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INFLUENCE OF INVESTMENTS OF COMMUNES ON THE STATE OF LOCAL ECONOMIES, THE LIVING STANDARD AND THE LEVEL OF INHABITANTS' SATISFACTION, AND BUDGETS OF COMMUNES OF MAZOWIECKIE PROVINCE

WPŁYW INWESTYCJI GMIN NA STAN GOSPODAREK LOKALNYCH, POZIOM ŻYCIA I ZADOWOLENIA MIESZKAŃCÓW ORAZ BUDŻETY GMIN WOJEWÓDZTWA MAZOWIECKIEGO

Key words: economic growth, living standard and level of inhabitants' satisfaction, budget economy of communes

Słowa klucze: wzrost gospodarczy, poziom życia i zadowolenia mieszkańców, gospodarka budżetowa gmin

Abstract. The study presents results of assessing the influence of the size of investment expenses of communes on incomes of enterprises, inhabitants, the financial situation of communes and the level of population's satisfaction. They enabled constructing a synthetic measure allowing to assess the aggregated (total) effectiveness of investment expenses of local government units of the basic level. They concurrently enabled indicating some causes of the diversity of this effectiveness.

Introduction

The world crisis induces assessing various aspects of the effectiveness of actions of the public sector. It concerns, in addition, the assessment of their economic, social, political[1] and financial effectiveness. The further part of the study presents an attempt to assess the investment activity of Mazovian (mazowieckie) communes. The data used date from the years 2004-2010[2]. In order to depict the scale of the diversity of outlays in the population under examination they have been converted to 1 km². Such reference, in a given case, is better than comparing amounts under expenditure with the number of inhabitants. Activities of communes involves in the first place the supply of goods which are marked by a substantial degree of non-competitiveness and non-exclusiveness of consumption. Generating them in major inhabitant concentrations is cheaper per capita. It enables local government units with a larger number of inhabitants to utilize the phenomenon of scale economy and with the same size of expenses per inhabitant, creating a more diverse and complete offer. It causes the formation of diverse synergic systems which reinforce competitive advantage [Garbicz 2005]. The excessive advantage of some areas over others triggers a number of disadvantageous processes in the economic, social and political spheres. Therefore the overly large diversity of investment expenses can be a violation of intra-generation justice and prevent the implementation of the constitutional principle of permanent development [Rogall 2010].

Size and diversity of investment outlays of communes in the years 2004-2010

In the seven years' period under analysis, investment expenses of communes under examination totalled 226.1 bln PLN. Converted to a unit of area, they ranged from 37,982 PLN (Ceranów Commune) to 19,699,500 PLN (Warszawa[3]). A statistical commune invested 843,653 PLN per 1 km². However, half of them allocated for this purpose less than 167,412 PLN. A quarter, forming the so-called bottom quartile expended less than 114,947 PLN, and units making up the top quartile allotted over 336,869 PLN per 1 km². The comparison of mean positional values of the index under analysis indicates the extensive

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[1] By the term of political effectiveness, J. Stiglitz [2004] specifies the influence of activities of the public sector on the level of social acceptance, whose lack can prevent undertaking or continuing them.

[2] The influence of inflation has been eliminated by using indexes provided by the CSO (Central Statistical Office).

[3] Warsaw's investments absorbed 44.4% of the total outlays of all communes of the region.

asymmetry of its arrangement. It results from the unsteadiness of population distribution in a region because expenses converted per inhabitant did not vary so substantially. The variability coefficient of the index of investment expenses of communes, converted per unit of area amounted to 259.26%, and per inhabitant – 42.60%.

Influence of investments of communes on economic activity

The economic effectiveness of investments has been assessed on the basis of an estimate of their influence on company's incomes. Analysis included the co-variability of the size of investment outlays borne in the period under examination, as well as the increase of income tax on legal entities which is based on the area of a unit per km^2 (Investment Economical Effectiveness Index – IEEI). The model of regression obtained clarified 21.6% of the total variability of the dependant variable and confirmed the existence of such a connection. On the basis of the estimated size of the coefficient of linear regression, one can state that every 1 PLN spent by local government in the period under examination caused an increase in a unit's income on average by 0.5 gr (1 gr = 0.01 PLN). It signified an increment in profits of companies statistically by about 0.5 PLN[4]. Such great effectiveness results from the fact that investments of the public sector increase the supply of public goods which serve to reduce transaction costs of businesses operating in a given area. The analysis of unexpected remainders indicated a significantly higher increment in incomes in Pruszków. Changes lower than expected occurred in: Legionowo, Płock, Mińsk Mazowiecki, Żyrardów and Piaseczno. In 89 units (28.3% of Mazovia's communes) incomes of companies expressed in fixed prices underwent reduction. The largest negative difference (8.6 mln PLN) occurred in Piaseczno. Płock recorded a deficiency of 3.7 mln PLN, Grójec – 3.4. In the remaining cases, a deficiency of incomes did not exceed 900 thousand PLN in prices of 2003, including the fact that in 22 it exceeded 100 thousand PLN. Assuming that the difference between incomes on account of CIT of outermost years of the period under examination, lower than 50,000 PLN means lack of changes, it must be stated that in 244 units (77.7% of the population under examination), despite investment expenses borne by it a growth in the incomes of businesses operating in their area did not occur.

Influence of investments of communes on inhabitants' incomes

It has been confirmed by indicating the co-variability of the size of municipalities' investment per 1 km^2 and by a growth of amounts gained on account of participation in income tax on private individuals per 1 km^2 (Investment Social Effectiveness Index – ISEI). The regression model obtained indicated that investment expenses of communes result in an increment in their incomes on account of participation in PIT, statistically amounting to 7 gr for every invested 1 PLN. An increase in fiscal incomes was accompanied by an adequate increase in inhabitants' incomes. The exacerbation of inhabitants' situation was recorded only in three rural communes of the region.

Influence of investments of communes on the level of inhabitants' satisfaction

A growth in incomes of businesses and population, as well as the extension of the scope of public services should cause an increase in inhabitants' satisfaction. M. Binswanger [2010] and R. Layard [2006] point out, however, that people rate their wellbeing against the background of others. Therefore if an improvement occurs both in a certain area and in areas forming a reference point, it may pass unnoticed. It can be favoured by the similarity of changes occurring in space. If individual units of local government undertake similar investment assignments, in spite of engaging substantial funds, they do not have to obtain a growth in citizens' satisfaction. However, if they abandon such actions, it can cause a reduction in the level of inhabitants' satisfaction. It is meaningful not only for the permanence of local public authority. Economic effects are more important. Lack of inhabitants' satisfaction encourages them to take on work beyond the place of residence and to migrate. The processes lower local resources of manufacture factors and reduce demand. They hinder the development of economy. Also owing to this, Stiglitz Commission recommended the examination of the level of inhabitants' satisfaction. [Stiglitz et al. 2009]. Such examinations are difficult, notably at local level. However, it seems information is provided by observing changes in the number of inhabitants. For it is difficult to prove that the areas from which population migrates guarantee the same level of the fulfilment of needs as those that augment the number of inhabitants. In the study described for the measurement of the level of inhabitants' satisfaction the

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4   It follows from the level of the participation of communes in the state income, which amounts to 6.7 and 19% of the rate of income tax on legal entities.
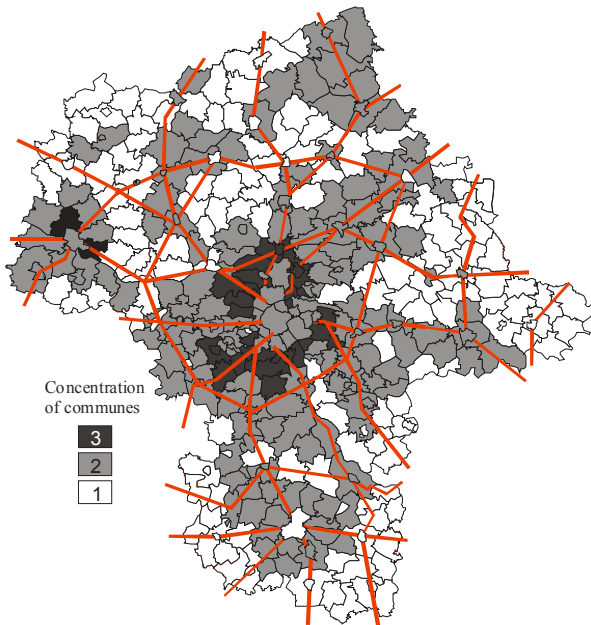
Figure 1. Spatial distribution of communes belonging to concentrations isolated on the basis of the assessment of the level of inhabitants' satisfaction
Rysunek 1. Przestrzenny rozkład gmin należących do koncentracji wyodrębnionych na podstawie oceny poziomu zadowolenia mieszkańców
Source: own study
Źródło: opracowanie własne

inhabitant number change index was used (INCI)[5]. Its size proved correlated with the investment outlay size, as converted per inhabitant (IOS). It was not a firm connection (value R^2 amounted to 19.2%). The estimated value of the regression index suggests that every 1000 PLN of investment expenses falling on average to a citizen caused in statistical terms an increase in the inhabitant number change index by 2 (people per 1000 citizens). The problem is more complex. The concentration analysis method allowed isolating in the population under examination three groups (concentrations) of units marked by the statistical similarity of the qualities under analysis. Concentrations marked by numbers 1 and 2 (Fig. 1) numbered 145 communes each (46.18% of the population under examination). Concentration 3 was formed by 24 units. Due to the mean value of the INCI (-32), concentration 1 can be termed a group of communes with the low level of social satisfaction, concentration 2 a group of the mean one (INCI=19), and concentration 3 (INCI=172) – a group of the high satisfaction level. The comparison of mean values of the IOS and INCI indexes in the mentioned concentrations indicates the existence of the positive relationship between those figures. However, examinations of correlations occurring inside concentrations do not confirm it. In all of them, it is possible to point out a feeble negative relationship. Not too large a force of the connection between the variables under examination (R^2 from 6.5% to 15.0%) demands searching for factors affecting the level of social satisfaction, other than the size of investments of communes. It seems that they are effects of the capital, the remaining regional growth centres and the roads linking them, constituting the regional axes of development. It is indicated by the spatial distribution of communes belonging to the concentrations described above.

Influence of investment activities of communes on their budgets (financial effectiveness of investments)

Investments influence the situation of communal budgets concurrently in two ways: 1) contributing to an increase in internal incomes and 2) causing an increase in costs of current activity resulting from the utilization of new property components.

Units covered by the examination may be divided into four groups (concentrations) marked by the statistical similarity of influence which is exerted by investment activity on the state of their finances (Fig. 2). Cluster 1 numbered 8 communes (2.5% of the population covered by the examination). An increment in receipts on account of a tax share averaged 207.3 thousand PLN/km², as converted to 1 km² of the area, and investment expenses corresponding to it (averaged 6.0 mln PLN/km²). All the observations qualified for this group lay beyond trustworthiness ranges of the regression function estimated for the entire population, which indicates the occurrence of factors firmly increasing the positive influence of investment expenses of communes on the state of their budgets. The factors caused the communes belonging to the concentration in hand to gain, in the period under examination, an increment in internal incomes higher than an increment in current expenses.

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[5]   Inhabitant Number Change Index is a measure stating a growth in the number of inhabitants in a period under examination compared with their number in the first year of the period.

In cluster number 4 the action of factors reinforcing negatively the effect of investment on the financial situation of units. Four of them lay beyond the trustworthiness range and the remaining five on the virge of the trustworthiness range of the assigned regression function. The situation of Ostrołęka, Płock, Radom, Siedlce and Warsaw accounts for the fact that the cities concurrently fulfil the role of communes and counties. The system of public finances applicable in the country has not guaranteed effective sources of internal incomes to counties. Naturally, units of this level (including communes with a county status) to a smaller degree participate in economic growth which may be the aftermath of their investments.

Observations counted as clusters 2 and 3 were arranged along the estimated line of the trend mostly inside the trustworthiness ranges.
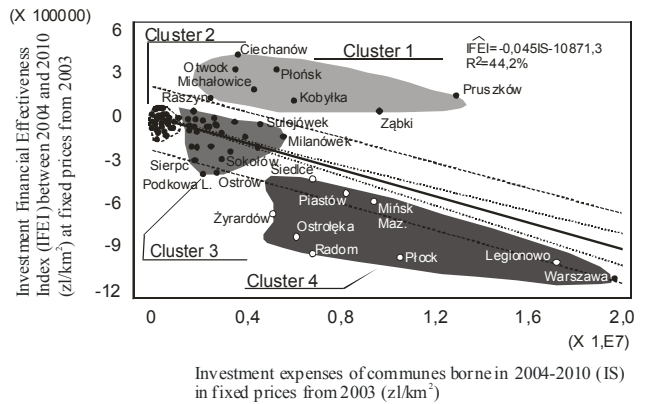

Figure 2. Linear regression of the value of the Investment Financial Effectiveness Index (IFEI) in the function of the size of investment outlays borne in 2004-2010 (IS)
Rysunek 2. Regresja liniowa wartości Wskaźnika Inwestycyjnej Efektywności Finansowej (IFEI) w zależności od wielkości nakładów inwestycyjnych poniesionych w latach 2004-2010 (IS)
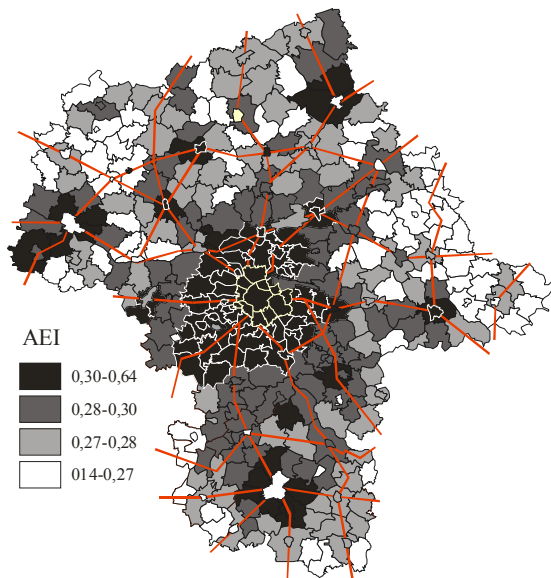Source: own study
Źródło: opracowanie własne

It is worth noting the phenomenon visible both in the whole community and in individual clusters of the negative correlation between the size of investment outlays and a change of the difference of internal incomes of communes and current expenses. The relationship found is a result of the fact that an increment in internal incomes of communes gained thanks to investments is lower than a growth in current costs caused by the implementation of an investment.

Assessment of the aggregated effectiveness of an investment

The Aggregated Effectiveness Index (AEI) for every commune of the regions has been calculated by summing fragmentary effectiveness indexes previously subjected to zero unitarization (Wgei, Wsei, INCI, IFEI). The following formula has been used for this purpose:

$$UFEI_n = \frac{FEI_n - FEI_{min}}{FEI_{max} - FEI_{min}} \tag{1}$$

where:
$UFEI_n$ – value of Unitarized Fragmentary Effectiveness Index calculated for the nth commune;
FEI_n - value of Fragmentary Effectiveness Index calculated for the nth commune.

$$AEI_n = \frac{UIEEI_n + UISEI_n + UINCI_n + UIFEI_n}{4} \tag{2}$$

where:
AEI_n – Aggregated Effectiveness Index calculated for the nth commune;
$UIEEI_n$, $UISEI_n$, $UINCI_n$, $UIFEI_n$ – Fragmentary Effectiveness Indexes subjected to zero unitarization calculated for the nth commune.

The value of the AEI index theoretically fits the range <0;1>. Such a situation can occur only when at least one commune is marked by lowest values of all effectiveness indexes and concurrently at least one unit is distinguished by their highest values. In the population under examination, the range of variability was included between 0.14 and 0.65. The value of the bottom quartile amounted to 0.265, the median – 0.277, the top quartile – 0.299. The arithmetic average (0.291) was placed between the medium word and the beginning of the top quartile. The spatial layout of the measure in hand in Mazowieckie Province, presented in figure 3, confirms the highest effectiveness is a quality of public investments of units located around regional centres of economic growth. In growth centres themselves it tends to be low (Ostrołęka, Płock, Radom). As one moves away from growth centres, the effectiveness of investments is lowered, and in units located along national roads forming regional development axes, a fall in

Figure 3. Spatial outlay of the Intergrated Investment Effectiveness Index (IIEI)
Rysunek 3. Rozkład przestrzenny Zintegrowanego Wskaźnika Efektywności Inwestycyjnej (IIEI)
Source: own study
Źródło: opracowanie własne

effectiveness is smaller. Higher effectiveness is fostered locally by the neighbourhood of minor centres such as Ciechanów, Garwolin, Mława, Płońsk, Przasnysz, Wyszków. In the map one can spot the effect of major communication routes of the region. One can state that the effectiveness of actions of local authorities is not by and large their merit and it should be recognized as a component of the location advantage.

Units marked by the highest values of the aggregated effectiveness of investments, accounting for 25% of the population, counted as the first quarter (quartile I), in the period under examination borne significantly higher outlays as converted per unit of area than the other communes. They averaged 2,235,033 PLN/km². Even on removing Warsaw from the group, the average exceeded 2 mln PLN. The concentration of outlays was not, however, the principal factor enlarging the effectiveness of actions. Relatively high outlays as converted per unit of area was also a feature of a group with the lowest value AEI. The occurrence of differences was decided by fragmentary effectiveness instances.

Every 1 PLN spent for investments by communes belonging to the first quarter was linked with an increment in their internal incomes on average by 17 gr. In the other commune groups marked by the lower effectiveness of investments, an analogous increment averaged from 9 to 11 gr. Concurrently the group in hand was marked by a low mean increment in the costs of current activities related to investments. It amounted statistically to 19 gr for every invested 1 PLN. In the remaining quartiles, the index assumed comparable value (II) or higher value (III – 22 gr, IV – 25 gr). It was reflected in the value of the investment financial effectiveness index. Its mean value in a group of units counted as quartile I amounted to 2. In the other groups it was substantially lower. In communes counted as quartiles II-IV, it amounted respectively to: -9, -13, -14.

The mean value of IEEI was also high. It amounted to 0.42. It is noteworthy that the mean value of the measure in quartile III was higher than in quartile II.

A mean increment in the internal incomes of communes on account of participation in income tax on private individuals as converted to 1 PLN of the value of an investment in communes belonging to the first quarter amounted to 7.5 gr. In the remaining groups it fluctuated from 4.18 to 4.74 gr.

Conclusions

The material presented in the study allows one to state that investments implemented at the lowest level of the public sector influence both the development of the region's economy and the level of population's incomes, which is reflected in the size of amounts raised on account of income taxes on both private individuals and legal entities. Investments of communes feebly influence the level of population's satisfaction, which is also an important element of prosperity [Stiglitz, Sen, Fitoussi 2009]. It is crucial for local government, which in its actions must take account of the so-called political effectiveness dependent on inhabitants' moods [Stiglitz 2004]. The total effectiveness of investments covering their influence on the performance of economy, the levels of inhabitants' incomes and their satisfaction is firmly determined spatially by the arrangement of effects of regional and local growth centres and the arrangement of communications links between them. The low effectiveness of investments in respect of stimulating economy is a feature of rural communes. Smaller differences occur when one takes into consideration their influence on the size of population's incomes. However, it is a result of transferring incomes by inhabitants working outside the place of residence. The situation does not foster the fulfilment of essential social needs and affects the level of the fulfilment of inhabitants' needs [Binswanger 2010, Layard 2009]. This is surely the cause of the low influence of investments of rural communes on changes in the number of inhabitants.

It is worth remembering, however, the examination covered short-term effectiveness. Sustainable development, being a constitutional principle in Poland, requires one to be guided, or at least take account of long-term effectiveness, that is the so-called intergeneration justice. It requires actions so that differences of short-term effectiveness do not cause breaking the principle of intergeneration justice, that is such division of goods, which would ensure the equality of chances for citizens independently of the place of residence. Incapacity to implement the principle launches a number of processes in the social and economic spheres, which on a feedback basis in the long run exert a disadvantageous influence on economy. It must then be expected that public authorities aware of the fact under the 2007-2013 regional operational scheme will take actions effectively balancing market mechanisms observed.

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Streszczenie

Przedstawiono wyniki oceny wpływu wielkości wydatków inwestycyjnych gmin na dochody przedsiębiorstw, mieszkańców, sytuację finansową gmin oraz poziom zadowolenia ludności. Pozwoliły one na zbudowanie syntetycznej miary pozwalającej na ocenę zagregowanej (łącznej) efektywności wydatków inwestycyjnych jednostek samorządu terytorialnego szczebla podstawowego. Umożliwiły równocześnie wskazanie niektórych przyczyn zróżnicowania tej efektywności.

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