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TECHNIQUES FOR DETERMINING THE EFFICIENCY OF INVESTMENTS USED TO DEVELOP RURAL INFRASTRUCTURE

Georgeta BUMBAC[1]
[1] Lecturer, PhD, General Economic Directorate, Ministry of Health, Romania

Abstract:
The mitigating of agricultural disparities from rural environment can be achieved acting simultaneously in two directions: adaptation, modernization and development of the rural economy in an coherence integrated vision and promoting investment programs that contribute to sustainable rural development consistent with that of the European Union countries. Meanwhile, shares of investment for the development of rural infrastructure have by their nature, complex economic effects.
Keywords: *rural economy, rural infrastructure, sustainable rural development*

1. THE ROLE OF INVESTMENTS IN THE DEVELOPMENT OF RURAL INFRASTRUCTURE

Currently, in Romania, there are differences between the levels of development of the rural areas compared to urban areas and among developing regions [Istudor, 2006]. The mitigating of agricultural disparities from rural environment can be achieved acting simultaneously in two directions: adaptation, modernization and development of the rural economy in a coherence integrated vision and promoting investment programs that contribute to sustainable rural development consistent with that of the European Union countries.

Shares of investments for the development of rural infrastructure have through their essence complex economic effects. Therefore, they have complex efficiency. The investments in infrastructure have as sources: budgetary allocations, private investments coming from domestic operators or from external financing. Amounts of external funding may be commercial loans or grants. However, the amounts required for the infrastructure must to be used in priority areas of development where they can have a complex efficiency as high. Therefore, in this area, attention is given to critically analyze the investments effects. If we critically analyses investments in agriculture, we can say that the characteristic of our people is that we live in today until tomorrow without having future projects viable and able to best capture the desire of men to coagulate energies in achieving a goal [Dropu, 2007].

In the past five decades have been created financial organizations - banks aimed to facilitate access to capital-required states do not have the financial resources to ensure their infrastructure development. As a result, many countries of the world, to overcome economic difficulties, enlist the aid and international assistance. The best-known international organizations, financial - bank the money for infrastructure that is International Monetary Fund (IMF), European Bank for Reconstruction and Development (EBRD) and European Investment Bank (EIB).

International financial institutions grant loans based on a profound analysis of investment projects developed by potential beneficiaries. To ensure normal running of loans, international banks have developed its own methodology and a system of indicators for assessing the economic efficiency objectives to be built using loans. The most important indicators used by financial organizations - banks and have been adopted by the banks in our country are presented below.

2. MAIN INDICATORS USED IN ELABORATION OF INFRA-STRUCTURE PROJECTS

Beyond the urgent need for the adoption of investment projects to fulfill public interest objectives in agriculture, they must be analyzed in terms of financial and economic rationality. To observe the performance of an investment project can calculate a number of specific indicators, depending on what we want to evaluate the analysis. The evaluation work (especially the one before financing) used the expression in value units, comprehensive option when complex processes due to the high degree of generalization

1. *The commitment of capital* - is an indicator that the total initial investment cost for building production capacity and subsequent startup costs for the operation objectives, including depreciation, expressed in value at the reference date, which in most cases is considerate time of commencement of investment. In economical activity, this indicator is known as the "capital employed" and is calculated by the relation:

$$K_{ta}^{n} = I_{ta}^{n} + C_{ta}^{n} = \sum_{h=1}^{d+D} (I_h + C_h) \frac{1}{(1+a)^h}$$

Where:
A = coefficient update;
d = execution period of the investments;
D = effective lifetime of the target building.
K_{ta}^{n} = total committed capital updated at the moment "n";
I_{ta}^{n} = total investment updated at the moment "n";
C_{ta}^{n} = total costs updated at the moment "n";
I_h = annual investment;
C_h = annual costs

To use this indicator to analyze the economic efficiency of investment in infrastructure, it is necessary to bear in mind that investment alternatives can be evaluated on the basis of equity unless sun projects comparable, ie they have the same execution time, the same length of service and operating costs are similar. In practice infrastructure investments, the issues are very complex. You can use the tools or techniques of construction and operation that may change during the execution key, period of service and the amount of annual expenditure. Therefore, equity indicator is used always when evaluating investment alternatives and only selective projects to analyze different investment objectives.

For investments in rural infrastructure, which have a very long operation and a low rate of return, based on the evaluation of the indicator "capital employed" is in good condition when considering options, but only for guidance when it comes to different projects which, investment in infrastructure and incomparable environment call (once). Whether it is used in the analysis of economic efficiency, the "Capital Commitment" is of great important for investors and managers, because through its use is in response to a number of key questions for the economic analysis, as is the total amount of cash flow is higher or lower than the capital employed? Banks believes that a project is efficient if it satisfies a prerequisite, as evidenced by the relationship:

$$CF_{ta} \rangle K_{ta,}$$

in which: CF_{ta} = total updated cash flow;
$K_{ta,}$ = total updated committed capital.

In the case where, in an embodiment has been invested more in equipment and technology, compared with other methods, to obtain the corresponding savings in annual operating costs, so that the duration of the service, to reach an acceptable value of equity. The investment

process, in any field, it is intended that capital commitment to be as small in relation to total economic effects. Although committed capital indicator is widely used in the analysis of efficiency of investment projects where investments are made for rural infrastructure and environment, this indicator will be used subject to the inclusion in income and social effects obtained.

2. *Relationship between total updated revenue and total updated costs.*

We know that for all investment projects primary endpoint is formed by static and dynamic analysis of the revenue / costs. In business practices, analyze revenue / costs are based on an assessment report and the absolute difference between total updated revenue V_{ta} and total updated costs C_{ta}, highlighted by employed capital $K_{ta,}$ for n = 0 [Stoian, 2010]. For a static approach to the problem (n = 0) the net benefit of the project will be:

$$AN = V - K$$

When using present value at a certain discount rate (a) the net benefit for a particular project will be:

$$AN_a = V_{ta} - K_{ta}$$

If $V_t = K_t$, respectively V_{ta} = $K_{ta,}$, ratio revenue / cost (r) will be equal to 1:

$$r = \frac{V_t}{K_t} = 1 \text{ and } r = \frac{V_{ta}}{K_{ta}} = 1$$

In this case, the beneficiary does not lose investment, nor profit.

When the project is effectively $V_t > K_t$ and, respectively $V_{ta} > K_{ta}$ and ratio revenue / cost will be greater than 1, respectively:

$$\frac{V_t}{K_t} > 1 \text{ and } \frac{V_{ta}}{K_{ta}} > 1$$

Since the analysis of this indicator refers to a distant horizon, when V_h and C_h is forecast sizes, in order to remove some of the deformation of indicator r *,* as a result of changing market conditions, to allow a design, it is necessary to *r* to be much greater than 1. The higher this index is to 1, the more efficient investment.

For investments in rural infrastructure and environmental protection, the value of this indicator is generally high. This is explained by the fact that infrastructure investments have a low level of profitability, but at the same time, social and environmental effects that are not included in the income calculation produce the economic effects.

Assessment method in infrastructure project investment based on analysis of cost-income ratio, although satisfying many requirements indicating the possibility of obtaining the maximum economic advantages but also some drawbacks. This inconvenient are that criterion does not directly take into account certain restrictions financial, currency and so on, no requirements to ensure future development possibilities of production and, on this basis, to increase revenue.

3. Net present value (VN_{ta}) is a crucial indicator for the economic evaluation of investment projects in rural infrastructure works. Its content updated total net income indicator shows the absolute value of the economic benefit of an investment project, expressed either as cash flow in the current or as the net present value. When the duration of the project investment, d is shorter than one year, and start operation immediately target the expression used to calculate this indicator is:

$$VN_{ta} = \sum_{h=1}^{D} CF_h \frac{1}{(1+a)^h} - I_t$$

If execution time is longer than one year, *d*> 1 year,

$$VN_{ta} = \frac{1}{(1+a)^d} \cdot \sum_{h=1}^{D} CF_h \frac{1}{(1+a)^h} - \sum_{h=1}^{d} I_h \frac{1}{(1+a)^h}$$

The net annual value for each year, *h,* means the difference between the projected annual income and an investment project and the amount of annual investment costs and operation in *h* year

$$(I_h + C_h = K_h)$$

Where: $VN_h = V_h - (I_h + C_h) = V_h - K_h$

Given that the investment project data updates, VN_{ta} can become negative if you choose a discount rate - a - too big.

Knowing that the most effective investment project is the one that provides the highest net income VN_{ta} calculated as the difference between V_{ta} and I_{ta}

$$VN_{ta} = V_{ta} - I_{ta}$$

This indicator is used as a criterion for investment decision making. Net present value calculated based on annual income and annual capital and operating costs expressed in present value when n = 0, allows a full analysis on the time horizon - d + D, taking into account the dynamic and flow parameters thereof. It follows that on the basis VN_{ta} can established as an investment project or some variants of it are convenient makers. With all the advantages mentioned, the indicator VN_{ta} presents some drawbacks, including:

a. VN_{ta} helps us to see that the project is profitable, but do not indicate relative contribution of that project;
b. based on this indicator cannot decide if it relates to different periods of service projects;
c. VN_{ta} not take into account the payback period;
d. VN_{ta} depends on the size of update rate .

Although the drawbacks mentioned, net present value is an indicator that is used to analyze the current investment projects for rural infrastructure and environmental protection. To highlight as many sides of the economic efficiency of investment in infrastructure, but have used this indicator in conjunction with other indicators, recovery period, rate of return, IRR, etc.

4. The profitability index is the ratio of net operating cash flow amounted updated with residual value and investment at the moment. Health experts recommend that the assessment should take place at key "type or" entry point ". With this indicator shows the ratio of the net present value and volume of investments that generate this income. May be taken into account for the calculation of this index, initial investments I_t or their current value. With the stylus to select options presented efficient design. They are ordered in relation to the profitability index values. Note that the higher the index is higher, the projects are potentially more effective in comparable. Usually we use the analysis projects with profitability index when they differ among themselves in the investments (I_t), since it allows to take into account the amounts invested and the investment costs, issues that are not reflected by VN_{ta}. In such analysis, the optimal variant design is one that meets the criteria: $K_a \rightarrow$ maximum.

For investments in rural infrastructure and environment, profitability index (K) must be interpreted specifically. The fact that this indicator is lower than in other sectors due to high payback period and include, in the calculation of the environmental and social effects of high utility. Specialized studies indicate that the hydro investments to limit landslides and their effects eg the index of profitability K ranges from 1% to 8%. The low level of profitability is given the high costs of the works but does not yield any direct, immediate, so real economic effects, but the effects of soil protection against

degradation by slipping and social effects such as protecting the village, construction of means of communication and local residents.

5. Internal rate of return is composed of the rate at which net present value of the project has a nominal value zero. This indicator shows the maximum cost of capital which is supported by the project in question. Projects are rejected if *Rir* has the value below the cost of capital and interest, but at the same time if you have to choose from several projects in the selection, will earn the highest rate. The value of *IRR's* most faithfully, concrete and coherent internal capacity of a project to produce benefits by amounts invested, and so is the determining factor in accepting the maximum level of interest of the project. This indicator has shortcomings posed by the method of calculation (quite laborious and references to results approximate) false idea that project revenues will be reinvested in a project that can be calculated more internal rate of return.

$RIR = a$, where (a) = 0.

Internal rate of return is therefore limiting the update rate, which is canceled VN_{ta} in a particular investment project:

$VN_{ta}(a = RIR) = 0$ and $\frac{V_{ta}}{K_{ta}} = 1$.

In literature, internal rate of return is an important indicator expressed as the discount rate at which revenues are equal to total cost, ie net present value is zero. This indicator should not be confused with financial rate of return used in the current analysis view of the business, which is calculated as the ratio of annual profit and total production costs. Internal rate of return calculation can be done about analytical or graphics.

The calculation is as follows:

$$RIR = e_{\min} + (e_{\max} - e_{\min})\frac{VNA(+)}{VNA(+) - VNA(-)}$$

Where:

$e_{\min}$, $e_{\max}$ - the minimum and maximum refresh rate;

$VNA(+)$ - net present value of the minimum rate update;

$VNA(-)$ - net present value of the maximum rate update.

For the selection of investment projects by this indicator's level should be compared with that of similar projects executed in the country or abroad, were selected only those that IRR is above the level of similar past. Basically, the IRR calculation is done by successive attempts. To calculate the internal rate of return operative may be used graphs of the type shown in Figure 1, being able to determine the IRR, setting the minimum and maximum on the abscissa the discount rate and the ordinate the net income properly maintained. When joining within the intersection of the two net present values with abscissa, is the internal rate of return.

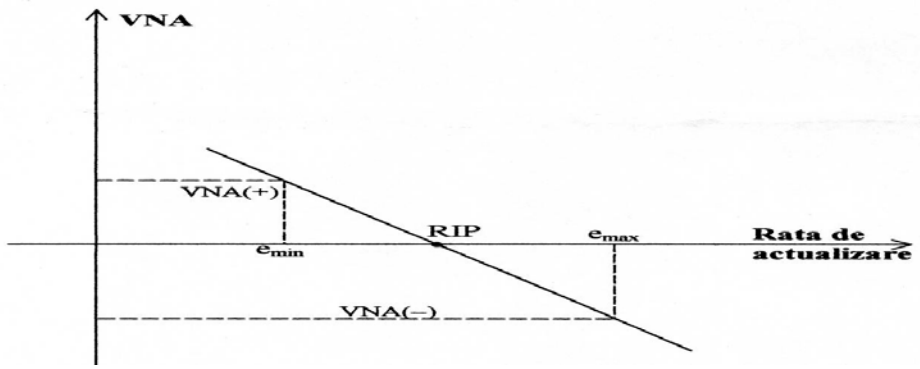

Fig. 1 IRR calculation graphical method
Source: Vasilescu I., Roman I, CICEA C. (2000) "Investments", Economic Publishing House, Bucharest, p.233

To use this indicator in the analysis of economic efficiency, it is necessary to bear in mind that investment alternatives can be evaluated on the basis of equity only if projects are comparable, ie they have the same execution time, that period of service and costs operation are similar. In practice, you can use tools or techniques implementation and operation that may change during the execution key, period of service and the amount of annual operating expenses. Therefore, equity indicator is used always when evaluating investment alternatives and only selective projects to analyze different investment objectives of rural infrastructure.

For investments in rural infrastructure and environment that have a very long operation and a low rate of return, based on the evaluation of the indicator "capital employed" is in good condition when considering alternatives, and only for guidance when it comes on different targets in this area are, by their nature, "which are unique works" and produce many social effects.

It is content, internal rate of return is fundamental criterion function for evaluating investment projects and formulating options. However, investment projects that have values close is IRR choose what is maximum. IRR is an important indicator, with force greater information than the recovery period, the coefficient of profitability and economic efficiency. To properly assess complex but an investment project, IRR always used with other complementary indicators such as: ,

In case of investments for infrastructure and the environment, an investment project can have multiple internal rates of return convenient. Such situations arise when the objective has built a long life, and this time, make new investments for rehabilitation. However, although the IRR may result in less consistent when assessing investment projects, this indicator was hurting a main criterion for selection of projects in the different conditions of the investment process. Therefore, it is commonly used in our country banks and international financial organizations.

3. CONCLUSIONS

The efficiency of economic activity from agriculture account for partial efficiencies of each individual or commercial farm. The economic efficiency can be considered depending on the amount and quality of resources, but also the diversity of effects. When choosing the desired investment project to be implemented optimally criteria are used. These criteria are of relative, modifying from one period to another and from one object to another. Optimizing time and space optimization form

important sectors of economic objectives of economic efficiency. In this sense, I think it takes a perfect collaboration between all those involved in the investment: customer, designer, equipment manufacturers, etc.

Given that the country's agricultural area is limited (about 60% of the total surface) I think we must made great efforts to exploit the maximum of what we already have, and even efforts to increase this area by introducing recovered infertile land surface. The orientation of the investment decision-making bodies should be made taking into account and the low allocation of investment resources available now.

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