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DEVELOPMENT OF AGRICULTURE AND RURAL AREAS IN CENTRAL AND EASTERN EUROPE

Thematic Proceedings

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1. METHODOLOGICAL DETERMINANTS OF RURAL GENERATORS AND INDICATORS

Analogous to definitions of major macroeconomic generators and indicators, for the rural area is applied as follows:

(1) Gross domestic product (GDP) of rural area which represents a part of the national GDP realized in rural areas, as well as in the sections of the economy being part of the multifunctional rural sector. The GDP of the rural sector is an approximate statistical-analytical generator, which is more objective for the analyses of rural areas than for branches or sectors. It represents a balance generator of the production value (generated by the rural policy) realized within an accounting period. Consequently, we can distinguish the areas which are entirely rural opposite to the ones which are significantly but no dominantly rural, as well as the marginal rural areas. Analogous to the definition of the GDP, we define and specify the NDP (net domestic product) for rural areas.

(2) GDP and NDP based on «per capita» of rural area represent a quotient between the aggregate values of GDP and NDP in rural areas and population living in them. The «Per capita» indicators point at the level and rate of economic and social development of rural areas, and they are always present in macroeconomic models and analyses concerning evaluation of rural development level and sustainability.

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1 Goran Popović, Ph.D, Faculty of Economics, Banja Luka, Bosnia & Herzegovina
2 On nomenclature of macroeconomic generators, that is, rural inputs and outputs, more can be found in «Economic terminology», European Commission, Directorate General for Agriculture, Final (Part C), 2004.
3 In the countries implementing rural policy there is neither exclusive statistical nomenclature nor observation rural macroeconomic values. Along with a certain rate of approximation, data for analysis in rural areas can be provided.
4 Areas defined as rural by the authorized criteria and resolutions of the public institutions (undeveloped, uninhabited, abandoned and distant). In absence of conventional economic activities, on these areas, certain rural interventions are dominant. They are considerably stimulated by central, regional, cantonal as well as local state funds.
5 For example CSD indicators of sustainable development in the economic group of indicators use the GDP «per capita» indicator for analysis of economic structure.
(3) Economic growth of rural area exists if the GDP and NDP real increase\(^1\) is realised, both in total and on «per capita» base. Economic development exists when the long term rates of economic growth are in accordance to the structural changes\(^2\). Qualitatively, rural development is a complex category, because along with GDP growth, it includes some other factors generated by multi-functional structural changes and diversity\(^3\).

(4) Investments in rural area represent resources invested in the defined time period in the activities that can be defined as rural or mainly rural. Investments in rural area represent the difference between total investments, that is, gross-investments in the economy and infrastructure of a defined rural area, and investments which could have been invested had the policy of the integral rural development not been realized. Investment analysis at the rural areas can be carried out on the basis of gross or net values, either in a long or a short term, etc.

(5) Fixed funds (capital) of a rural area or a sector represent a sum of investments in a rural compound. The rural fixed funds represent the sum of initial fixed funds (established by a defined methodology) and of rural investments cumulative during a defined period of time.

(6) Capital coefficients\(^4\) of a rural area reflect investment efficiency and its profitability. They can be estimated on the basis of gross and net values, as average and marginal or common and technological coefficients. Their value depends on the investments rate and output growth, development level achieved, structure of the economy, area location, disposable resources, existing conditions, period of investments activation and other factors. The rural policy realizes positive results

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\(^1\) The term «real» comprises that the growth rates are settled up without affects on price changes, by the elimination of the inflation impact (by applying the so-called deflator). On the economic growth and development problems at the territory of former SFRJ, Ivo Vinski gave first definitions in the «Introduction to National Income Analysis», Naprijed, Zagreb, 1967, p. 9-92.

\(^2\) The mentioned CSD indicators in the economic series of determinants are dealing with subjects concerning the economics, which observe the fluctuation of GDP per capita, with investment participation in GDP, balance of trade with foreign countries, as well as with indicators of financial state in some countries.

\(^3\) For more modern aspects of rural development, look at: Goran Popovic, «Experience of some European Countries in the Field of the Concept of Rural Development», Economics in Agriculture, Belgrade, No. 1-2, 2004; Goran Popovic «Experience of the USA in the Process of Development of the less developed Territories by Applying the Measures of Rural Policy», Acta Economica, Faculty of Economics, Banja Luka, 2005.

\(^4\) The rural policy of developed countries, especially of the EU comprises calculation of macroeconomic efficiency of invested resources. Methodology in capital coefficients (K/Yratio) is effectively applied to the analyses of the macroeconomic efficiency of rural and sustainable investments.
along with a long-term increase in rural investments, and along with a simultaneous decrease in value of the capital coefficients. Capital coefficients are used for the macroeconomic analyses, as well as for planning of rural indicators in the future. As alternative means, they are used for determination of an optimal investments rate, demographic investments rate and for an absorbent power of a rural area. Efficiency of the invested means depends on the existing structural relations, as well as on quantity and quality of invested resources as a result of rural policy. Establishment of efficiency comprises classification after the level of rural development of certain areas and observation of existing activities. Volume and quality of investments depends on economic and social level achieved in the national economy, as well as on the development level of some areas.

2. MEASURING ECONOMIC EFFICIENCY OF RURAL INVESTMENTS BY THE K/Y RATIO

Capital coefficients or K/Y ratio is a significant indicator of the macroeconomic efficacy and of contribution of the investments to the economic growth, that is, of measuring investments and interdependence of economic growth.

The growth of the real GDP of a rural area is a function of the investments, that is, \( r_r = f(I_r) \). A relation between deposited investments and trade growth of a rural area is:

\[
\frac{\Delta K}{K} = \frac{\Delta Y}{Y} = \frac{s}{k} \quad \text{(s - rate of investments, that is, of saving; k - capital coefficient)}
\]

Also in the Coob-Douglas production function, the elements of the capital coefficients can be seen:

\[
\frac{\Delta Y}{Y} = a \frac{\Delta F}{F} + b \frac{\Delta Z}{Z} + c
\]

(\( \Delta Y/Y \) – rate of growth GDP; \( \Delta F/F \) – rate of growth in the fixed funds; \( \Delta Z/Z \) – rate of employment; a, b – coefficients, c – residual factors of growth)

\( ^1 \) Multifunctional indicators after PAIS method, CSD-ISD, OECD rural indicators, indicators after RRA methodology and many others are applied to in the calculation of the rate of rural development within an area.

\( ^2 \) Capital-Output-Ratio, that is, capital coefficient, abbr. K/Y, that is, COR.

\( ^3 \) Constituents of the capital coefficient create a part of many models of growth, for example Harrod-Domar’s model:

\[
\Delta K = \frac{\Delta K}{K} = \frac{s}{k}
\]

area\(^1\) is calculated by \(K/Y\) ratio. It is directly proportionate to the rate of investments in a rural compound, and inversely proportionate to the rate of rural economic growth, that is

\[ k_r = s_r / r_c \]

By the growth of the investments along with other unchanged elements, the \(K/Y\) ratio is enlarged. By increasing the rate of the GDP growth in rural compound, along with other unchanged elements, the \(K/Y\) is decreased. The changes of economic structure and of technical progress are defined by these characteristics of the \(K/Y\), giving the answer to the question whether the growth is generated by investments or by productivity\(^2\). The changes of the \(K/Y\) ratio show the intensity of investments in a rural area, and the efficiency of the invested resources, defining how many capital units should be invested, in order for one output unit to be realized. The extrapolation of the \(K/Y\) ratio makes it a useful analytical planned instrument, because the economic efficiency of the rural resources, that are to be invested, is estimated in that way. Most simple form of the \(K/Y\) ratio is an average Capital-Output-Ratio of a rural area, which shows the relation between investments and output of the observed area:

\[
K_r = \frac{K}{Y} = \frac{\sum I}{Y} = \frac{F_f}{Y} \quad (K\text{-capital, } Y\text{-output, } I\text{-investments, } F_f\text{fixed funds})
\]

Most simple form of the simultaneous marginal \(K/Y\) ratio of a rural area shows how many units of investments should be deposited in a rural area, in order for the output to be increased for one unit:

\[
k_r = \frac{K}{\Delta Y} = \frac{I}{\Delta Y} = \frac{\sum_{i=1}^{n} I_i}{\Delta Y} \quad (\Delta Y\text{-rural output growth})
\]

Elimination of the impact of investments, during the first and the last year, is ensured by the use of the marginal \(K/Y\) ratio in a rural area. New rural activated investments increase a value of the fixed funds in rural areas, so the marginal technological \(K/Y\) ratio is:

\[ k_r = s_r / r_c \]

\(^1\) By the adequate statistical methodology, generators and indicators of the rural sector are analysed as macroeconomic proportions.

(m-activation period, that is, an average period from the beginning of making to the beginning of the investments exploitation programmes).

K/Y ratio\(^1\) is exclusively analysed at the level of the national economy or at a wider territorial whole. That does not mean that the use of branch capital coefficients is excluded, although it occurs rarely. The second very important aspect of these coefficients is their time-limit. The K/Y ratio values are not relevant in the case of calculating within short time intervals\(^2\). Redistribution is one of their significant properties. By using comparative methods, the coefficients can show capital and revenue redistribution in the domain of national economy.

Modification of the inversed capital coefficient produces the so-called production coefficient, that is \(p=1/k\). Output-Capital-Ratio (OCR) is an indicator which provides an answer to the question: What level of production or its growth can be realized at a defined investment level? In that sense, we distinguish the average and marginal production coefficients, on the net and gross bases, and they are shown as follows: \(p = Y/I\) (or \(Y/K\)) as average, or \(p = \Delta Y/I\) (or \(\Delta Y/K\)) as marginal production coefficient. Their use in relation to applying capital coefficients is negligible\(^3\). The basic formula for calculating macroeconomic efficiency of investments in rural areas, stands as follows:

\[
S = \frac{\sum_{i=1}^{n-m} I_i}{\sum_{i=1}^{n-1+m} \Delta F_i} = \frac{\sum_{i=1}^{n} \Delta Y_i}{\sum_{i=1}^{n} \Delta Y_i}
\]

\[(e-\text{coefficient of the investments efficiency, } Y\text{-outputs on the basis of gross and net } S\text{-investments}).\]

Production coefficient or a global efficiency of a rural area represents the quotient between the territorial output and investments. The coefficient can be calculated on the basis of net value, by replacing gross with net domestic product.

\(^{1}\) Many authors investigated the Capital-Output-Ratio. Besides Solow, Romer, Hartman, Boskin, Gale, Slemrod, Hines and Devereux as well as others have also given a theoretical and empiric contribution.

\(^{2}\) Solow thinks that there are many serious problems in the analysis of capital coefficients on the basis of a single or of branch principles. He points out that the K/Y ratio is not completely reliable indicator when it is calculated within the short periods of time because of possible fluctuation of its values.

If we want to define what level of the output growth is reached by the investments within a certain period of time, in that case the marginal (global and regional) coefficients of efficiency should be used. In that case, the following formula is to be used:

\[
\frac{\Delta Y}{I}, \text{ or } \frac{\Delta Y}{S}
\]

These investigations can be enlarged by correlative, regressive analyses, with what a bigger stability in making conclusions is achieved. Investigations of relations between the output and the capital deserve a significant place in macroeconomic analyses, both directly and indirectly, in the form of a constituent of many samples in the rate of growth, balance etc\(^1\). The researches can be focused on the coexistence of general and specific development policies, and as such, they represent an essential component in the analysis of changes within economic structures. However, it is important to emphasize that the production coefficient has a less analytical use than the capital coefficient.

### 3. PARTICULARITIES OF CAPITAL COEFFICIENTS (K/Y RATIO)

Characteristics of rural economy in some fundamental propositions deviate from the classical capitalistic values and basic principles of open competition. Deviations mainly relate to the more influential role of the state and necessity for the broadest types of planning. The rural policy in many segments breaks the principles imposed by the competition policies. Certainly, there is a controversy also in the domain of fiscal policy, especially in the conflict between the supporters insisting on the rural area development, using common agrarian policy (CAP), and followers supporting an integral rural development. The capital coefficients in researching rural development give some significant analytical-planned information on macroeconomic trends inside the rural economy, particularly an evaluation of the efficiency of measures in rural policy. The land is one of the basic resources, and one of the most important factors of the economic development of rural areas. Its specific qualities must be isolated and observed within a larger social context. The long-term K/Y ratio decrease of the national economy (especially in the industrial sector) as well as the growth of total investments, point at positive developmental-structural changes and efficient spending of the

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\(^1\) Romer was the first who has formulated the so-called K model, as a more complex form of the output-capital-ratio. For more details see: Romer P. «Increasing Returns and Long Run Growth», Journal of Political Economy, 1986. Also Solow, incorporate in the growth models the quotients Y/K, that is, Output-Capital-Ratio: Solow R. «A Contribution to the Theory of Economic Growth», Quarterly Journal of Economics, 1956.

investments. On the other hand, direct and indirect investments in all sectors have an impact on the value of land as a dominant resource of the rural economy. Besides the dynamic rates of growth, they can enlarge K/Y ratio value for a long time, what will be reflected on the rise of the price of land.

Long-term investment at rural territories has for a consequence the growth of value of capital coefficients, with improvement of the land as a resource, and a real rise of price of land reserves. The rise of price depends on quantity and quality of the invested capital which enhances the existing areas (investment into traffic infrastructure, irrigation, melioration, environment protection etc.), as well as investment into farm production, food processing industry, services). The existing differences between the rural and other territories which are the result of a different investment rate, in a long period, represent the second, very important factor of variation of capital coefficients. When it is about investments being a part of a sustainable economic development, then we can talk of that particular part of the capital, that is, of the fixed funds which have not been realized in a newly created GDP or new productions. A discrepancy between profit making and a need for maintenance of natural balance, demands an introduction of taxes, what serves for the purpose of alleviating or eliminating the consequences of a strong and uncontrolled industrial-urban development. Taxes are being transferred to investments of the sector of sustainable development. These activities are being reflected on the rise of land price, especially at the areas which, are directly treated by measures of sustainable development policy, with tendency of growth of value of capital coefficients, which in such situations do not reflect inefficient managing investments1, but «enhancement of area». Experience in K/Y ratio fluctuation at the rural, distant, uninhabited areas, at which the policy of integral rural development has been implemented, points at a correlation between fluctuation of capital coefficients and price of land. These analyses show the structure of investments and revenue generated by habitual business activities, especially by «outputs»), which exist as a result of a free access to some rare and natural resources. Unobstructed exploitation of some natural resources can affect the revenue growth even without proportionate investments. That may cause fluctuation of capital coefficients, as before, so after introduction of measures of rural and sustainable development.

4. SUMMARY

Measuring macroeconomic efficiency of investments is an obligatory procedure for defining the success implementation of general and particular development policy.

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1 There is also a possibility of inverted situations, for example: free access to exploitation of natural resources (glacier water, rare forests, rare minerals, metals and similar) where high revenues are achieved by means of small investments, and also of low values of capital coefficients.
The use of K/Y ratio can be supplemented by the correlate and regressive analyses. The latest papers have been supplemented by both differential and integral calculus. Analyses of the investments efficiency, having rural and sustainable characteristics, are specific, particularly due to directing the means through state interventionism, and which originate from central, regional and local funds. For that reason, it is necessary to analyze macroeconomic efficiency achieved in these sectors. It is also necessary, because of the high quality planning investments, to interpolate their values in the time to come. The K/Y ratio analysis is one of successful planned-analytic frameworks used for the realization of goals set in that way.

REFERENCES

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