THE EFFICIENCY OF CAPITAL INVESTMENTS INSIDE COMPANIES

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Abstract: Justifying the decisions regarding the investment projects that are going to be implemented by companies is based on a series of efficiency criteria which reflect the most important aspects of the investment process tied to the obtained results in accordance with the expenses. Considering the opportunity cost of the invested capital and the time's influence on value, making the investment decision is not an easy task. The paper presents aspects regarding two important criteria used in substantiating the economic efficiency of the capital investments: the net adjusted present value and the internal rate of return.

Key words: economic efficiency, capital investments, net adjusted present value, the internal rate of return, substantiating decisions

1. The net adjusted present value method

Because the investment objectives usually have a long exploitation period, naturally their economic parameters manifest differently in time and affect the efficiency degree and the economic viability.

The project's investors are the main capital suppliers who, by financing the project, give up a potential earning resulted from using the capital in a different business or on the capital market. They will be interested in the invested capital's opportunity cost and its value at different moments of time, which is important for substantiating the decisions regarding the proposed project. For the investors it means the expected rate of return which justifies giving up the chance to render profitable the capital in a different alternative of investment. For the entrepreneur the invested capital's opportunity cost represents the minimum profitability level, which must be guaranteed by efficiently managing the resources allocated for the desired objective.

In setting the invested capital's opportunity cost its influence factors intervene, such as: the incomes resulted from the project during its life duration, the investment's cost and the influence of the time factor.

For the investment projects, time is an important economic resource which leaves its fingerprint on each element involved in reaching the objective. Both the investment efforts' elements and the elements of the resulted effects have a bigger or smaller size when they are analyzed in comparison with the epoch outlook. Establishing the correct economic profitability, which means the earning brought by the project, implies a temporal approach of its economic parameters by using up-dating techniques.

For investment projects the most important moment is the launching of the objective's execution. From this moment the capital suppliers give up allotting their capital in other investment alternatives and pour their money into the project.

When analyzing the opportunity cost, the biggest interest is studying the economic-financial indicators specific to the investment's objective at the moment of substantiating the decision and at the start of the project's life cycle. When evaluating the project's economic efficiency we usually adjust the parameters at the m_o moment, but depending on the interests of the investors other scenarios can be used.

By placing the moment of the economic profitability's analysis in the phase of substantiating the investment decision, in order to compare different economic-financial indicators achieved in different time periods it becomes necessary to find out the adjusted present values of the efforts' and investments effects' parameters at the time of starting to implement the project (m_0).

The financial approach of the opportunity cost takes into consideration the liquid assets flows which are obtained in the future by exploiting the objective. These future earnings are evaluated through their present value.

When an *S* sum is invested in the project and the investment objective is reached in a number of years (*d*) and from its functioning result annual net earnings (*P*), the calculus formula of the net adjusted present value (*NAPV*) is:

$$NAPV = \sum_{h=1}^{n} \frac{P_h}{(1+a)^h} - \sum_{h=1}^{d} \frac{S_h}{(1+a)^h}$$

If we apply the formula for all the situations which imply making a net income or having investment expenses in any year of the objective's existence, the calculus formula is:

$$NAPV = \sum_{h=1}^{n} \frac{P_h}{(1+a)^h} - \sum_{h=1}^{n} \frac{S_h}{(1+a)^h}$$

or

$$NAPV = \sum_{h=1}^{n} \frac{I_h}{(1+a)^h} - \sum_{h=1}^{n} \frac{S_h + E_h}{(1+a)^h}$$

where: I_h şi E_h represent anual incomes and expenses for *n* years

The situation when the net adjusted present value is positive proves that capital suppliers can choose as investment to finance the project and thus have a comparative earning with the alternative to invest on the capital market. If the net adjusted present value is zero it means that allocating money for the project is not a good decision, because a superior fructification of the capital can't be guaranteed. In these conditions, the available financial resources can be directed towards the capital market with the same earning rate and with a lower risk, or towards financing a different, more profitable project.

In order to determine the net adjusted present value there are other calculus methods recommended by the methodologies of different financial institutions involved in monitoring funds destined for financing investment projects. They lead to approximately equal results.

An aspect which influences a project's efficiency is the capital's adjusting rate. It can be set at the level of the capital's opportunity cost, which depends on: the interbank bid rate (if the project is financed from long term loans), the inflation rate (to maintain the capital at least at the present level), the sector's or the economy's rate of return, etc. If the project is financed from own sources then the actualization rate is set depending on the average return of the company in which the project is implemented (set for the last 5-10 years) to which a certain risk premium is added.

For the actualization rate to guarantee a fair evaluation of the project, the rate should be set at the level of the weighted average cost of capital, which will lead to an earning regardless of the used sources of financing (own or lent). Because of the difficulties tied to establishing the cost of different capital components, in practice the actualization rate's size, which guarantees a reasonable profitability for a project, is at the return level of the money market and it corresponds to the opportunity cost of the long term capital. For the European money market the rate stretches between 5 and 10%. In Romania, for the 2000-2006 periods, the reference size recommended by specialized institutions for the adjusting of investment projects was 6%.

The rate's size also varies depending on the economic sector in which the project is set. For example, for agricultural investments the Ministry of Agriculture and Rural Development recommended a value rate of 8%, which covers the refinancing rate of the European Central Bank and the country risk margin.

2. The analysis of the internal rate of return

The analysis of the internal rate of return allows appreciating the future performance of the investment project, by offering information about the extent to which the project will ensure in a real manner the needed cash for its good functioning and won't be in the danger of being stopped.

The internal rate of return is an adjusting rate for which the total adjusted incomes resulted in a project is equal with the total adjusted expenses spent during the investment and its exploitation.

The rate's level shows the quality of the project, expressed through its capacity to recover the expenses caused by reaching the investment objective (the investment cost and the operating cost) and to create net income. Because it reflects the earning power of a project, in the case of multiple alternative projects, the

chosen project will be the one which is characterized by a higher internal rate of return. A necessary acceptance condition for a project is for its internal rate of return to be higher than the capital's opportunity cost approximated through the adjusting rate, if this is an imposed regulation. In this case, the project offers the investors a higher financial yield than in the case of a different investment alternative (the banking system, papers, a different project).

The calculus algorithm of the internal rate of return is based on the idea of the net value's inversely proportional dependence to the adjusting rate. We must find that certain internal rate of return (adjusted) which when used to bring to present the net incomes derived from the project, can lead to a total adjusted income equal to zero. The economic significance of the indicator is at a low level of yield, a point when the total adjusted incomes equalizes only with the total adjusted expenses, thus, there is no profit. Over the level of the internal rate of return, the net adjusted value is positive (profit), and below its level there are losses. The steps of the algorithm are the following:

- in the beginning, the net value is adjusted to different adjusting rates;
- the size of the net adjusted value is established at >0 and has as correspondent the smallest adjusting rate a_{min};
- the first net adjusted value's level <0 is calculated and has as correspondent the biggest adjusting rate a_{max} ;
- the internal rate of return will be in the [a_{min}, a_{max}] interval, which must be lower than 5% and in the interjection.

The calculus relationship of the internal rate of return is based on the following formula:

$$IRR = a_{\min} + (a_{\max} - a_{\min}) \cdot \frac{NAV_1}{NAV_1 + |NAV_2|}$$

where: *IRR* is the internal rate of return;

NAV_1 – the positive net adjusted value;

NAV_2 – the negative net adjusted value.

3. Case study

Studying the profitability of an investment is illustrated in the case of a project which presents the following economic-financial indicators in table 1.

Indicators	Years									
	1	2	3	4	5	6	7	8	9	10
1. Annual expenses, as follows:	4576	14135	31753	28566	28284	29644	28644	28284	28284	28284
- Total investment	4576	6360	3903	320	-	1360	360	-	-	-
- Operating costs	-	7775	27608	27948	27948	27948	27948	27948	27948	27948
- Interests	-	-	-	32	32	32	32	32	32	32
-Taxes	-	-	242	266	304	304	304	304	304	304
2. Annual incomes	-	6000	23370	30100	30100	35218	36182	36265	36265	36265

Table 1. Financial indicators of the investment project, thousand lei

On the basis of the elements of expenses and incomes resulted from the investment objective's functioning it can be established which are the annual net income flows and what is their adjusted value. The results are presented in table 2.

Indicators	Years									
	1	2	3	4	5	6	7	8	9	10
1. Annual expenses	4576	14135	31753	28566	28284	29644	28644	28284	28284	28284
2. Annual incomes	-	6000	23370	30100	30100	35218	36182	36265	36265	36265
3. Net incomes	-4576	-8135	-8383	1534	1816	5574	7538	7981	7981	7981

(2-1)										
4. The $(1+a)^{-h}$ factor	0,926	0,857	0,794	0,735	0,680	0,630	0,583	0,540	0,500	0,463
5. The net adjusted income	-4237	-6972	-6656	1127	1235	3512	4395	4310	3990	3695
6. The net adjusted value	4399									

Table 2. The net adjusted value (a=8%), thou lei

The analysis made on the basis of the net adjusted value indicator shows that the project is acceptable and represents an investment opportunity. It guarantees that at an adjusting rate of 8% the total adjusted cash flow is 4399 thou lei, a sum which represents the real earning resulted from implementing the project.

In order to find the internal rate of return, first we must determine the interval in which the profitability of the project is placed. In the case of the studied project, it has already been observed that for an 8% adjusting rate the adjusted net value is positive, but we must know the turnaround, which is the level of the adjusting rate from which the adjusted net value starts to be negative. To find the size of NAV_1 and of the NAV <0, which is NAV_2, the adjusting rate must be increased successively.

Years	**Annual net incomes**	**Net adjusted incomes**	
		a=10%	**a=15 %**
1	-4576	-4159	-3976
2	-8135	-6719	-6150
3	-8383	-6296	-5508
4	1534	1048	877
5	1816	1128	902
6	5574	3144	2408
7	7538	3867	2834
8	7981	3723	2610
9	7981	3384	2267
10	7981	3077	1971
Total	**19311**	**2197**	**-1765**

Table 3. The net adjusted income used to calculate IRR, thou lei

On the basis of the results obtained in table 3 it can be seen that the internal rate of return is in the [10, 15] interval and its value is:

$$IRR = 10\% + (15\% - 10\%) \cdot \frac{2197}{2197 + |-1765|} = 12{,}8\%$$

At a level of financial profitability of 12.8% the project can be accepted. This profitability covers the rate of interest, the expected inflation rate and a certain safety margin.

Conclusion

The used methods of analysis allowed substantiating the opportunity of the investment decision, the purpose being the company's economic-financial development. The criteria which guided the profitability's evaluation for the project was economic and both of the decision criteria pursued especially to signal the critical aspects that could lead to the impossibility to cover the financial efforts and to a lack of an earning for the capital suppliers. The real evaluation of the investment's profitability must be made

on the basis of a more complex system of criteria, which will target benefits not only for the economic perspective, but also for the local communities and for the environment.

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