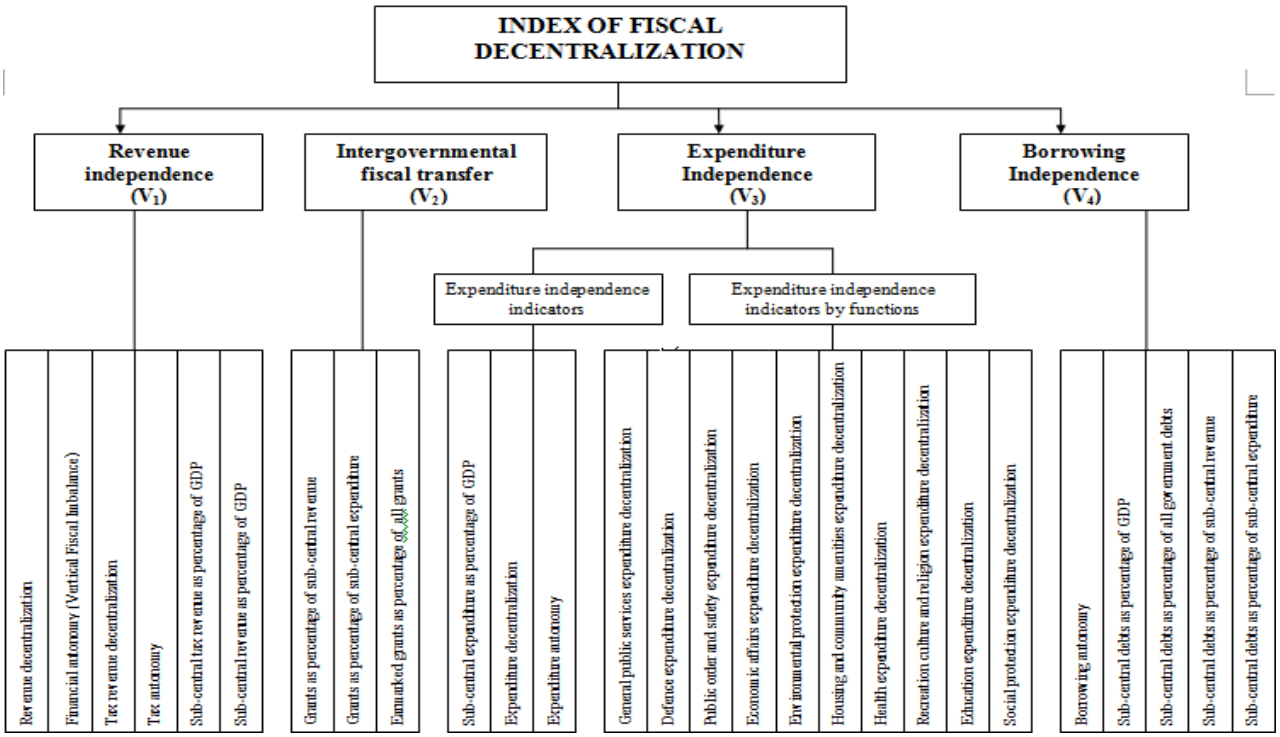

Figure 1. Hierarchically structured framework of fiscal decentralization indicators of a country (source: compiled by author).

The multi-criteria assessment SAW method requires the nature of change of all indicators to be the same, i.e. all of them need to be maximizing or minimizing.

Maximization or minimization of indicators values is performed in the following ways (Hwang, Yoon, 1981):

$$q_i^{\max} = \frac{q_{i\min}}{q_i} \quad \text{(a)} \qquad q_i^{\min} = \frac{q_i}{q_{i\max}} \quad \text{(b)} \qquad (3)$$

where $q_i^{\max}$ - the maximized value of indicator i; q_i - the value of indicator i; $q_{i\min}$ - the lowest value of indicator i for all regions; $q_i^{\min}$ - the minimized value of indicator i; $q_{i\max}$ - the highest possible value of indicator i for all countries.

We need to determine the country of fiscal decentralization of an individual country; therefore, we should perform normalization employing the ESP method (Ginevicius et al*.,* 2011; Ginevicius et al., 2015):

$$\tilde{\tilde{q}}_i = \frac{q_i}{q_{i\max}}; \qquad (4)$$

where $\tilde{\tilde{q}}_i$ - the normalized value of indicator i; $q_{i\max}$ - the highest value of indicator i (obtained from statistical data or established through expert assessment). In this case, the value of the indicator $\tilde{\tilde{q}}_i$ for the analyzed country does not depend on the values of the same indicators of other countries.

Indexes weights can be determined in two main ways: direct and indirect. The first way is suitable when the number of evaluated indexes is not big – till some (Ginevicius & Podviezko, 2007). Experts determine the weights of indexes in parts of a unit at once. This technique is very simple, understandable and convenient to apply. When the number of evaluation indexes increases, it becomes problematic to apply it. The reason is that it is harder for an expert to determine the correlated relations of indexes weights from the point of view of an examined phenomenon. At the same time, the incompatibility of opinions grows which often exceeds allowable limits. The best-known one is T. Saaty hierarchy analysis method (Saaty, 1980; Ferreira, 2013; Aghdaie, et al*.*, 2013). In this case, the experts compare only two indexes, but not all at once. The other one which is less widespread for the present, named FARE method, is also grounded on reciprocity of indexes. On the basis of minimal initial information about the main index influence on other system indexes, the interrelations and strength of all the rest indexes are determined by applying an analytical technique. It allows to form completely coordinated matrix of indexes interactions and to calculate the weights of a larger number of indexes considerably more accurately.

The weight values can be used in further multicriteria evaluation, provided that experts' judgments are consistent (in a concordance). The concordance level can be determined by Kendall's concordance coefficient W (Kendall, 1970):

$$W = \frac{12S}{r^2 m(m^2-1) - r\sum_{j=1}^{r} T_j} \quad \text{(a)} \quad \chi^2 = Wr(m-1) = \frac{12S}{rm(m+1)} \quad \text{(b)} \qquad (5)$$

where r is the number of experts, m – the number of the criteria considered.

In fact, the concordance degree of experts' estimates is determined by the value χ^2 rather than the concordance coefficient W (Kendall, 1970). It has been shown (Kendall, 1970) that if the value of χ^2 calculated by formula (5b) is larger than its critical value χ^2_{kr} taken from the distribution table of $\chi^2$with

ν = m – 1 degree of freedom and the significance level α chosen to be close to zero, then the statistical hypothesis about expert estimates' consistency is adopted.

4. Level of Fiscal decentralization in selected Central and Eastern Europe

The main purpose of this section is to calculate the local government revenue autonomy index for a range of developing and developed Europe economies to facilitate subsequent investigations of the relationship.

For research was selected these Eastern and Central Europe countries - Estonia, Latvia, Lithuania, Poland, Slovakia, Slovenia, Hungary – developing countries. Other developed Europe countries (The United Kingdom, Denmark, Netherlands, France, Finland, Sweden and Luxembourg) were selected to make a comparison between developing Eastern and Central Europe countries. Data was taken from Word Bank, OECD, Eurostat and calculated (3 table).

Table 3.Calculated fiscal decentralization indicators of Europe Countries (source: compiled by author)

Indicators	V_1	V_2	V_3	V_4	Indicators	V_1	V_2	V_3	V_4
Countries					Countries				
Eastern and Central Europe countries Developing countries					Other Europe Countries Developed countries				
Estonia	0,33	0,74	0,40	0,68	United Kingdom	0,49	0,49	0,48	0,48
Latvia	0,63	0,79	0,44	0,35	Denmark	0,85	0,20	0,72	0,52
Lithuania	0,26	0,45	0,43	0,37	Netherlands	0,59	0,43	0,57	0,80
Poland	0,51	0,64	0,56	0,37	France	0,64	0,76	0,51	0,65
Slovakia	0,43	0,57	0,33	0,31	Finland	0,82	0,71	0,68	0,66
Slovenia	0,45	0,73	0,33	0,34	Sweden	0,91	0,66	0,73	0,45
Hungary	0,48	0,55	0,36	0,16	Luxembourg	0,49	0,55	0,36	0,58

The weights of fiscal decentralization of the country were determined by interviewing experts. The estimates of all criteria (1 Figure) provided by 10 experts from different countries (such like Australia, Italy, Rumania, Slovenia and other, see 4 table).

Table 4. Experts by countries (source: compiled by author)

Expert	1	2	3	4	5	6	7	8	9	10
Country										
Austria									+	
Italy	+									
Lithuania				+				+		+
Portugal							+			
Rumania		+	+							
Slovenia					+					
Turkey						+				

The concordance coefficient W = 0.74 was calculated by a formula (5a). The value of χ^2 = 33.25 calculated by formula (5b) exceeds the critical value χ^2_{kr}= 11,07 with the significance level α = 0.05. It shows that experts' judgments are consistent and the criteria weights (5 table), calculated based on expert estimates can be used in the multicriteria evaluation.

Table 5. Weights of fiscal decentralization indicators of the country (source: compiled by author)

Name of indicators	Autonomy of revenue (V_1)	Intergovernmental fiscal transfer (V_2)	Autonomy of expenditure (V_3)	Autonomy of borrowing (V_4)	Total
Weight of the indicator	0.378	0.161	0.289	0.172	1.0

In the last step (formula 1) the index of fiscal decentralization in selected Europe countries was calculated (see Figure 2).

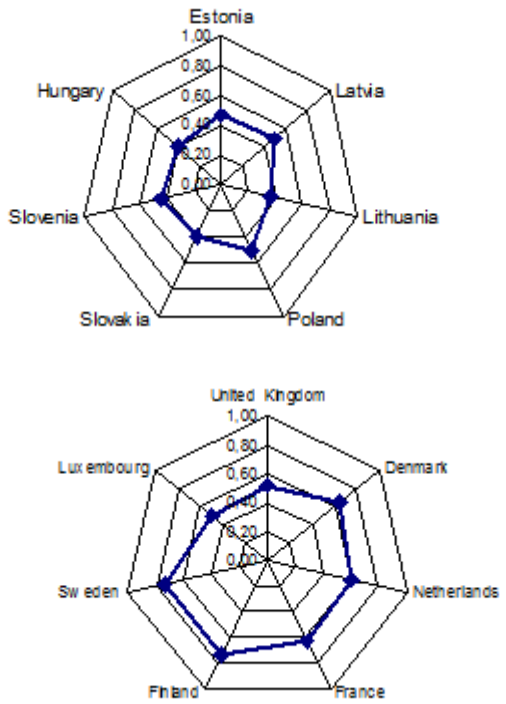

Figure 2. (a) developing Eastern and Central Europe countries; (b) Developed Europe countries (compiled by author)

Calculation results are shown in 2 figure for developing Central and Eastern Europe countries (a) and developed (b) other Europe countries. As seen in Figure 2 a, the highest index of fiscal decentralization of Eastern and Central countries has Latvia (0.49) and lowest in Lithuania, only 0.36. In contrast to the situation in the developed countries, where fiscal decentralization index is high then 0.5 (see Fig. 2 b.) fiscal decentralization index range from as high as 0.75 in Sweden and less 0.52 in Luxembourg. Fiscal decentralization index in Lithuania is the lowest among 14 selected Europe countries.

5. Conclusions

Multicriteria evaluation methods have been used in Lithuania for more than 30 years. At first, they were used for solving technological problems in construction. Their universal nature allowed to start applying them later in analyzing socioeconomic systems, especially in quantitative evaluating of the processes which have such nature and for evaluation of expressions position. Evaluation of fiscal decentralization is a new object for using multicriteria evaluation methods.

The degree of fiscal decentralization of Europe countries in developed countries is higher than in developing Central and Eastern Europe countries. These results show that local government in developed countries (such like Sweden, Denmark and other) has more power for financial solutions then in developing countries (Estonia, Poland and other). Fiscal decentralization index in developed countries range from 0,75 till 0,52 (0.75 in Sweden and less 0.52 in Luxembourg). Fiscal decentralization index in Lithuania is the lowest among 14 Europe countries.

The principles of the integrated evaluation of fiscal decentralization were developed and the methodology integrating the qualitative analysis methods is fiscal decentralization indicators, scenarios analysis, and complex quantitative evaluation was offered. Quantitative evaluation is based on the concept of fiscal decentralization as an aggregate of components and the use of a model created by applying formalization and multicriteria evaluation methods.

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