THE METHODS OF MEASURING THE EFFICIENCY OF THE PUBLIC FINANCE SECTOR

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МЕТОДЫ ИЗМЕРЕНИЯ ЭФФЕКТИВНОСТИ ГОСУДАРСТВЕННОГО ФИНАНСОВОГО СЕКТОРА

Abstract
The article analyzes the issues of efficiency, with special emphasis on measuring it in public sector units. The reason behind establishing units of the public finance sector is to satisfy the needs of the society, whereas the expenses paid to satisfy those needs are financed from public means. The measurement of the efficiency of such units is an important element used for assessing the degree of accomplishment of public tasks. The article offers a review of the issue and attempts at characterizing selected efficiency measures used in the units of the public finance sector.

Keywords: public sector, efficiency, efficiency in public sector

Streszczenie
Artykuł analizuje kwestie skuteczności, ze szczególnym naciskiem na pomiar w jednostkach sektora publicznego. Powodem ustanowienia jednostki sektora finansów publicznych jest zaspokajanie potrzeb społeczeństwa, a koszty do zaspokojenia tych potrzeb są finansowane ze środków publicznych. Pomiar skuteczności takich jednostek jest ważnym elementem służącym do oceny stopnia realizacji zadań publicznych. Artykuł zawiera przegląd zagadnień i próby scharakteryzowania wybranych mierników stosowanych w jednostkach sektora finansów publicznych.

Słowa kluczowe: sektor publiczny, efektywność, skuteczność w sektorze publicznym

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Аннотация
В статье анализируются вопросы эффективности с акцентом на измерения в единицах государственного сектора. Причиной создания отделов в секторе государственных финансов является удовлетворение потребности общества, а расходы, уплачиваемые для удовлетворения этих потребностей, финансируются за счет государственных средств. Измерение эффективности таких единиц является важным элементом, используемым для оценки степени выполнения общественных задач. В статье содержится обзор вопроса и попыток охарактеризовать выбранные меры эффективности, используемые в единицах финансового общественного сектора.
Ключевые слова: государственный сектор, эффективность, эффективность в государственном секторе

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Statement of the problem in general outlook and its connection with important scientific and practical tasks.

Over the past decades Poland has been experiencing a period of huge transformation from the communist system to the democratic one. These changes have naturally brought about the necessity to build a system of public finance tailored to conditions of free market economy. The central axis in creating the new system of public finance was, and still is, as the adjustment process has not been completed, the problem of allocating financial responsibility for satisfying the basic needs of citizens between the state budget (public finance) and household budgets (private finance) (Owsiak S., 2006, p.378).

Public funds should be carefully supervised, not only to check if they are properly spent, but also to ensure the best effects related with their allocation for specific tasks. Public finance, due to its limited nature, should be spent as “effectively” as possible. Efficiency is defined as a relation between the achieved results and the incurred expenses (Nogalski B., 2002, p.83). Each evaluation of efficiency of some actions should focus on comparing the relation between the achieved results and the data concerning expenditure.

Aims of paper. Methods.

The problem lies in finding the criteria for assessing efficiency, especially in the public sector, which is related to the specifics of this area. The assessment should be made in line with the adopted and agreed criteria. The biggest problem always concerns the measures of the assessment, since the outcome largely depends on the adopted solution in this area. Also the selection of a specific assessment parameter

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should determine the choice of a corresponding measure. By measures we understand economic categories (profit, costs, productivity, turnover) reflecting the events or operations concerning managing, which took place in the unit and its surroundings, presented in appropriate units of measure. The purpose of using a measure is to determine the phenomenon on the basis of which we assess an economic unit and take economic decisions. In order to accomplish these tasks the measure should have a simple and transparent form (for example natural and value measures) and it should allow us to determine precisely the volume and decision making (Lichtarski J., 1995, p.167).

The aim of the article is to present the essence and significance of efficiency, especially taking into consideration new solutions applied by units of the public finance sector.

**Exposition of main material of research with complete substantiation of obtained scientific results. Discussion.**

Efficiency is one of the basic, commonly used categories for assessing actions. It is used not only in economics but also in many other areas of human activity (Ziębicki B., 2013, p.20). The subject literature offers a wide spectrum of defining and interpreting efficiency. We should emphasize the multi-dimensional nature of the discussed concept. Research is dominated by organizational and economic efficiency, based on the indicator, parameter and non-parameter approaches. Researchers are also paying more attention to the ecological efficiency due to the popularity of the sustainable development concept. However, the content and scope of each type of efficiency evolves in time, adjusting itself to the development of theory and practice and to changing expectations of value systems of the society (Rutkowska A., 2013, p.439).

P. Samuelson and W. Nordhaus defined efficiency as the most productive use of the society resources in the process of satisfying people’s needs and eliminating their deficits (Samuelson P.A., Nordhaus W.D., 1999, p.478). Economic efficiency is an action aimed at achieving a particular effect while using the smallest amount of available resources or at achieving the best result while using a specified quantity of available resources. This concept refers both to individual entities and to larger aggregates, for example to the whole country economy.

The research concerning the economic efficiency is mainly connected with optimizing the allocation of resources. This issue is the subject of studies in the classic school of economics. It was A. Smith who was the first to analyze the issue in his studies. He claimed that effective allocation of resources occurs in conditions of total freedom of managing and is related to the influence of the natural, self-regulation mechanism, known as the famous “invisible hand of the market”. Contemporary economists express this thought more precisely, assuming that market forces push the economy automatically in ideal competition conditions to states of balance in markets of particular products and production factors and to balance on all markets in the same time, which, assuming that there are no external effects and public goods, means the optimal use of economic resources and also maximum level of social welfare available in particular conditions (Milewski R., Kwiatkowski E., 2012, p.208).

V. Pareto conducted some more detailed research on efficiency. According to him...
efficiency occurs when it is not possible to organize production to ensure that everyone is in a better situation without worsening the situation of anyone – the so-called Pareto optimality (Ziębicki B., 2013, p.21). This means that balance in Pareto optimality is achieved when the marginal cost of production of a particular good equals the marginal benefit associated with its consumption (Begg D.K.H., Fischer S., Dornbusch R., 2003, p.437).

Formulated in this way, Pareto optimality arouses numerous doubts expressed also in the subject literature. There might be many optimal states defined in this way and they are not comparable to each other. When assessing the proportion of sharing global income among members of the society, we also need to take into account non-economic criteria, such as moral and ethical ones (Milewski R., Kwiatkowski E., 2012, p.208).

Transferring research on Pareto optimality onto the level of single production units, economist T.C. Koompans presented a theorem according to which a single production system is effective only if it is possible to minimize the result or the expense by decreasing another result or increasing another expense. Efficiency in this meaning is connected with use of technical production capacities and is defined as technical efficiency (Ziębicki B., 2013, p.21). We can generally distinguish two approaches to analyze efficiency, differing in time horizon (Kozuń-Cieślak G., 2013, p.17):

- dynamic efficiency, connected with the ability to grow and develop in the long-term perspective,
- static efficiency, which concentrates on avoiding waste of the possessed (constant in a particular period) resources and their best allocation.

The static efficiency means optimal production and distribution of limited resources, its goal is to run the system towards achieving the production capacities curve. The static approach to efficiency is connected with the concept of Pareto’s optimality. Pareto efficiency is ensured exclusively in conditions of ideal competition – the market structure assuming perfect access to information, homogeneity of goods and services, which make it a hardly realistic structure.

The aim of the dynamic efficiency, on the other hand, is not to strive at achieving the production capacities curve, but to move it constantly to the right. From the dynamic perspective the aim of the activity is not to avoid wasting resources, but to discover and set new goals and resources all the time. The dynamic presentation of efficiency is closely related to the concept of entrepreneurship and questions the legitimacy of assumptions concerning given (fixed) resources. It is practically impossible to achieve the economic efficiency in a perfectly competitive market, since the long term non-profit companies with do not have funds for innovations. Monopolies and oligopolies, though ineffective in achieving static production and allocation efficiency, are good at implementing dynamic efficiency (Kozuń-Cieślak G., 2013, p.18).

Efficiency is analyzed on the level of economy from the perspectives of production, allocation, innovation and distribution. The production efficiency is achieved when we maximize production under given constraints of supply and demand. Allocation efficiency is connected with the allocation of resources in production zones, which society appreciates. Innovation efficiency means that the applied technologies allow us to obtain the highest possible productivity of economic resources. Distribution efficiency is when none of the entities tries to change the existing structure of division of the manufactured product.
In social perspective, efficiency is not always identical with economic efficiency. In economics we mainly consider production efficiency, which depends on allocation and innovation efficiency. Distribution efficiency is less important. However, distribution efficiency plays a dominant role from the social perspective. In the social perspective we additionally consider the so-called social costs of conducting economic activity. These are: environment pollution, depreciation of the assets’ value and depletion of natural resources.

Experts often point at social effects of managing, related to improvement of working conditions and safety, employees healthcare, increased staff satisfaction, meeting the society expectations, using space and natural environment protection. This is social efficiency from a narrow perspective. An attempt at combining economic and social efficiency is made in the concept of corporate social responsibility (CSR), which tries to encourage enterprise managers to take actions which are not only against social interests, but also pro-social ones (Zieliński M., 2013, p.140-141).

In its broader aspect, social efficiency is analyzed taking into account all dimensions of effects and expenses related to the management process (that is taking into consideration social, not private costs and benefits). This is the broadest possible approach to efficiency, since it is the measure of management rationality from the perspective of the welfare of the whole society.

Ecological efficiency, which is also a relation of effects to expenses, is presented as an element of social efficiency. However, in case of ecological efficiency, what really matters is the degree to which the adopted goals have been accomplished. The expenses they entail are of secondary importance, which does not mean the resources spent on them can be wasted (Kryk B., 2003, p.97). It is assumed that within the framework of ecological and social efficiency two rules are applied:

- the accomplishment of the priority goal is superior to the resources spent on it,
- on the other hand, we must observe the rule that resources must not be wasted.

The effects in the area of environment protection rarely appear as the only effects of actions. Thus, it is necessary to consider them along with other effects of a technical or energetic nature.

**Measuring economic efficiency**

In the theory of economics and in business practice we use various measures of economic efficiency. They may express the ratio of achieved effects (production, value added, national product, profit, etc.) to incurred expenses (employment, fixed assets, investment, used resources and materials, energy, fuel, etc.). Depending on what we take as an effect and what as an expense, we obtain various efficiency relations. The main efficiency relations are presented below:

- growth rate,
- work productivity,
- fixed assets productivity,
- consumption of materials,
- consumption of energy.

Improvements in economic efficiency are manifested in the increase of the first three relations and the decrease of the other two (economic calculation).

Gross Domestic Product is a measure of economic development and welfare of a country. Gross Domestic Product is a synthetic measure of the value of production manufactured in the economy within a year. GDP measures pure production, or added value, generated in the economy (Begg D.K.H., Fischer S., Dornbusch R., 2003, p.312). GDP measures the value of...
production manufactured in the economy of a given country in a year, however, there are also companies with foreign capital that operate in the economy and the profits generated by such companies partly belong to their foreign co-owners and may flow abroad. Therefore the category of Gross National Product was introduced, which corrects the size of GDP, subtracting the value of the above-mentioned income flows. On the other hand, national income is another production measure which takes into account net investments (the difference between GNP and depreciation).

Since they refer to the whole economy, categories of national product and income are not very useful in assessing the level of economic development of a given country and average living standards of its population. Here we should apply the categories of GDP or national income per 1 inhabitant. And even though these indicators are commonly used to determine the living standards (welfare) of the population, we need to be aware that they are not fully relevant measures of welfare. First of all, they do not take into account production which is either illegal or legal but not registered (used on one’s own to satisfy the household’s needs). Moreover, GDP indicators do not reflect the rest, which is of vital importance for the wellbeing of individuals. Additionally, these measures do not include “external effects” of production, concerning its side effects for the natural environment (Milewski R., Kwiatkowski E., 2012, p.243-245). Treating GDP as a welfare measure may result in taking wrong political decisions.

This was also emphasized by Nobel Prize winners: Stiglitz, Sen and Fitoussi, who were commissioned by Nicolas Sarkozy to develop a report titled: “Measurement Error. Why GDP is not enough.” (Stiglitz J., Sen A., Fitoussi J.P., 2013, p.14):

- the material living standards (income, consumption and estate) – income and consumption should be considered jointly with estate;
- health – it is the most important area which affects the length and quality of our life, therefore good measures of life expectancy and quality should be developed;
- education – it is strongly correlated with the evaluation of the quality of life even if it does not affect income or productivity;
- occupations of an individual (including work) – we need to consider the services that households provide for themselves and incorporate non-market activity into measures, it is also important to know how people spend their free time;
- political voice and influence on political decisions – they constitute an integral dimension of the quality of life;
- social ties and relations – people who have more social contacts consider their life to be better;
- natural environment (current and future conditions) – the state of natural environment affects people’s health;

“Measurement Error” presents numerous recommendations concerning better measures of economic development, ranging from simple to more technical ones. Although the publication does not provide us with definite answers to the questions and reservations made in it, it reminds contemporary researchers of the limitations and bias of the current measures, which should spur more intense work on this issue.

The authors emphasized that wellbeing is multidimensional and we should take into account (Stiglitz J., Sen A., Fitoussi J.P., 2013, p.14):

- the material living standards (income, consumption and estate) – income and consumption should be considered jointly with estate;
- health – it is the most important area which affects the length and quality of our life, therefore good measures of life expectancy and quality should be developed;
- education – it is strongly correlated with the evaluation of the quality of life even if it does not affect income or productivity;
- occupations of an individual (including work) – we need to consider the services that households provide for themselves and incorporate non-market activity into measures, it is also important to know how people spend their free time;
- political voice and influence on political decisions – they constitute an integral dimension of the quality of life;
- social ties and relations – people who have more social contacts consider their life to be better;
- natural environment (current and future conditions) – the state of natural environment affects people’s health;
According to the authors, it is necessary to develop questionnaire surveys which would help us assess relations between various areas of life of each person and the information from such survey should be used when developing social policy in various fields (Stiglitz J., Sen A., Fitoussi J.P., 2013, p.92).

In the authors’ opinion, people responsible for economy should stop behaving like a driver who has only a speedometer in his car.

**Efficiency and methods of measuring it in units of the public finance sector**

In units of the public finance sector efficiency is often viewed in the context of the amount of the spent public funds. However, we should also take into account the purposefulness of the expenditure and the effects achieved thanks to it in the area of public utility, understood as current and continuous satisfaction of the collective needs of the population (Jastrzębska M., 2016, p.44).

It should be emphasized that the main reason for establishing units of the public finance sector is the necessity to satisfy public needs of the society, including, inter alia, the need of safety, healthcare or education. The above needs are satisfied by entities of the public finance sector, which perform particular public tasks, while the expenses they incur to provide such services are reimbursed from public funds (Kaczyńska A., 2017, p.84).

M. Jastrzębska points out that the methods of analyzing the efficiency in the private sector cannot always be applied to measure the efficiency in the public finance sector, where it is not always possible to precisely determine the expenses and effects, while goals are often of qualitative nature and it is difficult to quantify them. It should also be stressed that the valuation of the effects related to public expenses is not based on market prices. Even if fees are collected for using public utilities, such fees usually do not reflect the costs of creating a particular public utility (Jastrzębska M., 2016, p.45).

M. Ziolo also points at difficulties in measuring the efficiency of the public sector while analyzing the Performance Paradox phenomenon consisting in a weak relationship between measures of effects and the measured object itself (Ziolo M., 2013, p.29-32).

Scientific literature concerning research on the efficiency of units in the public finance sector distinguishes the following categories (Kaczyńska A., 2017, p.83-84):

1) efficiency in its organizational aspect, understood as:
   - achieving efficiency of management,
   - performing tasks maximizing usefulness for the local community,
   - the functioning of an organization in line with the purpose of its manager,
   - achieving effects which are positively viewed,
   - strategic ability of an organization to adjust to changes in the environment and to use the resources at its disposal in a productive and economical way, directed at accomplishing the set goals,

2) efficiency in its financial aspect, understood as:
   - the ratio of the results of actions taken to the expenses incurred while performing actions,
   - the accuracy of the selected instruments of fiscal policy used for implementing processes of sharing and exchanging public goods and services rendered by entities in the public finance sector,
the evaluation of the results of the spent public funds, measured with changes in the direct surroundings of the entities of the public finance sector. The need to measure the efficiency of the units operating in the public finance sector is also emphasized by the model of public management called New Public Management – NPM. This model is based on the theory of public choice, according to which voters pursue their own economic interests while politicians offer voters such services which will secure them their support and votes. NPM is a form of implementing the principles of managerialism, which is manifested in the constant strive for improving the efficiency of the actions taken and is based on the principle of indirect control, that is management based on proper stimuli and values assuming continuous quality improvement (Kaczyńska A., 2017, p.84). The analysis of the subject literature allows us to distinguish the method of evaluating efficiency, based on the following approaches (Owsiak K., 2014, p.147-148):

- indicator approach, consisting in constructing relations between various quantities,
- parameter approach, based on econometric methods and introducing the production function to the evaluation of efficiency,
- non-parameter approach, which uses procedures of linear programming.

The evaluation of the efficiency achieved by the units of the public finance sector may be conducted on a microeconomic level, where we mainly determine whether the expenditure of public funds was rational and consistent with the adopted goals, or on a macroeconomic level. In the latter case we can apply one of four commonly used methods for measuring the efficiency of public finance sector units, namely: PSP (Public Sector Performance), PSE (Public Sector Efficiency), DEA (Data Envelopment Analysis) and FDH (Free Disposal Hull) (Owsiak K., 2014, p.147-148).

PSP is an indicator of public sector performance, which is the average of seven sub-indicators. The first four sub-indicators concern: administration, education, health and public infrastructure. The other three determine the influence of the government policy on market situations and these are indexes of: distribution, stability and economic results. The PSP indicator is the base for calculating the PSE indicator which is the quotient of the PSP indicator and the relation of public expenses to gross domestic product (Kaczyńska A., 2017, p.90). The combination of these indicators allows us to create a ranking of countries according to the efficiency of their public sector (Wojciechowski E., Podgórnia-Krzykacz A., 2008, p.23).

The global research on efficiency, also as far as the public sector is concerned, is dominated by the non-parameter method of measuring efficiency, the so called method of analyzing envelopment data – DEA method. In Data Envelopment Analysis we analyze mainly technical efficiency. The method allows us to take into account both many expenses and products typical for the activity of the analyzed entities (Kaczyńska A., 2017, p.91-94). One of the advantages of the DEA method is the possibility of using variables (expenses and effects) expressed in heterogeneous measures, which is of vital importance when measuring the efficiency of the non-market production due to the lack of market prices of these variables.

In spite of difficulties appearing while measuring the efficiency of the public finance sector, it should be underlined that people who take financial decisions should be aware of the consequences of implementing them, both in the short and in the long time. Such people should also analyze
the reasons that led to taking specific financial decisions (Jastrzębska M., 2016, p.49). B. Guziejewska points at ways of improving the efficiency of the public sector finance. Such ways, inter alia, include the following postulates (Guziejewska E., 2008, p.85):

- more direct inclusion of local politicians’ preferences in the financial policy of territorial self-government units,
- perceiving relations between the scope of provided public goods and public and law burdens imposed in order to finance them,
- taking into account the process of globalization in setting new goals of compensation transfers,
- stronger identification of local taxpayers with the territorial unit where they work and pay taxes, which is aimed at building the civil society,
- aiming at the widest possible decentralization of public finance, which allows more flexible finance management.

Taking the above into account, it would be advisable to consider the introduction of uniform methodology for measuring efficiency in the public sector, whose goal would be to normalize solutions on the national or EU level.

Conclusions.

The public sector, often called the government sector, is the section of economy which concerns transactions performed by the government. Using the income obtained from taxes and other sources of income, the government finances its expenses, affecting the economy and investment decisions (Pas Ch., Lowes B., Davies., 2000, p.439-440). The above definition, however, has become a little outdated. More and more expenditure on healthcare or education is being financed on commercial terms, following the growing scope of privatization of entities operating in these areas (Karpiński A., Paradysz S., 2005, p.59-60).

An important issue which appears in discussions concerning the purposefulness and rationality of the amounts spent is the concept of their effective spending and accounting.

The degree of development, the role of the public sector and its efficiency can be measured by means of various measures, including (Karpiński A., Paradysz S., 2005, p.62-63):

1) the share of public sector in the whole employment in the country economy (OECD),
2) the share of expenditure on the public sector in the Gross Domestic Product (GDP),
3) the share of the public sector in fixed assets of the economy,
4) the level of satisfying the needs for public services in particular categories of service users (for example the unemployed, the retired, children),
5) the share of public funds in financing particular types of services (healthcare, education, cultural activity),
6) the results of the public opinion survey evaluating the degree of satisfying the needs for public services,
7) the efficiency of funds spent on public services,
8) qualitative indicators evaluating the public sector operations.

The above indicators and their cognitive values are, however, commonly criticized. Therefore we should consider developing and adopting uniform criteria for evaluating the ways of spending public funds. This...

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