The impact of incomplete decentralisation on the quality of local public expenditures in Poland

Objectives,

The goal of this project is to study in quantitative terms the consequences of partial (or incomplete) decentralization on the quality of local governments' spending policy, where partial decentralization, is defined as centrally imposed constraints over the size and structure of local revenues and expenditures.

During the recent decades, in many countries a growing number of public task have been transferred to local governments (the process slowed down with the crisis of 2008). A full decentralization is a rare phenomenon though. The discretionary powers of the local authorities over their revenues and expenditures are limited by - among others - the central regulations that define the tasks which have been transferred to the local governments or the significant share of transfers from the central government in local revenues (Bach, S. et al., 2009, EU, 2013). Poland is by no means an exception. While the responsibility to supply selected public goods has been transferred to the local governments, the local authorities are also obliged to comply with the arbitrarily determined manner of manufacturing and financing of these goods. During the recent years, these obligations seems to be more and more important (see Raport o stanie..; 2013).

Therefore, the scope of decentralisation in Poland – similarly to other countries - is limited, yet, there are no quantitative analyses of the effect if these limitations on the local governments' spending policy. The evaluation of the impact of these limitations on the quality of public spending in Poland – which is the main goal of this project - can be an important argument in the public debate about the structure of Polish local finance, but will also provide an interesting contribution to the international literature.

The purpose of this project is to verify empirically the following hypotheses

Hypothesis 1

Centrally imposed restrictions on municipalities' expenditures have an impact on the "preference matching". This problem applies to both -the local spending limited by the central rules, as well as to these items of local expenditures that are not a subject to such limitations, .

Hypothesis 2

The limits imposed on decentralization have a negative impact on the efficiency of local expenditures, where efficiency is defined as the ratio of the level of inputs to the quantifiable results.

Hypothesis 3

Limitations of revenue and expenditure autonomy of local governments are a barrier to long-term local development.

Significance,

The topic of the project is a part of a broad theme belonging to the economics of the local government, based on the theories of fiscal federalism, more specifically this project is rooted in two generations of these theories. The first generation refers to the neoclassical economics, the second is formed by studies that introduce theories and insights from other sciences than the public finance – in particular the ones related to the new institutional economics. These two generations seem to be linked by the public choice theory (Oates, W., 2005; Vo, H.D., 2007: Quian, Weingast, 1997).

According to the model solutions, the local government's expenditure should be financed with local taxes, which binds the costs and the benefits arising from the provision of public goods by local governments. Such a structure of the local government causes local goods to be delivered in response

to the preferences of the citizens (and thus improves the allocative efficiency), while the mechanisms of competition between local governments and the social control of the actions of local authorities improves production efficiency. (Oates, W., 1972; Tiebout, Ch., 1956).

However, in practice, a full decentralization, defined as a complete autonomy of local governments in determining the size and structure of their spending and their revenues, does not exist. It is associated with the following problems in the shaping of revenues and tasks of local governments (cf e.g. Oates, W., 1999; Swianiewicz, P., 2011; Kornberger-Sokołowska, E., 2001):

- constraints and territorial diversity of the local tax base, which leads to significant disparities among local governments and therefore requires adjustment in accordance with the redistributive function of the state,

- need for stabilization policy tools to be held in the hands of the government,

- big scale of public tasks the production of which is local in nature but the results goes beyond the local government (e.g. implementation of the tasks related to education, health care, environmental protection).

The existence of the problems requires the State's intervention – and, therefore, limiting the decentralization by:

- additional financing of local budgets by general grants and of specific tasks by categorical grants,

- introduction of orders as to the quantity and quality of the goods supplied by local governments,

- determining the desired level of revenue and expenditure,

- limiting the freedom of local governments in shaping local taxes.

Limitation of decentralization affects the autonomy of the policy of local governments, which therefore affects the results of decentralizatin. The issue of assessment of the decentralization results is associated with the problem of:

1. Measuring the degree of autonomy in terms of revenue and in terms of expenditure, enjoyed by local government units.

2. Defining and measuring the quality of local spending policy.

The analyses conducted within the planned project will focus on the quantification of the effects of incomplete decentralization in three areas: - allocative efficiency, cost efficiency and their long-term consequences, summarized by the indicators of local development.

The analysis will be conducted at the municipal level in Poland. Although the study will focus on the experiences of Poland, our research should be also relevant for the international community. While the is a rich international literature on the effect of partial decentralisation, still some important research areas have been left out. For example, there is a gap in the literature with regard to the impact of partial spending decentralisation and its impact on the relatively unregulated part of local expenditures. Our research aims to fill this gap.

The most important topics undertaken in the project will be (1) the discussion of theoretical and empirical analyses on: measures of revenue and especially expenditure autonomy at the local level, (2) the assessment of allocative efficiency (2) measuring of cost efficiency (3) an assessment of the local development Below we briefly discuss each of these topics.

1) Measurement of revenue and expenditure autonomy

Autonomy in terms of local revenue may be assessed by analysing the structure of the local government's revenue. There are two approaches possible. The first approach is to determine whether and how much freedom the local government enjoys in determining its revenue and its spending. The least independent type of revenue are categorical grants, closely followed by general grants. The

second approach is to develop indicators of autonomy which evaluate the shares of less independent revenues and of more independent revenues in the local government's budget. (Kornberger Sokołowska, E., 2001)

As opposed to autonomy in terms of revenue, the autonomy in terms of expenditure is more difficult to quantify. In international studies, measures of the level of local government expenditure autonomy are usually defined as a share of local expenditure in public spending, or the share of expenditure referred as own local expenditures (eg, after deducting grants) in public spending or local government expenditure. Yet, all of these measures are imperfect. They are based only what expenses are executed locally, yet they do not indicate the extent to which the decision to spend is the result of local discretion. Rules restricting the autonomy of local governments may concern eg. the quality or quantity of the factors of production of goods and services, the size and quality of the output, the degree of local control measures.

Other measures of level of expenditure autonomy, used in in studies of individual countries are the amount of earmarked grants (eg Borge et.al, 2012). Indeed, if the central government sets limits on local expenditures, should also be directed to these minimum spending targeted revenues. This is consistent with the adequacy principle. However, such grants are not always correspond exactly to the minimum expenditure, and sometimes there are no special grants for centrally defined expenditures. This means that the commonly used measure of self-reliance of local expenditure, which is the share of grants in the income of local government, is imperfect. It is also proposed a variety of synthetic and other indicators. However, the problem is that, depending on what the decentralization measure is used, requests for its effects are different (Ebel, RD, & Yilmaz, S., 2002; Stegarescu, D 2005).

Yet another method of assessing the autonomy of local governments, is to analyse the discrete changes in this autonomy that happen as a result of changes in the law or central regulations. If in a given year the central government introduces rules that harden or lessen local expenses' independence, one can compare the spending policies of local governments before and after this change. This is an indirect way of assessing the impact of the expenditure autonomy. It is therefore a method similar to the "natural experiment" that allows to bypass the difficulties associated with the quantification of the level of expenditure autonomy of local authorities. As in Poland, an important for local budgets change occurred at least twice (as discussed below), the planned project will also conducts studies using this method. As this methodology is valued highly in the international literature, these analyses will probably be of interest to Polish as well as international specialists.

Determining the degree of decentralization is, as it has been shown above, a difficult task. The Polish scientific literature features quite a lot of analyses that attempt to assess the autonomy in terms of revenues. For example , the indicator analysis of Jastrzębska (2007) or of Heller and Farelnik (2013) concentrate on the revenue autonomy of the local units and look for the causes of the differences among local governments. Yet there are almost no studies that analyse the consequences of limiting the local autonomy for the structure and quality of public spending at the local level. The notable exceptions are: Herbst et al 2009 for education and Jakubowski&Topinska 2009 for social services).

The proposed project's aims to fill this gap in the Polish literature. Naturally, studies devoted to analysing the decentralisation at the level of a single country are common, and from this perspective our project will constitute another piece in this literature. But due to the different institutional arrangements in each country, it is difficult to incur a full description of the consequences of partial decentralization in one country, based on the experiences of other countries. In other words –trends are predictable on the basis of the existing international literature, but more detailed conclusions can be formulated based solely on the experience of the specific country. Because such studies for Poland are missing, a consistent discussion on the effects of incomplete decentralization in our country is impossible. We aim to fill this gap

However, to implement such a research for Poland, indicators and methods to assess the quality of local governments' spending need to be clearly defined.

2)   Evaluation of the allocative efficiency

Allocative efficiency, otherwise called "preference matching" means that public expenditures are carried out in accordance with the preferences of the inhabitants. The basis for assessing that match is to determine the demand function for local residents good. The classical solution is the so-called median voter model. In terms of independent local governments, the "median voter" decides on the expenditure made locally. In the literature it is a common practice to implement the average characteristics if the local citizens and the local units in order to proxy for the median voter preferences. Among these factors are: income, the share of local taxes defined as the price for local good, the size of local government which allows the differentiation of the cost scale and finally socio-economic characteristics that are responsible for differences in the tastes of the local population (Bergstorm T, Goodman R. 1973 T. Borcherding Deacon R. 1972).

It should be stress that in these analyses, it is not intended to quantify the allocative efficiency. but to verify the magnitude of the impact of preferences on the size and structure of expenditures. If the variables characterizing the inhabitants do not explain differences between local governments spending, it means that the median voter's preferences have not shaped the expenditures. In particular, if the expenses are mainly due to the amount of transfers or reflect the minimum necessary expenses related to the necessary costs, this means that we have to deal with limited effectiveness of allocation associated to incomplete decentralization.

As the research described in the world literature shows, the degree of autonomy has important implications for the structure and efficiency of spending at the local level. Where the autonomy in terms of revenue declines, the flypaper effect follows. As shown by Gramlish (1969), the income flexibility of general grants is higher than that of own revenues of local governments. The subsidy will, therefore, affect all the expenses of local governments, leading to their higher level than in the case of revenues being based on taxes only. This means that "public money sticks to public spending".

Specific grants are source of financing (or additional financing) of tasks indicated by the donor, but a strong influence of these grants can be observed, also on the other tasks. Empirical analyses show that a "push-out" effect occurs, and therefore spending on other local tasks, which are not subject to grants is cut. This may mean that the substitution effect is stronger than the revenue effect. On the other hand, public spending is characterized with low price elasticity. Thus, in practice grants often raise "other" expenses of local governments, not supported with a grant (the income effect prevails). In particular this may mean that, if it was not for grants, the local revenues which otherwise would be spent on the implementation of a task subject to the grant "leak out" to other tasks (Knight, B., 2002; Otim, S., 1996; Dahlberg, M. et. al., 2008)

The following group of analyses relates to the impact of a change in the grant and subsidy level on the local government spending (Gramkhar, S., 2002, p. 22). No consistent results as to the forces of response can be observed here. Some studies show that a reduction of transfer will result in a decline in the public spending, however, a much smaller one than in the case of growth. Which means that transfer money is replaced with the funding of local governments (fiscal replacement). On the other hand, papers can be found which indicate that the decrease of expenditure is stronger than in the case of an analogic increase. In both cases, this means that changes in the level of grants and subsidies affect not only the subsidized local government spending but the entire budget as well - including the fully decentralized tasks. (Levaggi, R., Zannola, R., 2003; Gramkhar, S., Oates, W., 1996; Darby, J., Muscatelli, V., Roy, G., 2005).

As mentioned earlier, the presence of grants in local budgets is primarily an expression of limitation of income autonomy. However, some studies also include indicators that aim at approximation of expenditure autonomy, but such studies are rare. An interesting study was conducted by Solé-Ollé (2009) who used difference in differences method – which helps to avoid the problem of quantification of autonomy – to show an impact of changes involved in centralization or decentralization reforms on the expenditure affected by the reforms. Conclusions of Solé-Ollé (2009) from research with the application of the method confirm that decentralization improves adjustment of services to the local needs.

Therefore, the concept of this type of research which we plan to implement in the project (impact of changes in local expenditure autonomy on the preference matching principle) will supplement this small number of international studies

3)   Evaluation of the cost efficiency

The theory of decentralization assumes that tasks are assigned to these levels of government which are best suited to perform them, i.e. which are more efficient. However, the literature on this issue is relatively scarce. Most studies of the efficiency of local governments consider only one field of their activities, like education (e.g. Sutherland, D. et al., 2007) or health (e.g. Afonso, A., St. Aubyn, M., 2006). They are not interested in decentralization in itself; thus, the measures of income or expenditures autonomy are rarely considered as determinants of the efficiency, although some include variables like taxes or grants from the central government. This aspect is more pronounced in analyses of the general efficiency of local government (e.g. Balaguer-Coll, M.T. et al., 2007) but very few of them focus on decentralization. If these issues are considered at all, the results show that more autonomous local governments are more efficient (Boetti et al., 2012), while the impact of taxes and grants from the central government is usually negative (e.g. Kalb, A., 2010; Loikkanen i Susiluoto, 2006). The project will fill in the gap in this literature, combining the efficiency with decentralization

4)   Evaluation of the local development

The studies that measure the impact of decentralization on local development, regions' convergence, the speed of economic development, the size and structure of the investment across countries, are frequently made in the literature (see, eg, Blöchliger, 2013; Rodríguez-Pose and Krøijer, 2010). The results, however, are contradictory. This suggests that, by studying only the cross-country experience, it is difficult to reach conclusions of practical importance relevant for decentralization policy at the individual country's level.. Hence, it is a common practice in the literature to implement studies at the individual county's level. (see, e.g., Barankay and Lockwood, 2006; Burki et al., 1999). Yet, there are no such studies done for Poland – the analyses planned in the project aim to fill this gap.

The literature review indicates what local development measures should be used in empirical research. The Polish statistics lacks measures of GDP at the municipal level. However this is a problem common to many countries, in the literature there is a lot of studies using other measures of development, such as data on the level and changes, of the size and quality of local infrastructure; the quality of education (Ehtisham, Brosio, Tanzi 2008). These indicators are also available for Polish municipalities and we will use them as proxies of the local development. The literature shows that the degree of decentralization has a significant impact on these indicators. Yet – as this literature shows, this impact can be non-linear and can change over time, - a phenomenon which could also be observable for Poland,. Also, a feature which must be also taken into account is that in case of Poland there are important differences at the mezzo level (or macro-regional level), which, among other factors can be attributed to the Polish history and the division of the country in XVIII and XIX century between Austria, Germany and Russia, which has left a mark still visible today in the characteristics of the three regions.

To summarize: "*Despite its relevance in much of the world, partial fiscal decentralization has received only limited treatment in the public economics literature.*" (Borge et al, 2012, p. 1). Important limitations of the existing literature are

1) many studies focus only on the constraints of the revenue's autonomy and on goods which are subject to the central government's intervention. Meanwhile, local budgets should be perceived as a whole.

2) a small number of studies that analyse the impact of decentralization constraints on production efficiency of local governments

(3) a small number of research devoted to the impact of decentralization restrictions on local development

In Poland, the limitations of the literature imply that the problem of the impact of decentralization on spending of local governments requires special scientific exploration. While the problems of the real autonomy of local governments, deepening in recent years are well recognized (eg, Report on the state .., 2013) , there are no quantitative analysis show how these limitations affect the spending policy of local governments. The planned study will complement this gap and can become an important, essential argument in the debate about the public finance in Poland.

Although the planned project will focus on the Polish municipalities, it is inline with the research problems present in the current scientific discussion in the literature of the world. In the literature there are many studies covering the experiences of individual countries, which serve as an illustration for drawing conclusions of interest to an international audience. As the planned research will address the issues that are not often analysed in the literature (for example, the impact of decentralization on incomplete fulfilment of the tasks fully decentralized), it may prove to be an important contribution to the discussion in the international literature.

Work plan

The goal of this project is to study in quantitative terms the effect of partial (or incomplete) decentralization on the quality of local governments' spending policy.

The purpose of this project is to verify empirically the following hypotheses using the example of Polish municipalities:

Hypothesis 1

Restrictions imposed on expenditure's autonomy of municipalities have impact on the "preference matching". This problem applies to both -the spending limited by central rules and those that are not a subject to such limitations, .

Hypothesis 2

A decrease in the degree of decentralization has a negative impact on the efficiency of municipal expenditures, where efficiency is defined as the ratio of the level of inputs to the quantifiable results.

Hypothesis 3

Limitations of revenue and expenditure autonomy of local governments are a barrier to long-term local development.

In order to systematically verify these hypotheses and to attain the main aim of the proposed project, a sequence of detailed research tasks have been specified.

The first detailed research tasks is to determine the degree of decentralization of municipalities in Poland.

In order to achieve this aim, we will construct indicators of income and expenditure autonomy for each municipality. The incomes' autonomy indicator is not a major analytical problem - following the literature we will take into account the local revenues broken down by type. On one hand, this will allow us to assess the wealth of local government, on the other - by indicating the grant we will indirectly determine limiting of the expenditure autonomy. We will also calculate income autonomy index- determining the share of each category of own revenues in total revenues.

Taking into account the specific nature of the tasks of Polish municipalities we will construct further measure of independence expenditure. For the purpose of our project we have selected two tasks of local governments, which are significantly limited by central rules, and also are important part of municipal budgets:

• Education – or more preciously- spending for kindergartens, elementary and middle schools. This tasks are defined as own local responsibility and should be financed by local revenues. However, there is a special source of revenues for education- local educational part of the general subsidy transferred

from the central government -calculated in accordance with the conversion the number of pupils in schools from the area of local government.

• social assistance - involving the payment of allowances. It is also an own local governments task, but according to the logic of redistributive function of public finance- most of these allowances are defined by central government and funded by earmarked grants.

Expenditure on these two tasks are an essential part of the current local expenditures (62% - in 2012). They are also limited by important central rules. The required level and any changes in these spending must affect other local tasks. Therefore, to measure the problems with local expenditure autonomy it will be taking share of the educational subsidy, grants for education (including preschool from 2013) and social assistance grants, in the current expenditure of municipalities.

 Education subsidy, although it can be used by local governments for various expenses, in practice is used by almost all municipalities for educational purposes only. The perception of many local governors is that this subsidy is simply an earmarked grant for education. (Kopańska A. 2014). At the same time, this subsidy is calculated on the basis of the so-called conversion pupils and reflects (albeit imperfectly) the necessary expenditure needs of local governments on education. In particular, there are calculated in teachers' salaries- this part of the educational task which is subject to the strongest central regulations.

In turn, grants for social services directly reflects the expected state-local spending. Thus, the size (though unfortunately imprecise) reflect the expenditure needs of local governments associated with central regulations in education and social assistance.

Another factor used in the analyses are discretionary changes in the degree of decentralization, defined by:

1) The introduction of the obligation to pay the teachers a minimum average salary for each group of professional advancement (introduced in 2009)

2) The introduction of subsidies for kindergartens (2013)

These changes significantly affected the autonomy of municipalities, therefore, to examine the consequences could be an important step in determining how the limitations of local expenditure autonomy affects the structure and efficiency of local governments spending, as described in the following specific objectives. Because these changes allow us to examine the effects of the so-called "Natural experiment", their description can also be a valuable contribution to the international literature.

 The second detailed research tasks is to assess the allocative efficiency of local expenditures, where allocative efficiency is defined as a "preference matching" or matching the size and structure of local expenditures to the preferences of the citizens.

The approach used here will be the modified demand function of the median voter. More precisely, the level and structure of selected expenditures will be modeled by:
• Local income, taking into account the different types of income
• Factors affecting the cost of implementing a given task (eg, size of school education, the degree of dispersion in the community)
• Characteristics of the local community (such as education, age, fertility, etc.), and other features that should differentiate the spending of local governments if they reflect the preferences of residents
• Indicators of revenue and expenditure autonomy

We will analyze expenditures that are characterised by significant central limitations imposed on the local discretion as well as tasks, where municipalities have a relatively high degree autonomy, like culture and sports. Using econometric methods, we will verify, to what extent the characteristics of the local communities affect the differentiation of the various types of expenditures between municipalities.

According to the hypothesis, we are assuming that the characteristics of the local community to a small extent differentiate expenditure on education and social assistance, i.e. the spending categories with limited local discretion. The spending on culture and sports should more clearly reflect the preferences of the inhabitants. In the same time, the local characteristics should have a higher influence over every category of expenditures than in municipalities with higher fiscal autonomy. More precisely, the statistical significance of variables measuring demographic and social characteristics that reflect preferences will be verified in regression models explaining the amount of own spending of the municipalities.

As, indicated above, we will also analyze the impact of regulatory changes on the degree of differentiation of local spending (i.e. we will assess the consequences of the "natural experiments"). According to the hypothesis, we expect that these changes had made the local spending more similar thus they have reduced allocative efficiency.

The third detailed research tasks is the construction of cost efficiency measures using DEA

The cost efficiency of local government will be analyzed with DEA method. With it we will be able to assess the efficiency measures of different types of expenditures. The crucial part of any DEA is the identification and measurement of relevant outputs of these expenditures: e.g. for expenditures on education one possible output is the outcome of the secondary school exams. The identification of the outputs of public activities is in this case the biggest drawback of DEA method, since for many fields of local governments' activities there are no data on outputs. The question of the identification of inputs is more straightforward: in our case it will simply be the size of municipal expenditures in a given field. Since DEA is a static method, in the next step we will use dynamic version of DEA, i.e. the Malmquist index, to analyze the change of efficiency in time.

Such analysis will create a ranking of local governments according to their efficiency. DEA is a relative method and allows for comparisons only within the population under investigation. It means that we will not be able to say if Polish municipalities are efficient, but only which are more efficient than others.

With DEA we can find input and output efficiencies. Calculating the input efficiency makes sense only when the analyzed entities exert any influence on those inputs. For Polish local governments the scale of this influence depends on the level of decentralisation. Therefore, it should be assumed that in the case of analysis of efficiency of centralized tasks only the analysis of output efficiency makes sense, i.e. the research how the municipalities spend funds granted for specific purpose. In turn, while analyzing the decentralized tasks, when the municipality exerts influence on the amount and type of expenditures, we can compute the input efficiency scores in order to identify whether and to what extent the municipality wastes its resources.

In the fourth detailed research tasks we will assess the impact of partial decentralization indexes on the cost efficiency, quantified with DEA.
DEA algorithm does not take into account any exogenous factors, which can influence the outcomes of local governments' operations. Therefore, next step of the analysis is the Tobit regression estimation, where the endogenous variable is the efficiency index, while explanatory variables are exogenous factors, like characteristics of a municipality, information about its financial condition and most important the indexes of partial decentralization. The objective of this analysis is to identify those factors, which cause differences in efficiency of local governments in spite of the fact that they operate within the same institutional and legal structure. In order to explain changes of the efficiency in time we will use panel regression.

The fifth research task is to examine the impact of the indicators of decentralisation on the long-run local development of Polish communities.

To implement these studies, we will construct measures that proxy the socio-economic development of each municipality. Since data on GDP at the local level is not available, we will refer to other measures, including the results of national secondary schools test (also measured by the Education

Value Added methodology) and the size and quality of the local infrastructure. Using econometric methods we will assess the impact of the decentralisation indexes on the level and growth rates of these indicators. This approach will allow us to answer the question of whether and to what extend the degree of development depends on the degree of decentralization.

Preliminary results of our research.

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Kopańska A & Bukowska G. (2013) analyzed how different is local expenditure policy depend on degrees of expenditure decentralization. Salaries in education represented less independent expenditures and school equipment more independent. Using panel regression it was presented significant differences in these policies-changes in the level of wages are not associated with changes in the financial situation of local governments, while school equipment highly depends on the situation. Kopańska A. (2014) - studied the effects of changes of the level of educational subsidies on municipalities' policy. It has been shown that in rural communities we could observed fiscal replacement behaviours. Kopańska A. (2014) also preliminary reviewed expenditure decentralization in selected local tasks. It has been shown significant variations in the degree of autonomy, depending on externalities related to these tasks. Kula (2013) done the research on efficiency of city counties with the use of data from the years 2006-2010 covers both, the prosperity period and the years of crisis, and shows that in that period the efficiency of cities dropped. The crisis and the growing debt are, apparently, to be found amongst the reasons underlying such move. A positive impact of European funds was not strong enough to balance the negative processes

The foregoing outcome of the initial research provides for the justification for the theses assumed in the project.

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We have carried out a simple analysis of the impact of demographic characteristics of municipalities' residents – age and sex – on two types of spending, which, to our knowledge, differ significantly in terms of degree of decentralization. The spending types, which were analysed, were the following: expenditures on public administration (showing high presumed degree of decentralization), education spending (showing high presumed degree of centralization), both in the period of 2005-2012. A simple panel data with fixed effects model was applied. Even the estimation of such simple models for 15000 observations showed significant differences amongst determinants of the level of spending. While the participation of the population at working and post-working age exerts a positive effect on the level of spending in both areas: public administration and education expenditure, the effect of the ratio of men to women appeared to be different. In the model explaining spending on education per capita, the parameter was positive though insignificant (p-value 0.218). A corresponding coefficient in the model explaining the amount of spending on administration was negative and significant (p-value 0.015). Therefore, it appeared that the diversification of preferences of the citizens by sex may exert different effect on various types of spending.

Methodology

The research will be carried out using of the newest statistical methods and advanced econometric techniques. It will be done on data for years 2000-2013.

In our analyzes, we will use data about the revenues and expenditure of local governments provide the GUS. In addition we will use the detailed budget data from the reports of municipalities RB 27S (income) RB 28S (spending).

In accordance with a sequence of goals presented above, the first stage of the research will be the construction of the partial decentralization indicators.

This will be based on the modified median voter's demand function (see, eg, Borge L, et al J;, 1995; Falch, T., & Rattsø, J. 1997). The point of departure is the utility function of a representative citizen. It is assumed that the public and private goods are not substitutes. This assumption implies that utility

will be maximized only with respect to public goods and that the private budget constraints can be ignored.

The utility of the i-th inhabitant of the j-th local government associated with the consumption of local goods is given by:

$U_{ij} = U_{ij} (Q_{kj}, Z_j)$

where

Q_{kj}-k is the per capita consumption of local goods (1. K) per capita

Z_j- is the vector of characteristics of the local population that determines the preferences.

Another important assumption is that taxes do not represent the prices of the public goods. In terms of local governments with limited revenue decentralization and a big share of transfers from the state budget in the local revenues, taxes are not perceived as a significant determinant of the cost-price of local goods.

Budget constraint (per capita) R j-th local government

$$R_j = T_j + G_j + D_j = \sum_k Q_{kj}$$

Where

T_j- denotes the (per capita) tax revenue of j-th local government

G_j-denotes (per capita)transfers from the state budget for j local government

D_j-is the budget deficit per capita (however, when the analysis concerns only current expenditure can be assumed to be balanced current budget-legally compulsory in Poland since 2010, when $D_j = 0$)

This allows to derive a simple linear demand function for k-local public good:

$Q_{kj} = f (T_j, G_j, Z_j)$

Additionally, we will also take into account the indicators of spending and revenue decentralization.

One of the more important element of this study is the selection of variables characterizing the local community. Studies show that the important characteristic of the local community, that need to be controlled for are: the average level of education, the age structure of the population, income, social capital (measured eg participation in elections). Most of these data is available in the Database of Local CSO. We will also use the data provided by the National Electoral Commission.

The econometric analyses of the local expenditures spending of municipalities conducted with the use of panel data must take into account the specificity of budgeting process, that is the fact that the spending in year t is mostly explained with the spending in year t-1. Therefore, for the model estimation we will use the System Generalized Method of Moments (System GMM).

The estimated equations will be as follows:

$$Y_{it} = \alpha Y_{it-1} + \beta X_{it} + u_{it}$$

$$u_{it} = v_i + \varepsilon_{it}$$

where Y_{it} means spending, respectively, of the municipality i in year t, X_{it} is a vector of explanatory variables – ratios of fiscal decentralisation and control variables, while α and β denote the estimated parameters. Random term u_{it} contains an error characteristic for given observation ε_{it} and non-observed, constant in time, individual effect v_i. Some of control variables may be endogenous (correlated with error ε_{it}) – e.g., the level of revenue per citizen may be related to non-measurable

preferences in terms of type and levels of public spending. The System GMM uses instrumental variables in the form of lagged values of variables and lagged values of their first differences in order to alleviate the problem of endogeneity, which justifies the choice of this estimation method.

A detailed econometric analysis of a fiscal policy conducted by local authorities regarding both the scale and structure of spending, as well as the regression that model regional development, will require, as it is presented in the review of literature that apart from the factors relating to revenue and spending autonomy, other factors should be considered that also shape both the policy and the needs of local communities. In our research we would like, particularly, to pay attention to the following issues:

• social and demographic composition of the population – including the number of persons at working and post-working age, its structure broken by sex, education, population growth rate (this composition will determine preferences of citizens in our research)

• local political class – including age and education of the head of the municipality/county/city, how long he/she holds the function, political fragmentation of the municipal council,

• territorial determinant – density of population, central or peripheral location.

• Territorial diversification, including the unique characteristics of regions that are due to historical heritage – namely the XVIII- XIX century division of the country between Russia, Prussia and Austria. As many studies show, these differences are still present and the have a major impact on social capital, as well as formal and informal institutional surrounding.

Another specific goal, which is the analysis of efficiency of municipalities, will be implemented with the application of the Data Envelopment Analysis Method (DEA)[1]. This is a non-parametric method, which does not require any a priori-defined functional relationship between expenditures and the results achieved by units of local government. Additionally, it allows finding the theoretical production possibility frontier, in relation to which the efficiency of units undergoing analysis is determined. Accordingly, it is the relative efficiency and allows for comparisons only within the population under investigation (Cooper et al., 2007).

DEA enables the analysis of efficiency of a large number of entities subject to many inputs and outputs. The analysis of a given set of units requires a formulation and solution of an optimization problem for each of the decision making units with the use of linear programming. Their purpose is to set the maximum value of technical efficiency for individual units. The efficient units define the production possibility frontier of the analyzed set. This method allows both a cross-sectional analysis, which creates an efficiency ranking of the analysed units at a given moment and an analysis of changes in efficiency over time, through the application of the Malmquist index. Its decomposition allows isolating changes in efficiency due to internal and external reasons pertinent to the analyzed units.

The DEA method is sensitive to outliers, thus the sample under analysis must be homogenous. In the case of Polish municipalities, it forces separate analyses for each type of municipality: rural, urban-rural, urban and cities with county status. Due to the differences between municipalities within each of the above categories, however, the analysis will use the method proposed by Simar and Wilson (1999, 2000). This method uses bootstrap procedure to estimate the bias of the results of DEA analysis, and, therefore, allows correcting the standard DEA scores by the estimated bias and calculating the confidence intervals of the bias corrected scores. Accordingly, we will be able to limit the influence of outliers on the results, with no need to remove them from the sample under the analysis. In the case of Malmquist index, the Simar and Wilson method will enable us to verify whether the changes in productivity, efficiency or shifts in the production possibility frontier are statistically significant for municipalities.

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[1] Calculations will be made with the use of FEAR package, R software (Wilson, 2008).

With DEA we can find input and output efficiencies. Assuming full efficiency, the former measures by how much we can reduce the inputs, while keeping the outputs constant. In turn the later shows a potential increase in outputs for a given input level. Thus, the crucial part of any DEA is the identification of relevant inputs and outputs. Calculating the input efficiency makes sense only when the analyzed entities exert any influence on those inputs. For Polish local governments the scale of this influence depends on the level of decentralisation. Therefore, it should be assumed that in the case of analysis of efficiency of centralized tasks only the analysis of output efficiency makes sense, i.e. the research how the municipalities spend funds granted for specific purpose. In turn, while analyzing the decentralized tasks, when the municipality exerts influence on the amount and type of expenditures, we can compute the input efficiency scores in order to identify whether and to what extent the municipality wastes its resources.

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