

## CONSIDERATIONS REGARDING THE INFLUENCE OF THE BASE LEADING RATE OVER INVESTMENT PROJECTS FINANCED BY EU FUNDS

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*ABSTRACT: The investment process is a complex economic process that implies risks. Allotting capital resources in an investment project without using an adequate discount rate of the cash flows, which will take into account the evolution of the base leading rate of NBR (National Bank of Romania), can lead to the total or partial loss of the invested capital by the European Union, by Romania's government and by the applicants. There is a permanent concern from the experts to find an adequate indicator to calculate the discount rate of the cash flows, which will be able to provide an accurate image of the efficiency of an investment project and that will allow to make the right decision regarding the existent financing or capital investment alternatives.*

*Key words: discount rate, base leading rate, internal rate of return (IRR), net present value (NPV)*

*JEL codes: D63, E22, E43, E58, G21, G31*

### **Introduction**

Regarding the investment decision, risk implies any situation when the features of a future event are not known, but what it is known is the number of possible investment alternatives and the occurrence probability of future relevant events for the success of the investment project. The risk sources present in the investment decision are:

- Errors in the analysis of the investment opportunity;
- An optimistic estimation of the data regarding an investment project (possible to diminish through applications of the prognosis methods);
- The inaccurate assessment of economic phenomena and processes;
- Unpredictable changes of the economic environment;
- The complexity of the economic environment and the size of the project.

The study of the investment risk uses differentiated methods for the risks associated to capital investments and financial investments.

In this instance we'll especially deal with the capital projects.

**Therefore, for capital projects** the risk is usually composed of three risk categories:

- *The individual risk of the project:* is the risk the project would face if it would be the only asset of the company and is measured by the variability of the estimated profitability of the assets in which it was invested.
- *The company risk:* is the effect of a project over the organization's risk without considering the diversification of the shareholders and is measured by the impact of the project over the variability of the company's profits.
- *The market risk:* is the risk of the project assessed from the perspective of an investor who owns an extremely diversified portfolio.

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We will add here a fourth risk category: the risk related to the frequent change of the base leading rate by the central bank – an aspect that we want to detail next.

### **Literature review**

The context and the starting point of this study is a rich specialized literature that defines the conceptual framework of the financial indicators of public or private investment projects; on the other hand, this literature sets the limits of this indicators in accordance to the economic context.

The macroeconomic context influences decisively the implementation of the investment projects co-financed by the European Union. Here are included the investment and operational costs, the delivery dates, the revenues' increase, the performance of the project's products – ultimately, obtaining the benefits of the project through the project. If the previsions put at risk the economic part of the project, it's the investor's responsibility to determine the needed changes and, ultimately, in worst case, to stop the project (Rodney J.T, Stephen J.S, 2004).

The economic side of the project is known under the name of cost-benefit analysis.

The object of the cost-benefit analysis is to facilitate the most efficient allotment of resources to society. There is an ex-ante cost-benefit analysis (which we are especially interested in within this study) and an ex-post analysis. The ex-ante cost-benefit analysis is done when it is time to decide on whether the financing resources will be allotted – in our case by the Government, European Union and various beneficiaries (public or private). If the analysis is accurate, it helps choose the best project or it could lead to the decision to continue or to drop the project (Anthony E.B, David H.G., Aidan R.V., David L.W., 2001).

The cost-benefit analysis is based on a series of synthetic indicators, which rely on the principles of discounting future cash flows, indicators that are used in assessing these projects. In all the evaluation processes we need a reliable benchmark in relation with which we estimate a value for the capital investment in an enterprise or a direct investment project or a portfolio investment project. Without this benchmark we can't give value to the business that could emerge from that capital investment.

The Opportunity Cost of Capital is the profitability that the investors give up if they invest in a certain investment project and not in securities from the same class of risk. (Stancu, I., 2002)

The most frequent opportunity level, namely profitability level, is measured through the refinancing interest of the central bank.

### **Research methodology**

The research targeted to identify the key elements related to the role of the discount rate of cash flows projected for determining the financial indicators specific to the investment projects financed by the European Union, namely give dependence to this base leading rate, as well as the influence exercised by the latter on the co-financing made by the beneficiaries for the projects regarding the eligible and ineligible expenses of the projects.

In order to conduct the research, we did a documentation based on various analyses, studies, practice handbooks elaborated by Management Authorities in Romania for the financing approval of projects within EU programmes, taking into consideration the stipulations of the Working document no. 4 of the European Union Commission, especially regarding the cost-benefit analysis of these projects.

At the same time, the specialized literature, the current legislation in Romania regarding feasibility studies, as well as the practical aspects met and resulted from the experience of the authors were also taken into account. Thus, the "live" research, the process of writing projects financed by the European Union, as well as their implementation were used, so that there is a research base of over 85 projects approved to be financed on the main programmes, as detailed below.

## Theoretical aspects

### 1. The consequence of the refinancing rate used as a discount rate in investment projects

Among the analysis methods regarding investments, the methods based on discount contribute to assessing the efficiency of the investment projects in an objective manner. The comparisons between investment expenses and the additional profits generated by a project are achieved by eliminating the time influence, bringing all the operations at the same moment of reference. The discount rate is established at the level of the average interest rate adjusted with the inflation rate and the risk premium (for investments financed from capital resources) or at the level of the weighted average cost of capital that take into account the economic and financial risk. Thus, the market interest rate earns the role of objective criterion for the assessment of investment projects and selection of the most efficient. Therefore, the level of the base leading rate often appears as the discount rate within the financial analysis of investment projects.

The purpose of these financial analyses is to use the previsions of the project's cash flow in order to calculate the adequate productive rate, especially the internal rate of return (IRR) or of the investment (IRR/C) or of the capital (IRR/K) and the adequate financial net present value (FNPV), by using the specific discount rate.

Therefore, the main efficiency indicators of the investments used in the decisional process are:

- 1) Internal rate of return (IRR);
- 2) The financial net present value (FNPV).

**The internal rate of return (IRR)** is the sole discount rate; if it is applied, the net discount rate reaches a null value, meaning the present value of the future cash inflows is identical to the present value of the current outflows associated to the investment. In other words, if the estimations related to cash flows are met, the investment value will be written-off during the economic life of the project, generating also an identical profitability to the used discount rate. One of the advantages of this indicator is the how easy it can be compared with the required profitability and/or capital cost – an aspect that we'll approach in this paper. Actually, for IRR the problem is finding the discount rate that balances the inflows with the outflows.

In order to allow the analyst to determine a sole rate of return for the project, IRR allows a ranking of the potential alternatives based on a single number and through a direct comparison with the profitability standard.

The maximization objective of the investor's welfare calls for maximum profitability for the same risk. Thus, for the same level of risk, the capital investment will be made for the project with the highest profitability. The capital investors in an enterprise or in an investment project target the maximization of the wealth through superior remuneration (IRR) (over the  $k$  average from that business risk class):  $IRR > k$ ;  $FNPV > 0$  (Stancu, 2006).

The internal rate of return must be higher or equal to the average rate of interest on the market or the weighted average cost of capital, in order to justify the made investment. Only in these conditions the internal rate of return allows to clear the financing cost.

The internal rate of return is defined as discount rate for which we have the following relation:

$$I.R.R. = "i" \text{ (unknown), for which } FNPV = 0, \text{ meaning:} \quad (1)$$

$$SUM [ CF_t / ( 1 + a ) ] - I = 0. \quad (2)$$

CF = cash flow

t = the year (within the time horizon of the investment)

a = the discount rate;

I = the investment value;

**Financial net present value (FNPV)** is used to estimate how the annual decrease of the operating cash flow is permitted during the economic life span, fulfilling the minimum profitability requirements requested by the investors, the financial net present value is used. After the calculus of

the net present value results either a surplus, or a deficit of the cumulated actualized benefits, compared with the present value of the investment.

The financial net present value (FNPV) expresses the capital surplus resulted at the end of the investment's life span, including the residual value. The discount of future revenues at the present moment and comparing the various investment options are met more often than their capitalization at a future moment, in order to make the same comparison of the investment options. The same argument is used, but the specialized literature recommends the FNPV criterion.

This method consists of comparing the initial expenses ( $I_0$ ) with the present value of the expected cash flows ( $CF_1, CF_2, \dots, CF_n$ ) for the entire life span of the investment ( $n$ ). The net cash flow represents in this case the liquid assets flow resulted after deducting the tax.

- where:  $i$  = the discount rate.

$$FNPV = -I_0 + \sum_{p=1}^n CF_p (1+i)^{-p} \quad (3)$$

If FNPV is positive, the sum represents an earning over the level of the capital cost.

The treasury flows that are compared are expressed at their future value resulted through the capitalization at the interest rate without risk. The financial net present value (FNPV) represents the capitalization of the net value for the life span of the investment ( $n$ ).

The net present value is determined as a difference between the future and the present treasury flows at the market interest rate. The FNPV rule starts from the hypothesis of unsaturated market. Capitals ( $I$ ) can be reinvested any time on the money market at the market interest rate ( $a$ ) in order to obtain future treasury flows ( $CF$ ):

$$I(1+a) = CF_t + VR, \text{ for } t=1, 2, \dots, n, \text{ years} \quad (4)$$

In order to justify the investment, FNPV must be positive and higher than the composed interest, cashable from the capital market. In these conditions, the higher is the present incomes in comparison to the invested capitals, the more efficient the investment project will be, tending to maximize FNPV. The optimum level of capital allotment is reached when the marginal return rate of the last investment projects become equal with the market interest rate ( $MIR = a$ ). If FNPV is negative, the cash flows don't allow the rebuilding of the funds allotted initially and the project must be rejected. For credited investments, FNPV must be higher to the paid interest.

If the discount rate ( $a$ ) varies from one period to the next, the FNPV relation can be written as follows: a high discount rate determines a lower FNPV, that is why is essential to choose the discount rate for the reliability of a study.

The FNPV selection criterion for investment projects implies the existence of a positive FNPV and the investment project with maximum FNPV is preferable because it will determine the maximum possible increase of profits and thus, of the owner's wealth.

## **2. The level of the discount rate in investment projects financed by the European Union, for determining the IRR and FNPV**

At this moment the recommended discount rate by the EU and used in investment projects co-financed by the European Union doesn't take into consideration the economic reality existent in Romania and the evolution of the base leading rate of the central bank, therefore the investment decisions associated to these projects are very often wrong and lead to losses on medium term instead of leading to net added value.

According to Working Document no. 4 of the European Commission, the recommended discount rate ( $a$ ) used in the financial analysis for the discount of the net cash flows is 5% in real terms (the analysis will be done in constant prices, without inflation).

The most known investment projects co-financed by the EU are:

**ROP – Regional Operational Programme** – programme that finances projects regarding:

- The improvement of the quality of life and of the town's appearances, as well as their growing role in the region;
- The improvement to the region's accessibility by developing the infrastructure networks – county roads and ring roads;
- The modernization of the social services: schools, clinics, intervention services in emergency situations, etc.;
- The increase of investments in businesses, by supporting small sized enterprises, improving the utilities networks and the business infrastructure;
- The modernization and rehabilitation of the existent tourism infrastructure.

The discount rate used in the financial analysis = 5%, and in the economic analysis = 5.5%  
As a general rule within ROP,  $FIRR(C) < 5\%$  for the justification of the non-refundable co-financing.

**SOP IEC – Sectorial Operational Programme „Increase of Economic Competitiveness”**

SOP IEC's general objective is to increase the productivity of the Romanian enterprises in order to reduce the gaps towards the average productivity in the European Union. The specific objectives are:

- The sustainable consolidation and development of the productive sector;
- Creating a favourable environment for the sustainable development of enterprises;
- Increasing the research-development capacity (R&D), stimulating the cooperation between research, development and innovation institutions (RDI) and enterprises, as well as improving the access of enterprises to RDI;
- Turning into account the potential of the informational technology and communications and using it in the public (administration) and private (enterprises, citizens) sectors;
- Increasing the energetic efficiency and the sustainable development of the energetic system, by promoting reusable energy sources.

The discount rate in SOP IEC is 5% in real terms (except inflation), and  $0 < FIRR(C) < 13\%$  for the justification of the non-refundable co-financing.

**NRDP - National Rural Development Programme 2007 – 2013, with 4 axis.**

The measures supported by Axis 1 target to improve competitiveness in the agricultural and forestry sectors in Romania.

The measures of Axis 2 target to maintain and improve the quality of the rural environment by promoting a sustainable management of the agricultural and forestry areas.

The support stipulated by Axis 3 targets to encourage the diversification of the rural economy and the improvement of quality of life in the rural area.

The support stipulated by Axis 4 targets to improve local administration and the promotion of the endogenous potential in the rural area.

The discount rate within NRDP is 8% in real terms (except inflation) and FNPV should be positive.

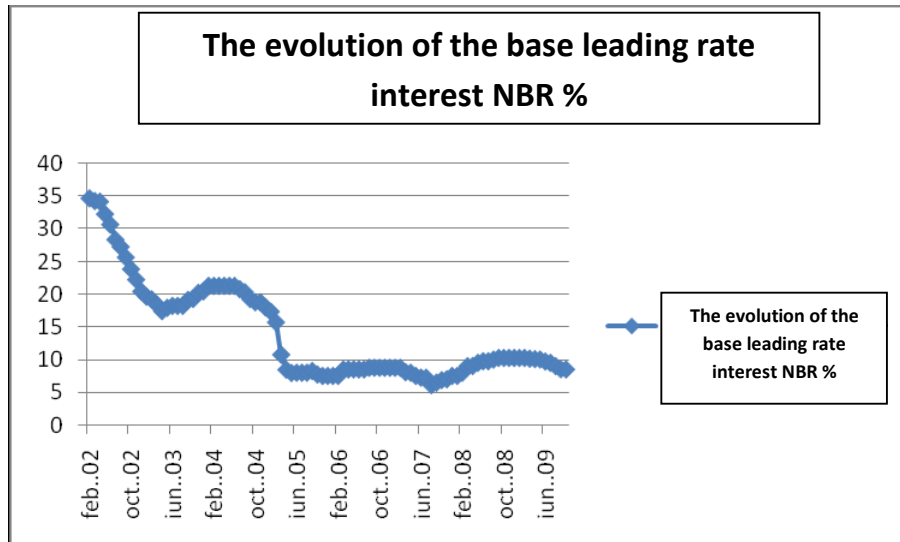
Therefore a synthetic table of the main discount rate used in the projects co-financed by the EU looks like Table no. 1.

Table no.1

**The situation of the discount rates within the main programmes financed by EU**

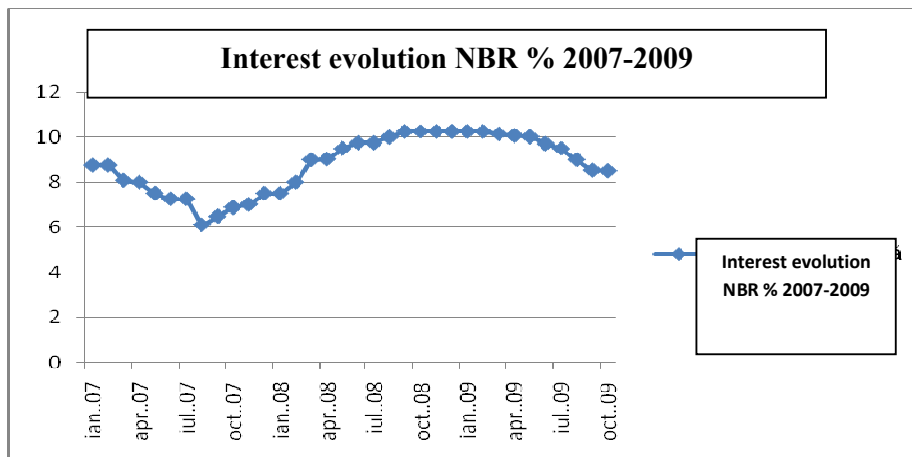
PROGRAMME	Discount rate
ROP	5%
SOP IEC	5%
NRDP	8%

In comparison to the data above, the evolution of the base leading rate, history percentage per year, is shown below:



**Fig. no.1 – The evolution of the base leading rate between 2002 and 2009**

For the period after January 1<sup>st</sup> 2007, the evolution of the base leading rate interest was:



**Fig. no.2 – The evolution of the base leading rate between 2007 and 2009**

The conclusion is that the level of the discount rate imposed by the EU for the main investment programmes co-financed by the European Union is not consonant with the evolution of the base leading rate not even at the data Romania joined the European Union – January 1<sup>st</sup> 2007.

The consequences of this work situation are that the net present value of these investment projects is erroneous and these projects approved through ROP, SOP IEC and NRDP are actually based on erroneous approval decisions of the Management Authorities and from the EU.

**The implementation stage of ROP at March 31, 2009** was the following:

- 1.519 projects on all 12 major intervention sectors of ROP from the total of 14 sectors, for a total worth of 3.64 billion Euro, wherefrom 2.3 billion Euro is the ERDF financing;
- 134 contracted projects (representing 8.8% of the filled projects) for a total value of 587.3 million Euro (16% of the total sum of the filled projects), wherefrom the ERDF financing is 412.2 million Euro.

**The implementation stage of SOP IEC till June 5<sup>th</sup>, 2009** was the following:

For the first four axes, 27 operations were launched from a total of 35. Through these operations were allotted 1177.14 million Euros, which represent 39.09% of the total budget of SOP IEC (approximately 3 billion Euros).

The total value of the requested financing for the 3072 filled projects is 9.711.325.680 lei.

Table no.2

**The situation of the projects within NRDP per sessions at June 12, 2009 (Euro)**

NRDP	No. of submitted projects	The public value of the submitted projects	No. of selected projects	The public value of the selected projects	No. of contracted projects	The public value of the contracted projects
TOTAL	13.338	5.061.973.195	2.548	1.627.217.919	1.829	914.150.259

In addition, these investment projects can produce and actually do produce negative consequences for their titular, the public and the private entities; the investment decision based on the mentioned discount rates, which are not based on the evolution of the base leading rate, is also wrong. This practice will lead (and it actually started to lead) to serious problems of profitability and feasibility regarding the investment especially for their owners. The problem is even more serious because the investment programmes co-financed by the EU instead of representing the main driving force of Romania's and even Bulgaria's economic re-launching, they represent an aggravating factor of this crisis on medium term, the starting point being the one when those projects reach maturity, which is generally estimated between 2010 and 2012.

**3. The consequence of the refinancing rate used as a crediting policy for investment projects**

It is known that the base leading rate of the National Bank of Romania is calculated as a weighted average with the transactions' volume, between the interest of the deposits attracted by NBR and the reversible selling of public securities done in the month previous to the announcement. The National Bank of Romania, as the central bank of this country, established monthly the level of the base leading rate, which is published in the Official Gazette of Romania, Part I. Previous to February 2002, it was called "rate of discount". Recently, NBR reduced again the base leading rate, but the level remained equal with the one from the period of the economic boom. The NBR interest is 8% per year, which is very high if we compare it with the inflation of below 5%, but we assess that NBR unfortunately can't hurry too much with adjustments, considering it must also wait for the fiscal policy to be corrected.

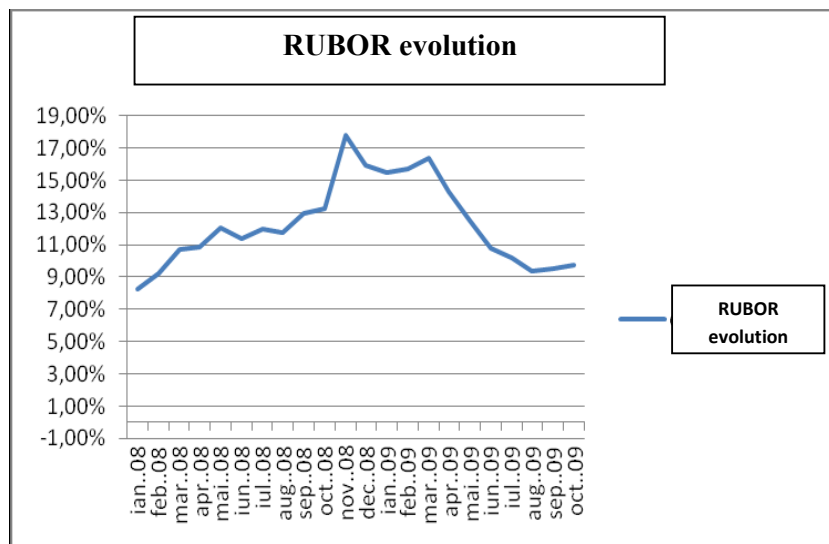
The consecutive interest adjustments announced by NBR have only managed to lower the deposit interests collected from the population. The average interest rates for deposits in lei have dropped considerably in the first eight months of the year. For the products targeted at the population, the average interest was compressed with 4.6 percentage points, reaching almost 10%

according to the NBR data. Those who want a loan in lei must bear interest almost as high as at the beginning of the year, and for mortgage credits they must pay even more: AER (annual equivalent rate) for mortgage credits in lei has increased with 2.25 percentage points (up to 13%) between January and August 2009.

Even the central bank has noticed the unequal treatment between the credit interests and the deposits interests. The reduction of the interests practiced by credit institutions in relationships with clients continued for deposits, as well as for credits, the descending adjustment of the latter being relatively slower.

As a result, in full economic crisis, the banks found the perfect moment to increase their profit margin. And this is predominantly done on the back of the population and partially on the back of the economic agents, towards who the banks don't have the same attitude as in case of the population.

Still, the companies benefited from a visible cheapening of the credits in lei. The average interest rate for credits has dropped with almost 4 percentage points in the first eight months of the year. Interests for deposits have dropped even more – with 6.4 percentage points.



**Fig.no.3 –RUBOR evolution 2008-2009**

In comparison to the RUBOR rates seen above, the level of the commercial interest is  $+4\div 4.5\%$ , which means that the monthly average of the commercial interest is approximately  $13.4 \div 14\%$ .

The deposit performance will definitely drop, maybe even more than the level of the adjustment made by NBR for the interest. Normally, deposit interests must be below the level of the money policy interest, which means we can expect an adjustment of approximately 1 percentage point in the following period.

In these conditions, no matter how much NBR tried, the credit in lei will stay just as unattractive in the following period, at least regarding the population. The companies hope that new interest adjustment will take place, but they are highly improbable because of the fiscal measure foreseen by the Government (increasing the VAT level, the level of duties, etc.).

The consequence of the situation described above: because of the high level of the base leading rate, the funds from the European Union can't be accessed being that the commercial interests established based on the base leading rate are practically impracticable for the beneficiaries of the investment projects. The next measure that must be taken is to change the way the base leading rate is established.



Practical aspects. Examples

**Example 1:**

To reflect the use of the IRR and FNPV as selection criteria for the projects, we have two projects with the following associated financial indicators:

Table no.3

**The comparative situation of the financial indicators for two investment projects**

<b>Indicator</b>	<b>Project A</b>	<b>Project B</b>
Investment value	4.589.960	4.589.960
Discount rate	5%	5%
IRR	5,10%	7,59%
FNPV	17.093,21	385.060,10

Table no.4

**The analytical calculus of the financial indicator for Project A**

Project A	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Investment value	2.024.938	2.565.022							
Net cash flow	-1.740.032	-2.239.224	553.943	528.537	609.542	632.569	655.595	678.621	1.422.726
Discount rate	5%								
IRR F	5,10%								
FNPV	17.093,21 lei								

Table no.5

**The analytical calculus of the financial indicator for Project B**

Project B	An 1	An 2	An 3	An 4	An 5	An 6	An 7	An 8	An 9
Investment value	2.024.938	2.565.022							
Net cash flow	-1.479.027	-1.903.340	526.246	502.110	579.065	600.941	622.815	644.690	1.351.590
Discount rate	5%								
IRR F	7,59%								
FNPV	385.060,10 lei								

The conclusion is that project B is more efficient for comparable risks.

**Example 2:**

In order to illustrate the influence of changing the discount rate over the level of the project's financial indicators, correspondent to the change of the base leading rate, we'll provide the example of a project approved to be financed, which has a negative FNPV because the discount rate was changed in accordance to the level of the base leading rate, so that the project doesn't generate positive results, but losses, with all the negative consequences for the investor and for the beneficiary.

Therefore, in comparison to the 5% recommended discount rate for which  $IRR \geq 5\%$  and FNPV are positive (values for which the project was approved to be financed), at the first variation of only 1% (an increase) of the discount rate, the investment parameters are inadequate, FNPV becoming negative and based on this, the investment should be excluded from financing. It's noticeable that at the level of the present base leading rate (8.5%) used as discount rate, the same FNPV indicator is severely negative.

**Conclusions and revision aspects**

Next to the future cash flow estimation from the capital investment operating, the issue of assessing the capital cost and the discount rate of the cash flows is essential for the efficiency (or inefficiency) assessment of that investment. The modern financial research has focused on determining this measuring reference of performance. Most Nobel awards in Finance were granted for researches regarding the capital cost, especially researches of the risk premium commensurate with the risk quantity taken on by the investors (Modigliani, Miller, Markowitz, Sharpe, Scholes, Merton etc).

In the present conditions of global financial crisis, we recommend that based on what was written above, the EU commission will revise the level of the discount rates for cash flows for projects co-financed by the European Union in Romania, in concordance with the evolution of the base leading rate of NBR.

We also recommend the quick change of the policy regarding the setting of the base leading rate level by NBR in the sense of giving up the efficiency criterion regarding the attracted capital. This criterion is valid only for NBR and should be replaced by the criterion of restarting to credit the economy in the favour of the economic agents, and implicitly the population, just like all the developed nations in the world do. The refinancing interest in these countries is maximum 1%, of course Romania must adjust this level by taking into account the existent elements of country risk.

Table no.6

**The analytical calculus of the financial indicators for the approved project with the recommended discount rate**

Years	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sales	196.233	1.310.618	2.102.750	2.203.567	1.793.099	1.793.099	1.793.099	1.793.099	1.793.099
Total incomes	196.233	1.310.618	2.102.750	2.203.567	1.793.099	1.793.099	1.793.099	1.793.099	1.793.099
Total operating costs	-11.673	782.541	1.350.206	1.422.455	1.119.008	1.119.008	1.119.008	1.119.008	1.119.008
Interest	-77.000	202.279	198.601	252.575	64.549	41.523	18.496	-4.530	-27.556
Total investment costs	2.024.938	2.565.022	0	0	0	0	0	0	-721.079
Total expenses	1.936.265	3.549.842	1.548.808	1.675.030	1.183.557	1.160.530	1.137.504	1.114.478	370.373
<b>Net financial flow</b>	<b>-1.740.032</b>	<b>-2.239.224</b>	<b>553.943</b>	<b>528.537</b>	<b>609.542</b>	<b>632.569</b>	<b>655.595</b>	<b>678.621</b>	<b>1.422.726</b>
Internal rate of return (IRR)	<b>5,10%</b>								
Financial net present value of the investment (FNPV/C)	<b>17.093</b>								
<b>The discount rate</b>	<b>5%</b>								

Table no.7

**The IRR and FNPV variation within the project depending on the change of the discount rate**

	5%	6%	7%	8%	9%	10%	11%	12%	13%
<b>IRR</b>	5,10%	5,10%	5,10%	5,10%	5,10%	5,10%	5,10%	5,10%	5,10%
<b>FNPV</b>	17.093	-145.375	-293.416	-428.328	-551.282	-663.336	-765.445	-858.475	-943.210

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