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STUDY ON
INTERNAL RATES OF RETURN

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CONTENT

9.4 ANNEX 4 - OVERVIEW ON ROMANIAN ECONOMY 49

1. SCOPE OF THE STUDY

Investment projects co-financed by the European Union cover a large area of sectors, use different financial mixes (different percents for public and private funds) and, in general, are characterized by different risks. For these reasons, capital budgeting have to use complex techniques in order to become a valid instrument for avoiding the waste of financial resources. Some chooses regarding the hierarchy of the different indicators or their meaning can be considered subjective, so the justification for their level has to be done cautiously. The issue is so disputable so European Commission (1997) recognizes: "Over the last thirty years, there have been two distinct approaches to the planning and evaluation of development projects: one has used rigorous financial and economic analysis, the other almost totally ignored such methods. Moreover economic analysis has often been perceived – and may still be perceived – as a way of justifying decisions that have already been made."[1]. This study is in line with the first point of view. It tries to explain the necessity of taking into account a rigorous level for financial and social discount rates. Moreover, it insists that the financial and economic analysis have to be done before the investment decision. Of course, it can be argued that nobody can know what the future will bring into life. However, a not perfect plan is better than total hazard.

In order to use an appropriate tool for selection of projects under budgetary constrains, ***discounting***, is the most popular a techniques which make different flows of money to be comparable. Discounting approach needs a defined ***discounting method.***

Internal Rate of Return (IRR) can be considered a financial indicator based on the principle of taking time into account in the appraisal of investment projects. As result, because the project benefits and costs occur at different time intervals there is necessary to calculate the financial flows in the moment in that the investment projects are analyzed, by using *the discount rate.* In cost-benefit analysis two types of IRR can be used can be used to describe **financial** or **economic** flows.

Usually, a project is viable when the *financial rate of return* is considered to be roughly equal to the level of financial discount rate. *The financial discount rate* is used to calculate the present value of the cash flow achieved in the financial analysis, every year, to take into account the value of the money in time.

The *economic rate of return* represents the measure of social benefits a project has to offer for it to be considered for financing. This reflects the social point of view on how the future benefits and costs should be assessed in comparison with the current ones.

In order to accept the necessity of estimating adequate levels for financial and economic IRR, it has to be accepted the principle of taking time into account. This principle is almost universal accepted by financial analysts (the principle of "*time value of money*"). The value of a sum of money changes in time, so the value of one Euro today is worth than the value of one Euro in the future, for at least three main reasons (European Commission, 1997, p. 20)[2]: (1) the general rise in prices (respectively, the inflation) that reduce the purchasing power of money; (2) "the preference for the present", which reduces the perceived value of future cost and benefits compared to the present ones; (3) the remunerative power of capital, which creates a "loss of earnings". Even these statements are based on some theoretical assumptions, sometimes different from person to person, they can be considered acceptable in order to quantify the

[1] European Commission, *Manual Financial and economic analysis of development projects*, Luxembourg: Office for Official Publications of the European Communities, 1997 – XXXV, p. 3.
[2] European Commission, *Manual Financial and economic analysis of development projects*, Luxembourg: Office for Official Publications of the European Communities, 1997 – XXXV, p. 20.

preference of the community for taking time into account. The main theoretical issues regarding discounting are presented in Chapter 3 of this paper.

As regard major projects, for the programming period 2007-2013, the EC recommended in the Working Document no. 4, a discount rate of 5% in real terms as a reference parameter for the opportunity cost of the long-term capital and a social discount rate of 5.5% for Member States benefiting from the Cohesion Policy - among them being also Romania - and 3.5% for the other EU Member States. In this respect all these figures represent the levels required for the appraisal of investment projects (5% represents the superior limit for financial rate of return of the investment, while 5.5% represents the inferior limit for the economic rate of return.). The same levels of financial discount rate and the social discount rate are indicated in the Romanian „National Guide for the Cost Benefit Analysis of the investment projects", conducted with the assistance of JASPERS. *These levels of the discount rates, recommended by the European Commission and indicated as such in the above mentioned Guide, have not been established by considering the socio-economic realities of Romania.* The EC recommendation regarding the use of a unique value as a reference for the financial discount rate is based on the assumption that the funds come from ordinary citizens of the EU tax payers. In this context, it may be considered that, even in situations where the projects have regional character or have an impact in terms of a particular beneficiary, the estimation of the relevant opportunity should be based on an European portfolio. In addition, the financial market integration should also lead to a unique value as long as is expected to achieve on long term the convergence in terms of inflation rates and interest rates in the EU Member States. The consequence of this fact can be represented by the wrong grounding of the investment decisions from Structural Instruments associated with such projects, generating losses on medium term instead of generating the net added value.

This study responds to the concerns of the Beneficiary - Government of Romania, Authority for the Coordination of Structural Instruments - regarding the estimation of the financial and economic rates of return values used in capital budgeting for public investment projects. This study proposes a justification for the levels to be used for these two indicators for the particular case of Romania. As is presented in Chapter 4, the performance economic indicators for Romania are still one of the poorest in European Union, so a deeply concern for the use of financial resources is explainable.

Thus, it is necessary to verify the applicability of the financial rate of return of 5% (recommended in the Community's methodological to be used in financial analysis of CBA) and of the economic rate of return of 5.5% (recommended in the Community's methodological framework to be used in economic analysis of CBA) to the socio-economic conditions of Romania.

Despite the simplicity of the "discount" concept, using rates of return is a controversial and a difficult issue of the cost-benefit analysis. It can be mentioned that there are different points of view regarding the IRR, and different recommendations for the relationships to be used in practice, for financial, but also for social discount rate.

The financial internal rate of return is a cornerstone for analysts. In the financial analysis, assuming the projects with net present value have to be accepted, a too higher level for the indicator will determine the rejection of many projects and opportunity costs (costs due to "the lost chance"). On the other hand, a too lower level for this indicator will generate the adopting of projects that are less performing than other projects, maybe rejected due to budgetary constraints. Even in the case of public projects, the importance of a rigorous estimation of level of rates of return (financial and social) can not be unappreciated.

Considering all of the above, the study seeks to provide answers to the following questions:

- *What level of rates of return is applicable to the socio-economic conditions from Romania?*

- *What is the impact of using these levels over the projects financed through Structural Instruments?*
- *Which is the most adequate level applicable to Romania in terms of financial and economic rates of return to be used in the cost-benefit analysis?*
- *What is the impact of using different rates (different than those recommended by the European Commission) over the projects financed through Structural Instruments?*

2. INTRODUCTION

For evaluating the performance of investment projects there are used a series of indicators, in order to compare the costs and the benefits involved in the project. The most important ones are net present value, cost-benefit analysis and internal rate of return (IRR). The profitability of an investment project, measured by IRR represents the discount rate (financial, real or nominal, depending on the nature of the capital flows used in the calculation) to which the cost flows and the benefit flows have the current net value zero. In other words, IRR represents that discount rate for which net present value is zero.

IRR is defined as the solution of the equation Net Present Value (NPV) = 0. NPV is a function of several variables related to the project: its cost (I_0), the cash flows generated (CFt) (taking into account the social benefits, too, in the case of social indicator), its lifetime (n) and its residual value (RV_n), but also is a function of the discount rate (k):

$$NPV = -I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} + \frac{RV_n}{(1+k)^n}$$

As result, FIRR is the solution of FNPV = 0, and EIRR is the solution of the equation ENPV = 0. Practically, this equation can be written:

$$NPV = 0 = -I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+IRR)^t} + \frac{RV_n}{(1+IRR)^n} \Rightarrow I_0 = \sum_{t=1}^{n} \frac{CF_t}{(1+IRR)^t} + \frac{RV_n}{(1+IRR)^n}$$

Considering the NPV a function of the discount rate, it may be observed that as long as NPV is positive/negative the IRR is greater/lower than the discount rate k. This remark is more easily observable in the next figure:

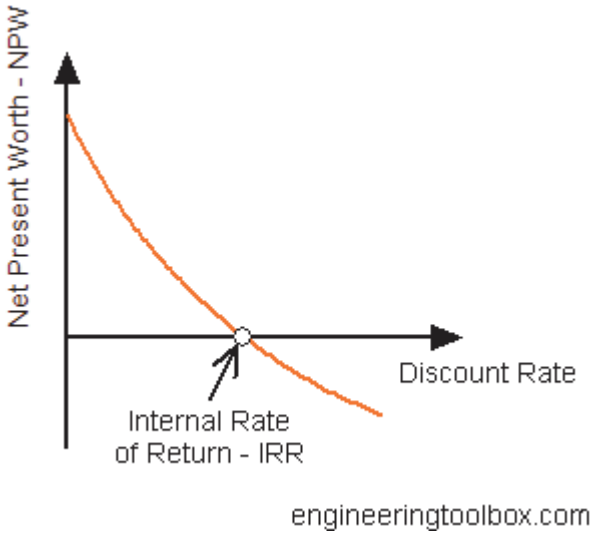

Figure …. - 1: IRR is the discount rate for NPV is equal to zero.

Source: http://www.engineeringtoolbox.com/internal-rate-of-return-irr-d_1235.html

The IRR is the solution of the equation NPV=0.

The value of IRR can be obtain in Excel, using the IRR function, or it can be estimated through interpolation using different values for the discount rate: lets say k_1 and k_2, the analyst calculate the NPV values; if the values of NPV have different signs, lets say $NPV(k_1)>0$ and $NPV(k_2)<0$, than the value of IRR is in the interval (k_1, k_2).

$$\frac{IRR-k_1}{k_2-IRR}=\frac{NPV(k_1)}{-NPV(k_2)}.$$

Notice that a project with positive NPV has also IRR greater than the discount rate k. The diference between these performance indicators consists in the way of measuring the performance. But when it comes to use these indicators for selecting the most performer project, the conclusions may be contradictory –the project characterized by maximum NPV is not necesary the same as the project with the maximum IRR.

For example, the following two projects represent this possibility: the initial investment is 100 for the first project (A) and 200 for the second one (B), the cash flows are 80 and respectively 150 for both the first and the second year. For the sake of simplicity, considering that both projects has the same risk, and the same discout rate, 10%, we compare the performance of these projects. Using NPV as selection criteria, the most performant project is B (NPV_A=38,84, NPV_B=60,33) but using IRR as a selection criteria the most performant project is A (IRR_A=38%, IRR_B=32%).

The preference for IRR or for NPV depends on the banchmarks. From a point of view, using NPV is preferable to analyze the investment projects performance in monetary units (m.u. hereafter), basically understanding the project as being an increase / decrease in value for companies or in the quality of life for society. For example, considering the viewpoint of a private investor, if financial NPV (FNPV hereafter) is 60,33 m.u., the project can be adopted, if only this criterion is applied, because the project should determine an increase in wealth. Also, from onother point of view, using IRR, the private investor can

understand better the performance of an investment project in terms of rate of return. In this case, for instance, if one project determines a return of 32%, this return is positive and greater than the discount rate, so the project can be adopted.

This criteria, IRR, is used to measure the performance in percentage. So it may be compared with different other rates, such as interest rate, required rate of rentability, cost of capital rate etc. As long as the IRR is greater than the cost of used resorces, the project generates positive value for the company.

There can be determined different IRR – from the economic or financial point of view. Economic IRR (EIRR) is the solution of the equation ENPV=0; financial IRR (FIRR) is the solution of the equation FNPV=0. Using the IRR as criteria for adopting or not a specific investment project implies to compare the IRR with some benchmark values.

From an investor's perspective, the higher is IRR, the higher is the performance of the project – as long as it is not counted for risks of the project. Form this viewpoint, it seems reasonable to fix a lower limit for the indicators, but unnatural to consider a too much higher level of performance should determine the rejection of the project.

This approach has some limitations if the funds are provided by public sources (national or international). If a project is too performer, why it should require public funds for its financing, because the private investors consider a great opportunity to use private funds in a project with high IRR, and the performance of the investment project will increase the market value of the company? Moreover, an increase of public financing can determine an increase of some agency problems, decision in asymmetrical information, corruption, bureaucracy etc. This is why it is recommended to take into account also an upper limit for FIRR for the case of private projects financed through public funds (hereafter, FIRRPP), and this upper limit represents the lower limit for private investment projects financed exclusively through private funds.

In order to consider such an upper limit, the methodology is based on the comparison between different costs of financing for the alternative investments from the financial market. For instance, if FIRRPP is higher than the cost of debt (eventually, corrected for taking into account the tax shields), the investment project generates positive economic value added in the context of bank financing (the private investor use a loan from the credit market to obtain the resources needed to finance the investment), so there is no rational reason to use public financial resources.
There are two main issues that have to be considered – the cost-approach (1) and the risks (2). Another supplementary concern is related to the capacity of monitoring, which is very important in the management of public funds. These subjects are presented in the following sections.

3. METHODOLOGY

Methodology for the elaboration of the Internal Rate of Return Study

In general, the financial internal rate of return (as well as the financial net present value) can be measured in terms of return of the investment cost or return of the national capital cost. Even if the value of the internal rate of return measured in terms of return of the investment is usually very small or even negative for the public investment (especially for certain sectors, such as that of the water), the internal rate of return measured in terms of return of the national capital will frequently have positive values.

As shown in the introductory part, the financial discount rate in real terms is of 5% and the return of the

beneficiary should be, basically, aligned to this standard. In fact, if the value of the internal rate of return of the national capital is expected to have substantial positive values, EU funding is expected to bring a higher return than normal to the national beneficiaries.

The indicator of the internal rate of return (IRR) must be carefully used, taking into consideration a series of limitations that were identified in association with this instrument[3]. The advantage of using an approach based on the internal rate of return is that, normally, it facilitates the comparison of the projects which, outside the dimensions, have similar characteristics.

The purpose *to be achieved within the task of the project is to determine the "rate of return normally expected from the investment projects* [4,] meaning *that rate of return that provides sufficient revenues to compensate the opportunity cost of the inputs into the project.* The reason for this analysis comes from *the European Commission's intention to avoid excessive financing of the projects* (Article 55 of the Regulation 1083/2006 which refers to the projects generation incomes); this aspect is very important especially when in the project is involved a private partner, case in which the contribution from the EU funds must be calculated in an extremely prudent mode so that no undue profit is reaped by the private investor.

For a project that needs European funds financing, the net present value of the investment should normally be negative (and the financial rate of return must be less than the applied discount rate). A very low or even negative financial return rate does not necessarily mean that the project does not subscribe to the objectives of the Funds, but only that it is not viable on the financial market. Under Article 55 of the Regulation 1083/2006, the size of the financing from the EU funds must be established taking into account a number of factors: the period of reference for that category of investment, the rate of return normally expected from the investment projects from that category, the principle "the polluter pays "(polluter pays principle) and ethical considerations (equity considerations - affordability assessment fees).

According to COCOF (on the application of art. 55), the factors that affect the financial return on investment (in case of the so-called incomes generating projects) are those that affect:

(a) the income - which is based on two elements: (a) taxes / rents / payments (established according to the relevant policy at national / regional / local level) and (b) the number of users and / or the quantity of goods / services provided by the project (element which depends in its turn to the current or anticipated level of the demand, itself affected by a number of factors);

(b) the investment value and the operating costs - these are also the product of two elements: (a) the nature of the inputs and consequently its unitary price and (b) the appropriate quantities (egg. the number of workers); each of these elements depend in their turn by a number of factors.

Considering all these factors, it is possible that a certain expected level of return could not be determined at the level of investment sectors or at Member State level.

However, to the extent to which these factors have a homogenous character (egg: for the investment projects in the same sector or in the same region, with a similar governmental economy and political structure) can be established an expected return of that investment project, if necesary data is available.

[3] Guide for the cost-benefit analysis of the investment projects of the European Commission, 2008

[4] Normally Expected profitability of an investment

The expected return can strictly dependent on the project's risks. The risk depends, for a change, on many factors such as: the socio-economic context of the country / region where the project is implemented, the difficulties of implementation of the project, the economic life, the foreign exchange and, above all, the risk bonded to the expected revenues (these aspects must be handled properly in the risk analysis and in the sensitivity analysis).

Study phases

In determining the normally expected rate of return from the investment projects, we will use as starting point the *methodology of discounted cash flow (discounted cash flow - DCF,* used by the EC regarding the determination of the financial return inside CBA). It will also be used as the benchmark in the calculation of the financial discount rate established as a result of the study conducted in the earlier task of the project.

In order to accomplish the study requested for this task of the project, a number of steps were taken, according to the following methodology for the study elaboration:

- *Documentation Phase:*
  - In-depth analysis of the existing methodologies from the rate of return point of view;
  - In-depth analysis of internal rates of return resulting from different investment projects in Romania (eg CBA Guide for PHARE and ISPA infrastructure projects indicate framing limits)
  - Analysis, at international level, for the EU member states, the methodologies implemented for similar programs, if such methodologies exist, and verify their applicability for Romania in accordance with the differences in economic conditions in Romania compared to EU members
  - Analysis of the country-level macroeconomic indicators;
  - In-depth analysis of existing documents in CBA's preparation for each type of beneficiaries (CBA instructions for public and private investments) - in terms of the internal discount rates
  - Analysis of the relevance of the financial/economical ratios ex-ante for projects implemented by public and private entities;
  - Study of the practical issues encountered or of the results from prior experience of the experts involved in the project;
- *Actual research phase:*
  - Collection of statistical information that will be used in base revenue and expenditure projections included in cash flow for determining the internal rate of return– the inflation, the exchange rate, the gross domestic product, the growth indices of the personnel costs, the growth indices of the electricity costs, the growth indices of raw materials and materials costs, the unemployment level. (INSS, National Commission of Prognosis)
  - Collecting information regarding country risk assessment; information related to Romanian socio-economic framework
- *Analysis of collected information and conclusions and recommendations;*

- Setting limits for the usually expected internal rate of return for an investment, depending on the types of beneficiaries (public/ private)
- Sustaining the proposals of these limits for the internal rate of return
- Assess consequences of using internal rate of return for selecting investment projects (ex-ante decision comparisons and consequences ex-post)
- Elaboration and finalization based on the Study Received feedback from the Beneficiary and the Representatives of the target groups

Reflecting the elaboration methodology of the study to be conducted, the *study regarding the internal rate of return includes:*

- An introductory part containing information with respect to the nature and the purpose of the study, to the reasons that determined the necessity of this study, retrieved from the evaluation report made under 1st Component of the project, as well as information about the relevant European methodological context;
- Relevant theoretical approaches regarding the internal rate of return and the normally expected rate of return from investment projects and examples of calculation methodologies, and framing in the context presented in the introductory part;
- Synthesis and analysis of the collected data and realization of the calculation, leading to estimates of the normally expected rate of return from the investment projects, for public and private sectors and, whether it will be appropriate, for development regions in Romania.
- Indication of bibliographic sources.

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We underline that the initial methodology for drafting this study aimed to estimate the internal rates of return at the level of investment sectors. During the research phase, a series of issues came out which led to giving up this approach for the estimation of the IRR at sector level and to using an approach of estimating the IRR for investments based on their grouping in public or private investments.

These elements which led us to use this approach of estimating the IRR for the public and private sector are the following:

- Lack of the relevant data for estimating the IRR at sector level and the inconsistencies between the existing data.

  Thus:

  - In the research phase, the FIRR and EIRR for the projects already approved under the current Operational Programmes were analysed. The diferencies in approaching the preparation and the evaluation of CBA for projects submitted for financing under these programmes, as well as the low quality of the analysis (identified as well in the assessment report prepared within the first Component of the same project in which framework the current study was drafted) make the values obtained for the indicators not relevant for the current study because they are not based on trusted input data (on costs and benefits).
  - The financed projects cover almost all investment sectors and there is no evidence of the number of the projects submitted and approved for financing at sector level. In these

conditions, for obtaining information on the expected profitability of certain sectors (in terms of IRR), we called unto the data available at the level of Chambers of Commerce. But neither these organisations have information on the return of investments at sector level.

- Although, as was shown, data was requested from commercial banks, from the companies active on the financial market and from private societies, only few relevant data was obtained and not enough for a sectoral approach. Also, there was the issue of the quality and trust of the relevant data, which could not be verified. The only feasible data (considered for the current study) are those coming from the reports of the National Bank of Romania (BNR), but these also did not support a sectoral approach.

The only sectors for which the expected levels for FIRR and EIRR are known are those previously financed through ISPA, namely transport and environment – drinking water, waste water and waste management – for which a specific study was prepapred at the level of EU[5].are known. But, in case of these sectors, only major projects are financed and the current study intends to determine the "return rate usually expected for investment projects", especially for non-major projects.

- In the Working Document No 4 of the European Commission, when the level of the profitability rates on investment sectors and on financing sources (loans, grants, etc.) are referred, these investments are approached not an individual basis but they are gouped. Thus, from the analysis of this document, the following can be noticed:
  - For investments in business infrastructures, energy, tourism, airports, telecommunications, productive activities, the level of profitability and implicitely of the financial internal rate of return may present high values while the level of the grant is low;
  - For investments in environment infrastructure and transport infrastructure (ports, highways, public transport), the level of the profitability present average values while the grant level is a high one (but corrected through the funding gap method);
  - For investments in transport infrastructure (railways), social infrastructure, education and research infrastructure, the level of profitability presents low values while the level of the grant is a high one, without corrections.

  Additionally, it can be noticed that for the first mentioned category of investments the great majority of the beneficiaries are coming from the private sector while for the other categories of investments tehe beneficiaries are from the public sector.

- The levels of the profitability of a sector can change based on the dynamic of the socio-economic context, which, in case of Romania, is a high one.

  The level of the internal rate of return depends in good extent on the risks of each individual project. These risks depend on the socio-economic context of the region/country, on the project duration, on the variations of the exchange rates and on the risks related to the revenues of the project.

- Another constrain with regard to the a sectoral approach for IRR came out from a comparison (presented in Annexes chapter, table 10.1) between various financial and economic indicators obtained for certain investment projects (transport, water, waste water, solid wastes, business development, urbanism, etc.). The indicators which were analysed (the net financial and economic

[5] M. Florio; S. Vignetti; Cost-benefit analysis of infrastructure projects in an enlarged European Union: an incentive-oriented approach; May 2003

discount rates, FIRR and EIRR) did not indicate major differences between projects. In fact, the economic rate of return for all considered projects indicated values significantly higher than the current rentability rate in use according to the EU recommendations. Thus, the current way of CBA use makes the sectoral approach irrelevant for the purpose of this study.

- Different sectoral thresholds for IRR may lead to non-unitary approaches during the evaluation of projects within the same operational program / priority axis / key area of intervention.

  A sectoral approach is useful during the programming period in order to determine more precisely which of the priority sectors needs co-financing through Structural Instruments.

  But, having in mind the major diversity of the co-financed investments, such is the case of investments financed through the Regional Operational Program and the Sectoral Operational Program Increase of Economic Competitiveness 2007-2013, the recommendation of sectoral thresholds for IRR may lead o non-unitary approaches within the evaluation of projects within the same operational program/priority axis/key area of intervention, because in case of such programs or even within the same key area of intervention are accepted projects coming from different investment sectors.

Taking into account the elements presented above, for the elaboration of the current study, as regards the return rates, an approach based on the type of Beneficiary has been chosen.

Also, given the fact that the internal rate of return represent the solution of a report in which the discounted net value of an investment project is 0 through using the discount rates, as well as the fact that within the complementary study on the financial and economic discount rates was proposed an approached based on the two types of beneficiaries (public and private), it can be appreciated maintaining this approach also for the current study.

4. ON THE POOLING OF RISKS

4.1 Financial versus Social Risks

Notions related to financial and social risks are common in project finance. On eficient financial markets, economic agents expect to obtain earnings in accordance with the assumed risk. There are many definitions of risk, depending by specific applications. **Risk could be defined as the possibility to record losses, but, also, as the possibility that the future does not correspond to agents' expectations.** In every day language, risk is connected only to the possibility that losses occur, which is a synonym to "danger". However, more common in Finance language, risk is defined as the "hazard", the possibility that something happens in the future in a different way than the expected one. In this context, risk is defined as a possibility that, in reality, indicators to be different by their expected values[6].

Project finance is generally used for large, complex and sizable operations, such as roads, oil and gas explorations, dams, and power plants. Due to their complexity, size, and location, these projects often have challenging financial, environmental and social issues, which may include involuntary resettlement, loss of biodiversity, impacts on indigenous and/or local communities, and worker safety, pollution, contamination, and others. Because these projects generally face high scrutiny from regulators, civil society, and financiers, the project's sponsoring companies allocate more resources to managing

[6] Dragota, Victor; Mitrica, Eugen; Catarama, Delia; Novac, Laura Elly, *Basic Finance*, Ed. ASE, Bucharest.

environmental and social risks.

In simple terms, discussion of risk in project evaluation is mostly about the risk that actual financial outcomes are different from those projected in advance. Ultimately, investors require a certain rate of return on their capital in order to take on that risk of a different financial outcome.

Financial Theory states that investors are generally rational and risk adverse. We remind here that an agent is considered to be rational if, having to choose between two projects, identical from each aspect excepting the return, he or she will choose the project that will generate the higher level of return. A rational investor is defined as the agent that, having to choose between two projects, identical from each aspect excepting the risk, he or she will choose the project that will generate the lower level of risk. In these conditions, they will try to reach a maximum level of return for each class of risk (see Figure 5.1) [7].

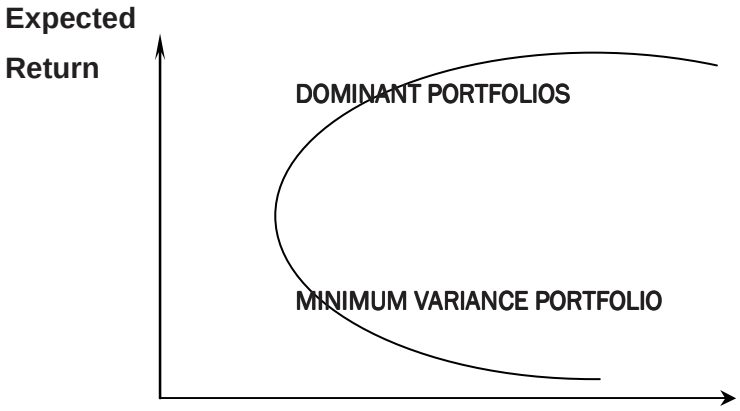


FIGURE 5.1: MARKOWITZ EFFICIENT FRONTIER. SOURCE: DRAGOTA, VICTOR; MITRICA, EUGEN; CATARAMA, DELIA; NOVAC, LAURA ELLY, *BASIC FINANCE*, ED. ASE, BUCHAREST.

As long as investors are considered to be risk adverse, they will accept only those projects that will determine a maximum return for each class of risk. These projects are called to be ***dominant***. For example, if the investor has to choose between two projects, characterised by the same risk, but by different expected returns (4%, respectively 8%), the project with higher return will be accepted. Portfolios with maximum return for each class of risk are placed on the *Markowitz Efficient Frontier*, which represents the geometrical place of combinations between return and risk that generate the maximum return[8]. The lower level for risk that can be attended is called the ***minimum variance portfolio***. It is assumed that no portfolio or asset can offer a risk lower that this level; also, this is the minimal rational level for return that has to be accepted by a rational investor. Also, this means that no rational investor, which is risk adverse, will accept projects that are not located on this frontier (respectively are dominated

[7] Dragota, Victor; Mitrica, Eugen; Catarama, Delia; Novac, Laura Elly, *Basic Finance*, Ed. ASE, Bucharest.
[8] Markowitz, Harry, "Portfolio Selection", *The Journal of Finance*, vol. VII, No.1, March 1952, pp. 77-91.

by the other portfolios)[9].

In the Markowitz model, it is assumed that portfolios can include only risky assets. One early development of this model – CAPM corrected this assumption by considering investments in risk free assets, with a safety return (R_f)[10]. In this category, T-Bills can be included taking into consideration the Government is a safety borrower. If it is possible to invest in such assets, a new efficiency frontier can be built, named Capital Market Line (CML) (see figure 5.2) [11].

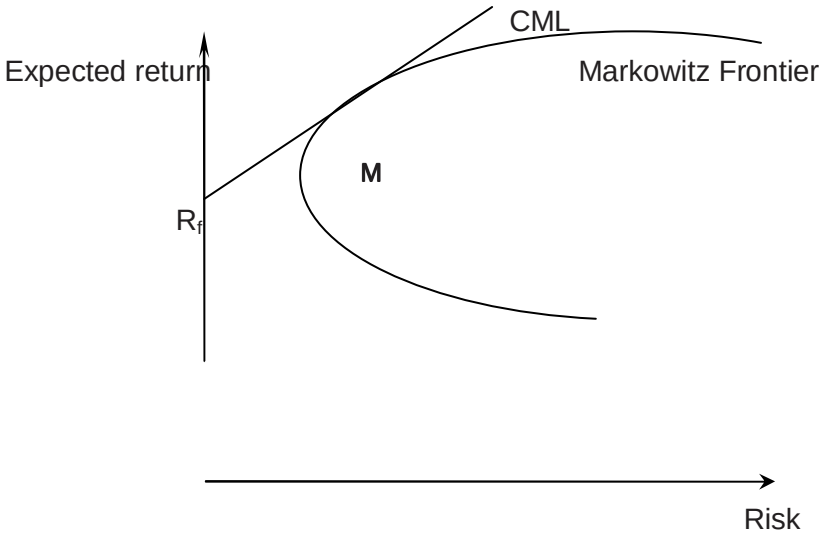


FIGURE 5.2: CAPITAL MARKET LINE FRONTIER. SOURCE: DRAGOTA, VICTOR; MITRICA, EUGEN; CATARAMA, DELIA; NOVAC, LAURA ELLY, *BASIC FINANCE*, ED. ASE, BUCHAREST.

As can be easily observed, CML dominates Markowitz Efficiency Frontier in all cases, excepting for the M point. This point represents the market portfolio. Market portfolio is defined as a portfolio that includes all the available assets on the market, the investment in each of these assets being a weighted average function to their market capitalization. Also, it can be noticed that an investor can build a portfolio using only two fundamental assets, respectively the risk free portfolio (with a return equal to R_f and without risk) and the market portfolio. Usually, as a proxy for market portfolio are used the market indexes [12].

Based on these theoretical backgrounds, practitioners use a variety of approaches to address risk within financial analysis. These approaches include:

- Sensitivity analysis of major variables that deterimine the main indicators (NPV, IRR), including Discount Rates and cash flow drivers
- Adjustments to cash flows to reflect perceived risks
- Utilizing categories of Discount Rates such as different rates for expansion of existing projects

[9] Dragota, Victor; Mitrica, Eugen; Catarama, Delia; Novac, Laura Elly, *Basic Finance*, Ed. ASE, Bucharest.
[10] Sharpe, William, "Capital Asset Prices: a Theory of Market Equilibrium under Conditions of Risk", *Journal of Finance,* vol. XIX, no.3, Sept. 1964, pag. 425-442.
[11] Dragota, Victor; Mitrica, Eugen; Catarama, Delia; Novac, Laura Elly, *Basic Finance*, Ed. ASE, Bucharest.
[12] Dragota, Victor; Mitrica, Eugen; Catarama, Delia; Novac, Laura Elly, *Basic Finance*, Ed. ASE, Bucharest.

versus entry into a new projects

- Monte Carlo simulations
- Decision-trees
- Real options
- Etc.

Whatever approach is adopted, where DCF is used, a Discount Rate will be required. It is important that its basis is understood and the relationship between the treatment of risk in IRR and the Discount Rate is consistent. Even regarding IRR, which does not use a required rate of return in estimation (see Chapter 3), a benchmark that is exactly the required rate of return should be provided.

If not managed properly, the financial and social risks can result in disrupting or halting project operations and lead to legal complications and reputational impacts that threaten the overall success of the project. Because anticipated project cash flows typically generate the necessary resources to repay the loan, any disruption to the project itself, regardless of the financial standing of the sponsoring companies involved, poses a direct financial risk to the financial institution.

The importance of managing social risk is becoming increasingly well understood by the proponents and financiers of large projects. Social risks arise from the dissatisfaction and grievances of external community and non-governmental stakeholders. Failure to manage these issues can have enormous economic costs, significantly damage the reputations of organizations involved and even put entire investments at risk.

Social risks are also often not adequately incorporated into project risk management processes because they are not as well understood by project teams as technical and financial issues.

Such potential social risks can include:

- Project delays or abandonment
- Reputational damage
- Lack of user acceptance
- Decreased operational revenues
- Consumer boycotts
- Major modifications due to stakeholder pressure
- Exposure to legal action
- Security problems

It is critical however that project stakeholders are not just seen as a source of negative risk to projects. Establishing good relationships with stakeholders and focusing on their concerns can generate significant positive opportunities for the project and proponent.

Potential social opportunities can include:

- Better project outcomes through stakeholder input
- Streamlined approval processes

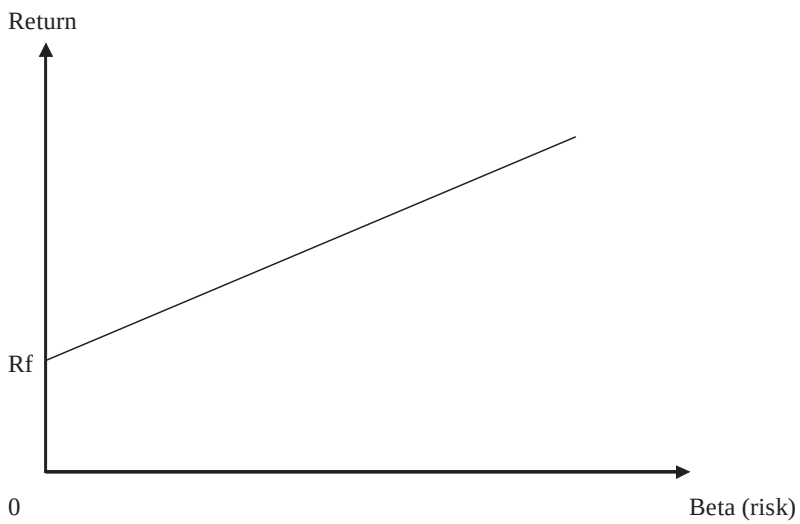
- Government and regulatory support
- Timely project completion
- Easier access to project finance
- Improved operational revenues through customer support
- Increased likelihood of support for subsequent projects or future expansions
- Value creation for proponent organization
- Enhanced contribution to sustainable development

4.2 Systematic risks in the project

The premise that underpins IRR, in the finance theory, is that the rate of return from an asset or investment should compensate owners for risk that cannot be eliminated by diversification through investing in other assets. This type of risk is called Systematic Risk and is sometimes referred to as market or non-diversifiable risk. Systematic Risk is a measure of the extent to which a particular project's (or asset's) returns are likely to vary relatively more (or less) than a portfolio of projects (or assets) across the market. The measure of Systematic Risk is known as Beta, and will vary from project to project. The Beta determines the additional return that an investor, including a Public Sector investor, would require in order to compensate them for investing in that project and thereby taking on the Systematic Risk of that project (see Figure 5.3).

The general assumption in finance is that agents are risk adverse. As result, if all the characteristics of the projects are similar from each point of view, excepting the risk, they will have a preference for the projects with the lower risk. Consequently, the projects will be ranked function of risk as in Figure 5 - 3.

Figure 5 - 3 Relationship between risk and return based on CAPM



This is called Security Market Line (SML). The expected return based on CAPM is a function of beta (volatility coefficient) as a proxy for risk. The minimum accepted expected return is the risk-free rate (R_f).

Assuming that one investor can obtain a return higher than the combination between risks and returns given by Security Market Line (SML), on a market with symmetric information, all the agents will migrate to this investment project, so SML will be moved upward in order to include this new project. On the other hand, using the same assumptions, no agents will be interested to invest their money in a project that offers a combination between risk and return positioned below SLM. That would be equivalent to accept a project that offers, for the same risk, a return lower than the one offered by SML.

It has to be underlined that not all the projects could be characterized by the same risk, so the investor should not be interested to obtain the same return no matter the risk of the project is. Otherwise, that would be equivalent that an investor should accept an equal return for projects characterized by different levels of risk. As long as investors are assumed to be risk adverse, rational investors will prefer always the projects with the lowest levels of risk, so, finally, they will invest only in projects with zero risk (and a return equal to Rf).

This assumption can be taken into account for the social discount rate. A risky project should be not preferred comparatively to a safe one, even the financial resources would be supplied by the public entities. Here it has to be considered that, even the required rate of return for a typical investor – "an average people (elector)" – can be assumed, the risk is differed from project to project.

Some researchers of Corporate Finance often consider that there are no reasons for such a distinction as long as the rational investors will require a rate of return in accordance with the assumed risk. In this context, the market equilibrium hypothesis is supposed. Thus, based on risk-return relationship, the projects shape the efficient frontier of Markowitz (1952) and the Capital Market Line. In practice, these hypotheses may be rejected, due to market inefficiency, information asymmetry, investors' feelings, heterogeneous expectations, different investment horizons, etc.. Markets also can reach, in some circumstances, a state of disequilibrium, because of regulations that may adversely affect the investment process. For instance, if the government offers a high rate of return for its bonds, the usual risk – return relationship is reversed: higher return is offered by the securities with lower risk (theoretically, risk free rate).

Anyway, some principles have to be considered. Firstly, **any investment project has to be discounted to a financial discount rate higher than risk-free rate**. Some problems can arise if risk-free rate cannot be found in one economy (for instance, the Government does not issue T-bonds). Regarding the social discount rate, it is more difficult to establish such a minimal benchmark – common sense should be this rate has to be positive.

Secondly, **financial discount rate, but also social discount rate has to take into account some risk factors, quantified in risk premiums**. These risk premiums, even these are very subjective, seems to be logically related to the characteristics of the economy, of the sector, but also for other specific characteristics of the entity that implements the project. As result, discount rates will be determined by a relationship inspired by CAPM (see above) like:

$$k = R_f + \pi_r$$

However, the financial and economic assumptions have to be related to other issues. If discount rates can be chosen by the analysts, the risk is induced that discount rates will be manipulated according to the interest of the applicant. The applicant can be interested to apply a lower level of financial discount rate and a higher level of economic discount rate, in order to obtain public funds.

The impact of risk is different for public financial resources compared to private ones. Based on this fact, a differentiation between the cost of capital for public funds, versus the cost of capital for private financial resources in co-financing of the projects can be considered.

The estimation of discount rates has to be understood as a permanent process of recalculations and re-estimations. For public funds, the social efficiency implies that public money to be not wasted for inappropriate projects. For private investors, too low levels of return offered by public-private partnerships (which are expressed by the rate of required return for the private investors', but also as cost for the public funds), can determine lags in development and opportunity costs. As a result, once the economic conditions, the expectations of the investors and the public policies are changing, these discount rates have to be recalibrated.

Risk is inherently present in all construction projects. Quite often, construction projects fail to achieve their time, quality, and budget goals. A risk model entitled construction risk management system (CRMS) is oftenly used to help contractors identify project risks and systematically to analyze and manage them. The CRMS model is a logical substitute for the traditional intuitive unsystematic approach currently used by most contractors. The influence diagramming technique and Monte Carlo simulation are used as tools to analyze and evaluate project risks. Alternative risk management strategies are suggested. Such strategies include: risk avoidance, risk transfer, risk retention, loss reduction, and risk prevention and insurance.

The need for economic foundations for a systemic risk measure is more than an academic concern as regulators around the world consider how to reduce the risks and costs of systemic crises. It is of course difficult, if not impossible, to find a systemic risk measure that is at the same time practically relevant and completely justified by a general equilibrium model. In fact, the gap between theoretical models and the practical needs of regulators has been so wide that inappropriate measures such as institution-level Value-at-Risk (VaR) have persisted in assessing risks of the financial system as a whole.

To bridge the gap between economic theory and actual regulations we start from the common denominator of various micro-founded models and we provide recommendations based on well-known statistical measures of risk.

Current financial regulations seek to limit each risk assumed or connected within each project. Unless the external costs of systemic risk are internalized by each financial prognosis made for each investment project, the financing institution will have the incentive to take risks that are borne by all. An illustration is the current crisis in which financial institutions had levered up on similar large portfolios of securities and loans which faced little idiosyncratic risk, but large amounts of systematic risk.

The most common method of Monte Carlo based contingency estimating used by industry is "line-by-line" estimating of ranges with Monte Carlo simulation applied. In this approach, as commonly applied, the estimate line-items (e.g., install steel structure, mechanical engineering, etc.), or estimate subtotals by work breakdown or other estimate categories are entered in an Excel spreadsheet which serves as the starting basis of a Monte Carlo model. The more detailed the estimate, the more lines that are usually modeled. Using @Risk® or a similar spreadsheet add-on program, the analyst/estimator then replaces each fixed line-item or subtotal cost entry with a statistical distribution of cost outcomes for the line item. These line item distributions are the simulation model inputs. For simplicity, the distribution used is almost always "triangular" with the line-item point estimate being the peak value, and the high and low "range" points of the triangle being assigned by the analyst or the project team during a "risk analysis" meeting.

Risks are things that drive uncertainty of future outcomes. Risks should not be confused with things that are simply higher in cost. For example, some people will say that revamp work in a process plant is "risky"

because it costs more (or takes more hours) than new work. However, revamp work is an attribute of a project scope that only increases the risk significantly if the scope development and project planning practices that define and mitigate the potential cost impacts of revamp work are not done well. If the process plant as-built and physical condition has been well examined, the range of possible cost outcomes (or risk) for revamp work will not be significantly wider than new work in percentage terms. In this case, the level of scope definition and planning is the risk driver or cause, not the fact that the work is revamp (which may be a cost driver).

This relates to our discussion of line-by-line Monte Carlo because, lacking a focus on risk drivers, teams using this method tend to focus on why line item costs are high. The exercise becomes focused on cost reduction or value improvement rather than risk mitigation. While total cost management recognizes that value and risk management are closely related concepts and should be practiced in an integrated way, users must be careful not to confuse them. Once again, the confusion comes because systemic risk drivers cannot be effectively discussed or dealt with at a line item level.

In best practice, a combined risk analysis/contingency estimating method should start with identifying the risk drivers and events. The cost impacts of the risk drivers and events are then considered specifically for each driver. For systemic risk drivers, random estimating methods are best. However, for project or item specific risks, more non-random cost estimates of the effects of risk drivers are generally appropriate.

Ideally, project-specific parameters should be estimated for each individual project because the opportunity costs of the resources used or produced may differ from project to project, due to the specific characteristics of each project. Because risks are different from project to project, the required rate of return should be adapted consequently, taking into account for the risks. However, in the context of public finances, in many cases the necessity for the controlling of the public financial resources can become a barrier for the applicability of the theoretical issues regarding the connection between discount rates and risks. Thus, accepting the use of different behchmarks for comparisons- different from project to project - can create agency problems, affecting the points of view of some analysts, which can adapt their discount rates in order to obtain public financial resources. As long as discount rates are very subjective indicators, these persons can justify in an incorrect manner higher or lower levels for discount rates, which can determine an inappropriate estimation of the benchmarks for comparisons with IRR.

As result, even the variability of the benchmarks from project to project can be accepted from a theoretical point of view, their approval should be given cautiously. However, **it can be considered the principle that, for very important projects and with a sounded justification, can be considered an allowance for a modification of the recommended level of social and financial discount rates taking into account the risks, according to the principle "higher the risk is, higher has to be the discount rate".**

The next chapter presents a suggested approach for Romanian socio-economic context in order to be applied for each type of beneficiary (public and private).

5. IRR APPLICABILITY ON EACH TYPE OF BENEFICIARY (PUBLIC AND PRIVATE)

5.1 Short description of the IRR rates standards applied until now

The guide for Cost benefit Analysis prepared for investment projects under Structural Funds, Cohesion Funds and Instrument for Pre-Accession Countries (ISPA) issued in 2002 includes some references related to discount rates used for NPV calculation for period 2000-2006 presented in the following part for both types of investments (public and private sectors). These discount rates used in NPV calculation are exactly the benchmarks for IRR (see Chapter 3 for details). In these conditions, the standards applied in order to determine these discount rates are exactly the standards for IRR, presented in "Study on Financial and Social Discount Rate".

The discount rate often used in capital budgeting that makes the net present value of all cash flows from a particular project equal to zero. Generally speaking, the higher a project's internal rate of return, the more desirable it is to undertake the project. As such, IRR can be used to rank several prospective projects a firm is considering. Assuming all other factors are equal among the various projects, the project with the highest IRR would probably be considered the best and undertaken first.

The IRR rule for strictly private financial investments represents a measure for evaluating whether to proceed with a project or investment. The IRR rule states that if the internal rate of return (IRR) on a project or investment is greater than the minimum required rate of return – the cost of capital – then the decision would generally be to go ahead with it.

Although this is usually the course of action regarding the financial IRR method, for projects financed through public funds to be eligible for grants, the financial IRR has to be below the financial discount rate used, to justify the funding necessity. On the other hand the economic rate of return has to exceed the social discount rate used for a certain project, to be eligible for financing. This is to show that the projects overtime social benefits are greater than the associated costs. As an example, the 2008 CBA guide suggests the use of the financial discount rate of 5% and a social discount rate of 5.5%. For a project to be eligible for financing through Cohesion Funds, Structural Funds etc. the financial rate of return should be below 5% to justify the monetary investment, while the economic rate of return should be greater than 5.5% to justify the social benefits of the project.

In the following parts we will summarized the values of IRR included in appraisal and selection of investment projects proposed by Managing Authority (MA) for existing sectoral programme at Romania level.

MA for Regional Operational Programme proposed the within assessment grid (depending on the type of beneficiary) basically two levels for social and financial internal rates, respectively:

- Up to 5% financial and above 5.5% social internal rates of returns for public beneficiaries (eg. investments in roads infrastructures, social, tourism, business environment);
- Up to 9% financial and above 5.5% social internal rates of return for private beneficiaries (investments in business development, tourism and increase of economic competitiveness of SME's).

MA for Sectoral Operational Programme for Incease of Economic Competitiveness proposed a different levels of this ratios, respectively:

- Up to 5% financial and above 5.5% social internal rates of returns for a certain type of investments with both public and private beneficiaries (eg. investments related to increasing energy efficiency, research and development)
- Up to 13% financial and above 5.5% social internal rates of returns for an innovative and eco-efficient productive system for private beneficiaries.

Ma for Sectoral Operational Programme for Environment during appraisal process of applications follows the recommendation of WD no 4 of EC regarding development of CBA, respectively 5% and 5.5% for financial and social return of investments.

Other MA do not propose any level of IRR due to different approaches during evaluation procces and limited influence of CBA in development of applications (eg. within CBC Programme CBA is required only to Hungary – Romania cooperation with public beneficiaries).

5.2 CBA weaknesses from the point of view of IRR rates

Basically, the role of IRR within CBA is to help beneficiaries of all kinds (public and private) for potential investments projects. Taking into account the high level of sensitivity of the assumptions when developing a CBA it can be appreciate that IRR analysis presents some strengths and weaknesses. As strength points we can mentioned the following: IRR percentage represents returns generates by an investment project; decisional criteria is consistent with decisional factors. The weakness points could be considered the knowledge required for CBA, the difficulty of calculation process of IRR and the interest of the projects measured using a variable rate during time horizon with direct impact in NPV.

When developing CBA model for any kind of investment projects the time and the interest have impacts in expected cash flows. One of the analysis based on IRR is referring to the value added on the cash flow of the projects and it cannot be considered as general applicable when referring to different types of investments. Another analysis is referring to IRR as to be equal with opportunity cost of the project. This approach is generally not appropriate due the different opportunity cost of cash flow which investor's should take into account. A third type of analysis is the IRR rule which conduct to various rates of return on the cash flows. An the last but not the least, IRR analysis does not consider the point when the yield curve is not as expected (the interest rate of the project is different over the time horizon – for fist year the value is not identical to the rate for next 5 or 10 years (Brealey and Myers 2007).

These issues related to IRR analysis might not help decisional factors for investment projects (to make an adequate decision for investing), along with the each parties involved (such EC) and the most important problem is the sensitiveness of IRR in relation with assumptions used for conducting CBA. The estimated IRR of a project will vary significantly if you modify any assumptions or any inputs which affect the future expected cash outflows and inflows.

Furthermore, the IRR methodology does not reflect any possible changes in interest rates during the lifespan of the project. Such changes could significantly modify decision for new investments (especially in private sector) given the potential impact on the firm's cost of capital. For short-term projects this situation can often be accepted, but for long term investment the variation of interest rates is considerable, compromising the level of the IRR. The IRR methodology proposes hypothesis rate for cash generated during the time horizon of the project, which should be the same level as IRR over the lifetime of the project. Although this approach of reinvestment could be feasible, in practice reinvested cash often reduce returns of the project itself. When the cash flow of the project is developed other costs and expenses should be considered (these items should be taken to evaluate in terms of management time and resources, as well as in purely financial terms).

6. THE REQUIRED RATE OF RETURN SUGGESTED APPROACH FOR ROMANIA

6.1 Applicable standards for Internal Rate of Return

As discussed in chapter no 3, internal rate of return is defined as the solution of the equation Net Present Value (NPV) = 0. NPV is a function of several variables related to the project: its cost (I_0), the cash flows generated (CF_t) (taking into account the social benefits, too, in the case of social indicator), its lifetime (n) and its residual value (RV_n), but also is a function of the discount rate (k):

$$NPV = -I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} + \frac{RV_n}{(1+k)^n}$$

As result, FIRR is the solution of FNPV = 0, and EIRR is the solution of the equation ENPV = 0. Practically, this equation can be written:

$$I_0 = \sum_{t=1}^{n} \frac{CF_t}{(1+IRR)^t} + \frac{RV_n}{(1+IRR)^n}$$

As it is mentioned before, IRR is a discount rate. The impact of discount rate on different variables can be deduced if the relationship of NPV is analyzed. Thus, an increase in the discount rate will affect the performance of the project because cash flows and residual value will be discounted at a higher rate. As result, the negative impact of discount rate (respectively, a higher level of discount rate) can compensate the positive impact of higher cash flows, social benefits and residual value).

In the case of projects that require financing through public funds, table 1: Decision process based on FRR and ERR (chapter 3) will need to suffer changes (see Table 7.1).

Table 6.1 : Decision process based on FIRR and EIRR

		Economic Efficiency (economic indicators resulting from Cost-benefit analysis)	
		Yes EIRR > required rate of return	No EIRR < required rate of return
Financial feasibility (financial indicators)	Yes FIRR < required rate of return	**Projects need financing so that they are implemented; economic benefits are greater than the cost of implementation.**	From financial point of view the project requires public financing but from socio-economic point of view the projects would not be implemented. The social and economic benefits are not good enough.
	No	Projects are beneficial for the	The projects would not be

	FIRR > required rate of return	community but do not require public financing.	implemented. The project is sound from financial point of view and can be implemented without external help, but the social benefits are neglectable. .

Even the recommended methodology for the estimation of IRR is quite standard (see Chapter 3), some technical problems can appear.

For instance, EIRR has to consider a minimal level as benchmark. As result, as IRR has to be compared with a required rate of return, an absolute minimal acceptable level for the EIRR in nominal terms can be considered the inflation rate. Also, an absolute minimal acceptable level for EIRR in real terms can be considered zero.

Also, there are some cases in which IRR can have some limits[13]:

- Depending on the type of flow sequence, several IRRs may exist – or even none at all. This is due to the fact IRR is the solution of an equation of n degree. In this case, IRR criterion cannot be used and NPV criterion should be preferred. However, any series of data initially negative then systematically positive allows only a single solution for IRR as discount rate in NPV calculation.
- The use of this indicator tends to reduce the attractiveness of those projects having a major initial investment, or those which only attain their self-sustaining state following a long rise in production phase, even if these projects have greater advantages over a long subsequent period. In this case, IRR criterion should be used cautiously.

Concluding, both FIRR and EIRR can be used as alternatives for FNPV and ENPV criterions. However, IRR has some limits and the analysis has to be done cautiously.

The main challenge for the analysis based on IRR is to determine the benchmark for comparison in order to take a decision. We will present the main recommendations in the next sub-chapter.

6.2 The econometric approach for determining the internal rate of return

For determining the internal rates of return of investment projects both for public and private beneficiaries, a solution may be represented by the application of an econometric method. The econometry represents the field of economic sciences which, based on statistical and mathematical models but also on statistics (data, macroeconomic indicators), aims at supporting the economic studies through conclusions based on measurements, verification and estimation techniques, prognosis and simulations. By using these data, which in theory are solid data and may bring precision to the estimation of the future path of the economic processes in various economic sectors, an internal rate of return could be determined for the investments projects.

In order to numerical characterization of the economic situation of Romania but also in developing and justifying some calculation methods, we use statistical indicators. We mention here only those which are often used: the level indicators (GDP), rate (e.g.: the rate of inflation, the rate of prices), average (e.g.: the

[13] European Commission, *Manual Financial and economic analysis of development projects*, Luxembourg: Office for Official Publications of the European Communities, 1997 – XXXV, p. 313.

average wage), amplitude, dispersion, the square average deviation, the standard deviation.

In the theory of the probabilities, the *standard deviation* of an aleator variable represents a measure of the dispersion of its values around a middle one. It is also called square average deviation.

For a X_0 variable with the average value of μ:

$$\mathrm{E}[X] = \mu$$

Here, the E operator indicates the average value (estimated) of X. Then, the standard deviation of X is

$$\sigma = \sqrt{\mathrm{E}[(X - \mu)^2]}.$$

The standard deviation σ is the square root of the average value of $(X - \mu)^2$.

The standard deviation is equal with radical from the dispersion of the aleator X variable; the standard deviation represents an indicator of the dispersion of the values of an aleator variable. E: standard deviaton (O.M.). The standard deviation is a measure of the distance up to which the aleator variable (the signal) fluctuates against the average and so a measure of the dispersion.

The deviation may be used when projecting the macro-economic indicators for a big time horizon, by analysis of historical data and by application of the optimist or pesimist scenarios. Though, these estimations may have a high level of risk due to the current socio-economic situation.

One of the characteristics of the economy is represented by a rolling of the process in a big number of cases, which makes necessary either the observation of the process for all cases (an extremely costly option) or the observation of a sample of cases (option which implies a risk for deviation from the true values of the studied parameters). In the econometric approach, the estimation of the parameters which may influence an economic process is followed, thorugh various methods: statistical regression, the method of the smallest squares, the method of the maximum verosimilityş the method of Bayesian estimation.

The *regression* is used for searching and cuatification of a relation between two variables. Such a relation is expressed by a report on y (the dependent vriable) based on one or more explicative variables (descriptive) – regression report y=f(x).

In the econometric studies, the use of regression in view of finding the influence on the evolution of an economic process by one or more factors presents a special interest both for analysis and prognosis.

The statistical regression has as a key element the regression function. In view of describing the dependency between y and x, it is considered that for each level of the (xi) factor exist more values on the effect.

The *method of the smallest squares* is a mathematical method used for obtaining a solution for systems of supradetermined reports meaning that it has more reports than unknown variables. The smallest squares refer to the fact that the obtained solution minimizes the sum of the square deviations against the values of the reports.

The most important application is the determination of the coefficients of a mathematical function which approximates as well as possible a data set. This best approximation minimizes the square deviations from between the given data and the data calculated with the help of the respective function.

There are two variants of the smallest squares method:

– The liniar method of the smallest squares, which solves the liniar reports systems based problems.

Such an example is the liniar regression, much used in statistics and in experimental data prelucration. Solving the reports system is usually made through direct methods.

– The non-liniear method of the smallest squares, which solves the non-linear reports systems based. The solving of the reports system is usually made through iterative methods, but a linearization is used for every iteration.

The estimators of *maximum verosimility* of the parameters which characterizes the repartition law on the aleator variable (y), with values for a sample of n cases, are represented by the values of the parameters which would reduce the values of the sample with the biggest frequency. Thus, we consider those values of the parameters for which the corresponding verosimility function, underlined through repeatet polls, reaches the maximum value.

Proposed by R.A. Fisher in 1912, the method of the maximum verosimility is one of the best fundamented methods for the estimation of the parameters of a regression report.

The *Bayesian method* aims, beside the frequentely used statistical data (obtained through polls or representing chronological series) and some information known from other sources on parameters, a dunction of the loss (the cost of risk) due to the deviations of the estimated values from the real ones.

The Bayesian method represents a systhematic method to use the information obtained at a later date, taking into account the data coming from the poll for estimations, thus reaching an exprimation of the incertitude thorugh the revised probability density.

The punctiform estimations to which we arrive through taking into consideration both categories (apriori and based on poll) have the quality to be selected so as the losses, as for the imprecision, to be as small as possible.

***

All these methods could be used when estimating the financial projections or when preparing a cash flow for a project (no matter the type of beneficiary or the investment type), through the estimation of the statistical data, but there are major risks in such estimations which come from the quality and trustfulness of these data. As we mentioned above, the observation of the economic process of Romania, needed for a real estimation of the values of the profitability of the investment projects, has many problems: the cash and time issue for the evaluation of all the components of the process and the risk of deviation from the reality through the evaluation of samples of components.

6.3 Proposed level and recommendation for the required rate of return estimation

As the IRR is directly linked to the discount rates, the viability of the project will be determined by comparing the resulted IRR (financial and economic) to the actual financial and social discount rates used. For a project to be considered for financing through public funds, from a financial point of view, FIRR should be smaller than the financial required rate of return (the actual financial discount rate used in the estimation of NPV).

As proposed in a complementary study related to financial and social discout rates, the level of the financial discount rate used in Cost Benefit Analisys for public and private investments, a discount rate of 6% should be used when financing public projects and 9% for private ones. Considering the above statements, the financial rate of return imposed in appraisal procedures must be below the rates indicated above. It has to be underlined that there are projects that are neither suitable from a financial, nor from an economic point of view, and they have to be rejected.

From private investor's perspective, higher is IRR, higher is the performance of the project – as long as it is not counted for risks of the project. Form this viewpoint, it seems reasonable to fix a lower limit for the indicators, but unnatural to consider a too much higher level of performance should determine the rejection of the project.

This approach has some limitations if the funds are provided by public sources (national or international). If a project is too performer, why it should require public funds for its financing, because the private investors consider a great opportunity to use private funds in a project with high IRR, and the performance of the investment project will increase the market value of the company. Moreover, an increase of public financing can determine an increase of some agency problems, decision in asymmetrical information, corruption, bureaucracy etc. This is why it is recommended to take into account also an upper limit for FIRR for the case of private projects financed through public funds (hereafter, FIRRPP), and this upper limit represents the lower limit for private investment projects financed exclusively through private funds.

In order to consider such an upper limit, the methodology is based on the comparison between different costs of financing for the alternative investments from the financial market. For instance, if FIRRPP is higher than the cost of debt (eventually, corrected for taking into account the tax shields), the investment project generates positive economic value added in the context of bank financing (the private investor use a loan from the credit market to obtain the resources needed to finance the investment), so there is no rational reason to use public financial resources.
There are two main issues that have to be considered – the cost-approach (1) and the risks (2). Another supplementary concern is related to the capacity of monitoring, which is very important in the management of public funds. These subjects are presented below.

1. The cost- approach. There are some benchmarks that can be used as upper limits for FIRRPP (hereafter, ULFIRRPP). Each of them has some limitations in order to be perfect proxies for ULFIRRPP, as follows. One benchmark for ULFIRRPP can be considered the interest rate for credits from the credit market. Methodological limits are given by the competitive characteristic of the market. As result of this characteristic, there is a great diversity for the levels for this indicator, varying from bank to bank and from project to project. In theory, another benchmark can be the interest rate for the bonds issued on the capital market. Unfortunately, the bond market is not developed in Romania. Moreover, theoretically, one investor can take loans from any international market. From this perspective, it is very hard (even not possible) to consider an ULFIRRPP.

Based on this cost-criterion, theoretically, the ULFIRRPP would be the lower rate of interest on credits (including bonds) from national and international financial markets. In order to determine an ULFIRRPP based on this, a comprehensive database is required. The beneficiary can take into account if the cost required for this database can be justified by the improvement in the results of the project. Considering this obstacle is passed, ULFIRRPP will be the minimal level of the interest rate on credits at which the private investors can be financed taking into account all these alternatives.

It is very important to consider an observation. In real economy, the credit contract includes many supplementary conditions related to size of the beneficiary of the loan, warrants, actual leverage, risk and performance indicators, previous experience concerning the relationship company-bank, additional fees

and other factors. For instance, in one recent study14, the Romanian lenders were asked to rank the main criteria used in granting a loan for a direct investment project (from 1, the minimal rank, to 8, the maximal one). The main results are presented in table 1.

Table 1: The main criteria used in granting a loan for a direct investment project

Criterion	Average	Median	Mode
Anticipated performance of the project (based on a feasibility study or a business plan)	6.57	7	8
Loan guarantees	5.86	6.5	7
Corporate credit analysis of the previous financial statements	5.74	6	8
The client's contribution to project financing	5.43	5	5
The long-term relationship with the client	4.63	4	3
Project investment cost	4.05	4	1
Firm's reputation	2.98	3	2
The quality of past collaboration between firm's manager and bank	2.50	2	1

Source: Dragotă, Ingrid-Mihaela; Dragotă, Victor; Ţâţu, Lucian; Pele, Daniel Traian; Vintilă, Nicoleta; Semenescu, Andreea, „Capital budgeting: the Romanian credit analysts' points of view", *The Review of Finance and Banking*, vol. 3(1), 2011, pp. 39-45:

http://ideas.repec.org/a/rfb/journl/v03y2011i1p009-045.html.

These considerations can impact the cost of credit or even the granting of the loan. For this reason, the approach of taking as real the cost of credit (the interest rate for credits) can be invalidated by facts: the companies cannot be financed always at the cost stipulated in the offers of the banks because they cannot fulfil the requirements of the banks in the analysis of the credit.

2. The issue of risks. Even the cost of financing seems to be invariable from project to project, each rational and risk-adverse agent will take risks into account: higher will be the specific risk of a project, higher will be the required rate of return for investors. In these conditions, the ULFIRRPP has to be adapted from project to project. However, risk is very hard to be estimated by an external analyst, which

[14] Dragotă, Ingrid-Mihaela; Dragotă, Victor; Ţâţu, Lucian; Pele, Daniel Traian; Vintilă, Nicoleta; Semenescu, Andreea, „Capital budgeting: the Romanian credit analysts' points of view", *The Review of Finance and Banking*, vol. 3(1), pp. 39-45, http://ideas.repec.org/a/rfb/journl/v03y2011i1p009-045.html.

can determine the acceptance of unrealistic projects and the rejection of useful and well founded ones. In this context, the analyst should take into account the specific risk of the project, which depends on the company's activity sector, the size of the company, the characteristics of the project (a replacement, a development or a strategic investment, which suggests a similar, a higher and a more higher risk of the project comparing with the company's risk), the macroeconomic development etc., and adjust the required rate of return considering the dimension of the risk.

3. Monitoring. There is a great danger that projects are implemented only for obtaining the external funds. Each business has its risk (which imply the possibility that one good project to fail in some conditions). However, the deciders need a clear image over the expected and realized performances of the proposed project that requires financing. Due to the asymmetrical information and to the agency problems, private investors can be tempted to obtain financial resources at a lower cost than the implicit cost of the project.

Based on the issues presented above, we propose the following methodology for the estimation of the upper limit for financial internal rate of return for private projects.

Methodology for the estimation of the upper limit for financial internal rate of return for private projects

Step 1: analysis of the levels of interest rates on credits on the target-credit market. This option seems to be reasonable and justifiable as cost. The offers of Romanian banks for interest rates on credits will be ranked decreasingly.

See Table M1 for one example.

Table M1: The offers for interest rates for credits for investments (example)

Bank	Interest rate for credits for investments
Bank 1	28%
Bank 2	27%
Bank 3	26%
Bank 4	22%
Bank 5	21%
Bank 6	20%
Bank 7	19%
Bank (n-2 = 8)	13%
Bank (n-1 = 9)	12%
Bank n =10	10%

Observation: we have considered only 10 cases in this example; n represent the number of banks included in the sample. The example can be easily generalized.

Observations:

The banks included in this analysis should be accepted by the Ministry of Finance and have to accept the conditions stipulated by the requirements of all the stakeholders implied in the process. These banks can be Romanian, but foreign, too, from which the local investors can obtain resources.

The interest rates included in this table have to be calculated as so to include all the costs required by the credit (in fact to be the annual equivalent interest rate, in Romanian, RDAE = rata dobânzii anuale echivalente).

Step 2: For this rank, will be excluded the highest 75% levels of the indicator, in order to encourage the competition between banks for offering credits of lower costs.

For our example, 75% * n = 75% * 10 = 7.5 (rounded, =8). Banks 1 to 8 are excluded.

Step 3: The higher level for the interest rate of credits will be the upper limit for financial internal rate of return for private projects.

For our example, the upper limit for financial internal rate of return for private projects will be 12%, corresponding to the offer of Bank 9.

General observations:

The theoretical correlations have to be respected (both rates have to be expressed in real terms or in nominal terms, etc.)

If there are different levels for the interest rates for investment function of the lifetime of the credit, it will be selected the rate that correspond to the lifetime of the investments project

The calculations have to be done at least monthly, in order to adjust the indicators to the actual conditions of the credit market.

Thus, for the next programming period, we cannot but follow the tendencies from the banking system and propose as limits for the financial internal rate of return for investments from the private sector the interval between 0% and 9%, closely related with the proposal on the level of the financial discount rate for the private beneficiaries. Though, sometimes the upper limit may be modified according to the results of the analysis of the minimum profitability rates which the banking sector could require from the private beneficiaries when making loans. In conclusion, an acceptable level of the upper limit may be considered 12%, but the credit market must be constantly analysed. We underline that these limits apply to all types of projects under state aid schemes. Supplementary, for analysis and framing of the internal rate of return of the invested capital, it should be kept in mind that this should register superior values but under the level of the discount rate or under the level of the profitability at sector level (if relevant data exists in this sense).

From public investor's perspective, a lower IRR is desirable due to requirement of the EU funds for public investments projects. An adequate methodology of setting the inferior limit of IRR ratios related to these projects seems to be difficult to establish (the forecast of operating revenues can not be developed in the

absence of tariffs – eg. Investments in public social infrstructures). Furthermore, the academic literature indicates various levels and range of this ratio for 2000-2006 programming period using the hystorical approach (focus on a sample of projects from previous programming period). In order to set a certain range for IRR ratio we strongly recommend establishing a certain methodologies for developing the forecast of financial cash flows, mainly developing of operating costs using new benchmarks of costs for each type of infrastructures.

From the analysis of the investment projects and of the current practice for the evaluation of these projects, the following could be noticed: the upper limit of the internal rate of return was under 0%, as condition for the selection for financing, and the lower limit around -6%. Taking into consideration the proposals on the financial discount rates for the public beneficiaries, these indicative values may be retained, while bearing in mind that for sustaining the lower limit of -6% it is necessary to check the validity of the input data, of the scenarios applied for developing the financial cash-flows, especially for the major investment projects which needed the involvement of several institutions (Managing Authorities, Intermediate Bodies, international experts, external consultants, Beneficiary, etc.). Also, it should be considered that for certain types of investments for public beneficiaries this rate cannot be calculated and then we cannot set a lower limit (for instance projects for county roads for which negative values of the cash flow are registered or waste management projects which have multiple financial internal rates of return because of the reinvestments in the system). The internal rate of return of the invested capital for the public investment projects should register values net superior to the return rate of the investment and to be positive around 0.

Subsequently, a social discount rate of 6% was proposed to be used in calculating the ERR (Economic Rate of Return). For a project to be eligible for financing, the ERR must be greater than the suggested social discount rate, because this is when a project has added social value.

Basically, for private investment projects seems to be difficult to set a specific range for ERR due to the following reasons: economic analysis for most of the EU funding programmes is not required; there are no methodology applicable to private business environment in order to identify and analyse the economic benefits and assessment grids within Operational Programmes for private business do not consider as an evaluation criteria this ratio.

Furthermore, for public investment projects within the next programming period the upper limit of ERR could be set considering: a new methodological approach to identify economic benefits for all type of infrastructure investments (except environment and road infrastructure projects) and establish the maximum categories of economic benefits included in economic analysis to avoid double-counting. Similar projects were analysed from the ERR point of view and in most cases economic benefits it have been noticed a very high levels of this ratios as a result of multiplying economic benefits. This is in fact a strong justification for the development of methodologies in this respect.

This represents an important reason for the development of a specific methodology. Though, for the financing request for major investment projects which needed a complex cost-benefit analysis, whith correct input data and realist scenarios, it was noticed that the upper limit of the economic internal rate of return was around 20%. This value may be proposed as the upper limit if the methodologies, which identify and quantify the economic benefits of the investment projects at sector level, type of beneficiary, etc., exist.

7. CONCLUSION

In conclusion, in accordance with the current situation in Romania and uncertainty for future forecasts also due to the worldwide downturn since 2008 which will affect the global economy on a longer period including the coming EC allocation 2014 – 2020 period, the lack of information at Romanian level, we believe a more conservative approach is more realistic in our case in respect with the EC recommendations relating levels of rates of return in correspondence with discount rates. Even if the requirement is that Romania shall align with the other EU member states' economy also from the discounting rates point of view and internal rates of return, the trend being descendant (as described in the study sections), we think this can be done with small steps and in accordance with country risks and variations on certain inputs affecting these ratios.

Therefore, as it has been described since the beginning of the study starting with macroeconomic ratios and the way they are affecting these discounting rates, comparison with other EU members, defining discount rates up to the end of the study where we have proposed a different approach for public and private sectors, in the light of a better consumption of EC funds but in line with our characteristics and developments Romania may take into consideration also new levels of internal rates of return in appraisal process of investment projects along with financial and social discount rates for the coming period.

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9. ANNEXES

9.1 ANNEX 1

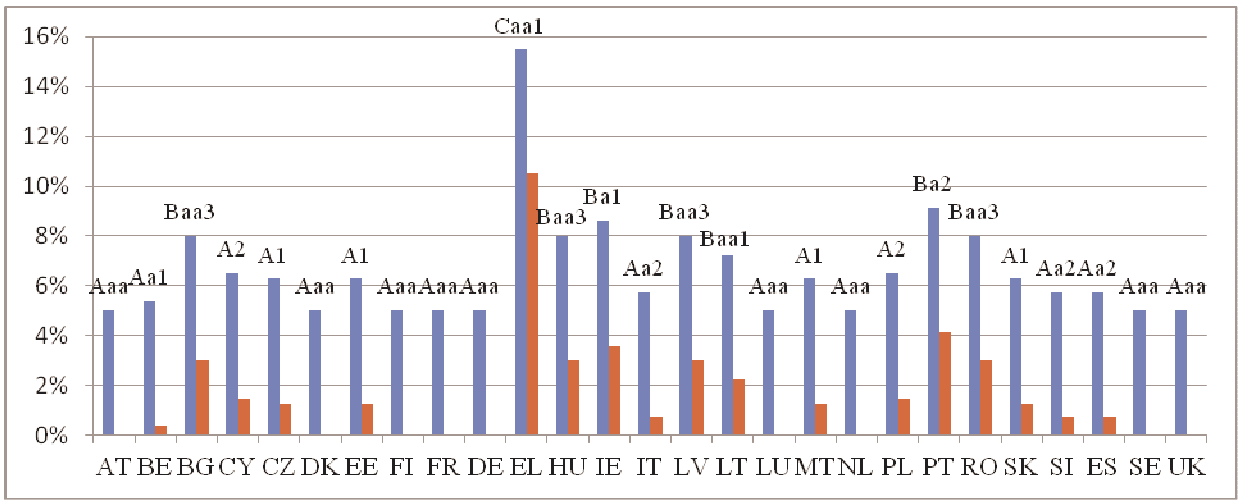
Table 1 - Financial and economic indicators obtained in different investment projects

Project	Value of investment in Eur	Before community assistance		After community assistance					
		NPV/c in Eur	FRR/c	FNPV/c in Eur	FRR/c	FNPV/k in Eur	FRR/k	ERR	ENPV in Eur
Water and Wastewater Botosani	102.472.411,00	-78.900.534,00	-5,49%	-12.166.806,00	0,10%	-10.785.838,00	-0,52%	22,50%	215.500.000,00
Water and Wastewater Mehedinti	72.841.729,00	-56.936.378,00	-4,68%	-8.718.217,00	0,69%	-8.380.341,00	0,22%	18,30%	109.419.667,00
A2 Cernavoda Constanta	324.539.274,00	-	-	-	-	-	-	13,20%	130.260.000,00
Naval Trafic Management System on Dunare - Marea Neagra Channel	4.216.350,00	-	-	-3.753.686,00	N/A	-1.127.650,00	N/A	7,27%	2.386.390,00
Solid Waste Salaj	34.137.657,00	-24.893.200,00	-12,00%	-10.337.070,00	-7,70%	-4.739.300,00	-2,20%	32,20%	47.433.731,00
Water and Wastewater Constanta Ialomita	192.392.899,00	-137.778.884,00	-5,60%	-21.311.788,00	-0,20%	-23.526.679,00	-2,52%	24,70%	401.803.000,00
Water and Wastewater Ilfov	72.131.478,00	-52.639.175,00	-5,62%	-7.834.271,00	0,23%	-6.078.871,00	0,35%	12,60%	38.500.000,00
Water and Wastewater Calarasi	99.500.000,00	-76.812.439,00	-8,40%	-10.483.407,00	-0,20%	6.192.982,00	1,50%	14,50%	57.800.000,00
Water and Wastewater Braila	94.782.000,00	-66.287.702,00	-5,03%	-10.190.472,00	0,41%	-10.216.498,00	-0,86%	19,60%	144.300.000,00
Comarnic business Centre (Values in RON)	5.299.403,20	-	-	-3.102.090,00	-2,78%	-3.102.090,00	-2,78%	6,19%	279.170,00
Slobozia Business Centre (Values in RON)	17.128.706,00	-	-	-3.657.736,00	1,60%	220.383,00	9,50%	43,00%	92.825.929,00

9.2 ANNEX 2 – COUNTRY RISK ASSESMENT

A simple way to measure and compare country risk is given by country rating . Clei (1998) points out: "Risk specificities of ranked countries cannot be accounted for by such a uniform approach. It is thus important to consider ratings as helpful decision-making tools that must be supported by a more qualitative analysis integrating all these specificities." In the following figure there are country rating, total risk and country risk premium for EU27.

Annex 2 Figure 1 Risk premium and country rating in UE



Total risk premium (blue column), country risk premium (red column)
Datasource: Damodaran (2011) "Country Default Spreads and Risk Premiums"

Romania, with a rating of Baa3 (according to Moody's rating scale, or equivalent BBB- according to Standard & Poor's and Fitch rating scale) is considered more riskier than the developed countries (AT, BE, CY, DK, FI, FR, DE, IE, IT, LU, MT, NL, PL, ES, SE, UK), even more riskier than some new member states (CZ, EE, LV, SK, SI), but less risky than EL, IE, PT (countries with serious financial problems). As a consequence of this rating, the total risk premium for Romania is 8%, and the country risk premium is 3% (the same is valid for Bulgaria, Hungary, Latvia).
These ratings provide a simple measure of country risk, but there are some inconveniences of using them as the only measure. For example, there were some debates about the "independence" of the rating agencies or, because the ratings agency focus on default risk, there might be ignored other risks that affect equity markets. A much more comprehensive measures of country risk implies the bottom-up approach, by analysing the economic fundamentals of the country.

Another approach for country risk analysis is to take into consideration the sources of risk and valuate the influence on discount rate. Considering the problem of the absence of a comprehensive theory about country risk, an exhaustive classification of the sources of risk is important. In the next table there is a sources of risks classification:

Annex 2 Table 1 Risk premium and country rating in UE

Socio-political risk			*Economic risk*		*Natural risk*
Political	Government policy	Social	Macroeconomic	Microeconomic	
Democratic or non-democratic change in the government	Change in the policy of the local authorities	Social movement intending to influence foreign business or host country policy	Any macroeconomic risk specific to the host country	Any microeconomic risk specific to the host country	Earthquake and other natural

Source: Bouchet, Clark, Groslambert (2003)" Country Risk Assessment - A Guide to Global Investment Strategy"

Country risk analysis involves examining the effects of a complex combinations of factors: macroeconomic policy, fiscal and monetary policy, capital market, structural and institutional weakness, public governance.

For emerging countries, there has to be taken into consideration the transition process, because the total risk is influenced by the country specific progress – large and small scale privatisation, restructuring of enterprises, price liberalisation and other relevant aspects of the transition. Romania, along with other former communist countries, is in the long and painful transition process. There were a lot of positive transformations, but there is still a lot of work to do. European Bank of Reconstruction and Development constructed a system of transition indicator scores in order to judge and compare country-specific progress in transition. The next table shows the evolution of transition indicators for Romania in 2000, 2005, 2009 and the values for the neighbouring countries:

Annex 2 Table 2 Transition Indicators

	Romania 2000	Romania 2005	Romania 2009	Bulgaria 2009	Moldova 2009	Ukraine 2009	Serbia 2009	Hungary 2009
Large scale privatisation	3	3,67	**3,67**	4,00	3,00	3,00	2,67	4,00
Small scale privatisation	3,67	3,67	**3,67**	4,00	4,00	4,00	3,67	4,33

Enterprise restructuring	2	2,33	**2,67**	2,67	2,00	2,33	2,33	3,67
Price liberalisation	4,33	4,33	**4,33**	4,33	4,00	4,00	4,00	4,33
Trade & Forex system	4,33	4,33	**4,33**	4,33	4,33	4,00	4,00	4,33
Competition Policy	2,33	2,33	**2,67**	3,00	2,33	2,33	2,00	3,33
Banking reform & interest rate liberalisation	2,67	3	**3,33**	3,67	3,00	3,00	3,00	4,00
Securities markets & non-bank financial institutions	2	2,33	**3**	3,00	2,00	2,67	2,00	4,00
Overall infrastructure reform	3	3,33	**3,33**	3,00	2,33	2,33	2,33	3,67
Telecommunications	3	3	**3,33**	3,67	3,00	2,67	2,67	4,00
Railways	4	4	**4**	3,33	2,00	2,00	2,33	3,67
Electric power	3	3,33	**3,67**	3,67	3,00	3,00	2,33	4,00
Roads	3	3	**3**	2,67	2,00	2,00	2,67	3,67
Water and waste water	3	3,33	**3,33**	3,00	2,00	2,00	1,67	4,00

Data source: European Bank for Reconstruction and Development, http://www.ebrd.com/downloads/research/economics/macrodata/tic.xls

As the previous table shows, Romania made small steps in transition process, for most of the indicators is above Moldova, Ukraine, Serbia, Bulgaria, but below Hungary.
For 2009, Romania is characterized by the following values, and the interpretation of these transition indicators is given by EBRD:

- ⇨ large scale privatization: 3,67

3=More than 25 per cent of large-scale enterprise assets in private hands or in the process of being privatised (with the process having reached a stage at which the state has effectively ceded its ownership rights), but possibly with major unresolved issues regarding corporate governance.

4=More than 50 per cent of state-owned enterprise and farm assets in private ownership and significant progress with corporate governance of these enterprises.

- ⇨ small-scale privatisation: 3,67

3=Comprehensive programme almost ready for implementation.
4=Complete privatisation of small companies with tradable ownership rights.

- ⇨ governance and enterprise restructuring: 2,67

2=Moderately tight credit and subsidy policy, but weak enforcement of bankruptcy legislation and little action taken to strengthen competition and corporate governance.
3=Significant and sustained actions to harden budget constraints and to promote corporate governance effectively (for example, privatisation combined with tight credit and subsidy policies and/or enforcement of bankruptcy legislation).

- ⇨ price liberalization: 4,33

4+ =Standards and performance typical of advanced industrial economies: complete price liberalisation with no price control outside housing, transport and natural monopolies.

- ⇨ trade and Forex system: 4,33

4+ =Standards and performance norms of advanced industrial economies: removal of most tariff barriers; membership in WTO.

- ⇨ competition policy: 2,67

2=Competition policy legislation and institutions set up; some reduction of entry restrictions or enforcement action on dominant firms.
3=Some enforcement actions to reduce abuse of market power and to promote a competitive environment, including break-ups of dominant conglomerates; substantial reduction of entry restrictions.

- ⇨ banking reform & interest rate liberalisation: 3,33

3=Substantial progress in establishment of bank solvency and of a framework for prudential supervision and regulation; full interest rate liberalisation with little preferential access to cheap refinancing; significant lending to private enterprises and significant presence of private banks.
4=Significant movement of banking laws and regulations towards BIS standards; well-functioning banking competition and effective prudential supervision; significant term lending to private enterprises; substantial financial deepening.

- ⇨ securities markets & non-bank financial institutions: 3

3=Substantial issuance of securities by private enterprises; establishment of independent share registries, secure clearance and settlement procedures, and some protection of minority shareholders; emergence of non-bank financial institutions (for example, investment funds, private insurance and pension funds, leasing companies) and associated regulatory framework.

- ⇨ telecommunications: 3,33

3=Substantial progress in commercialisation and regulation. Telecommunications and postal services fully separated; cross-subsidies reduced. Considerable liberalisation in the mobile segment and in value-added services
4=Complete commercialisation, including privatisation of the dominant operator; comprehensive regulatory and institutional reforms. Extensive liberalisation of entry.

- ⇨ railways: 4

4=Railways fully commercialised, with separate internal profit centres for freight and passenger services. Extensive market freedoms to set tariffs and investments.
Implementation of medium-term business plans. Ancillary industries divested. Private sector participation in freight operation, ancillary services and track maintenance.

- ⇨ electric power: 3,67

3=Law passed providing for full-scale restructuring of industry, including vertical unbundling through account separation and set-up of regulator. Some tariff reform and improvements in revenue collection. Some private sector involvement.
4=Separation of generation, transmission and distribution. Independent regulator set up. Rules for cost-reflective tariff-setting formulated and implemented. Substantial private sector involvement in distribution and/or generation. Some degree of liberalisation.

- ⇨ roads: 3

3=Fair degree of decentralisation and commercialisation. Regulation and resource allocation functions separated from road maintenance and operations. Level of vehicle and fuel taxes related to road use. Private companies able to provide and operate roads under negotiated commercial contracts. Private sector participation in road maintenance and/or through concessions to finance, operate and maintain parts of highway network. Limited public consultation/participation and accountability on road projects.

- ⇨ water and waste water: 3,33

3=Fair degree of decentralisation and commercialisation. Water utilities operate with managerial and accounting independence from municipalities, using international accounting standards and management information systems. Operating costs recovered through tariffs, with a minimum level of cross-subsidies. More detailed rules drawn up in contract documents, specifying tariff review formulae and performance standards. Private sector participation through the full concession of a major service in at least one city.
4=Large degree of decentralisation and commercialisation. Water utilities managerially independent, with cash flows – net of municipal budget transfers – that ensure financial viability. No cross-subsidies. Semi-autonomous regulatory agency able to advise and enforce tariffs and service quality. Substantial private sector participation through build-operator-transfer concessions, management contacts or asset sales in several cities.
In any country risk assessment, the quality of institutions represents a very important issue. Of course it is difficult to measure the real quality of the public institutions, but Kaufmann, Kraay, Mastruzzi (2004) constructed a set of indicators for six aspects of public governance, within the interval (-2,5; +2,5). These indicators are based on several hundred variables obtained from 31 different data sources, capturing governance perceptions reported by respondents - nongovernmental organizations, commercial business information providers, and public sector organizations worldwide – and these consist in:

- ⇨ voice and accountability - the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media
- ⇨ political stability and absence of violence - perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including political violence and terrorism,

- ⇨ government effectiveness - the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies,
- ⇨ regulatory quality - the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development,
- ⇨ rule of law - the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence,
- ⇨ control of corruption - the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

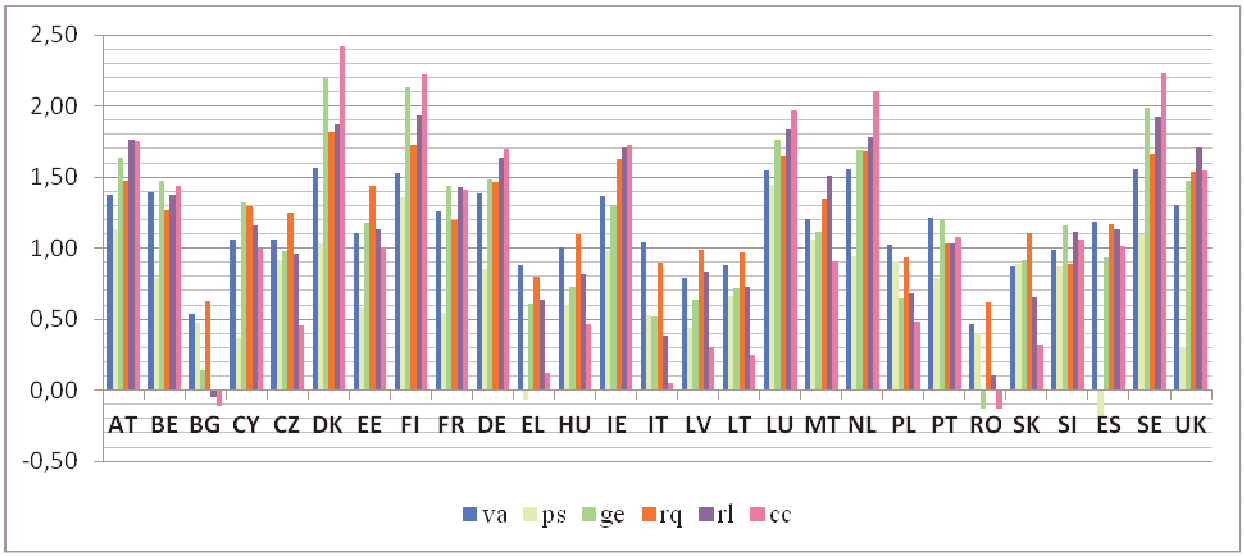
Annex 2 Table 3 Governance Indicators

	Romania 2000	Romania 2005	Romania 2009	Bulgaria 2009	Moldova 2009	Ukraine 2009	Serbia 2009	Hungary 2009
Voice and accountability	0,4	0,36	**0,46**	0,54	-0,31	-0,06	0,32	1,01
Political stability	0,02	0,22	**0,40**	0,47	-0,50	-0,27	-0,50	0,60
Government effectiveness	-0,39	-0,08	**-0,13**	0,14	-0,56	-0,77	-0,15	0,73
Regulatory quality	-0,1	0,19	**0,62**	0,63	-0,15	-0,54	-0,10	1,10
Rule of law	-0,14	-0,12	**0,10**	-0,05	-0,45	-0,73	-0,41	0,82
Control of corruption	-0,25	-0,16	**-0,13**	-0,12	-0,74	-0,90	-0,19	0,46

Data source: World Bank
http://info.worldbank.org/governance/wgi/sc_country.asp

Comparing situations 2009-2000, in Romania there were some good changes, but there are a lot to be done. The extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media (voice and accountability) had worsened in 2005 comparing with 2000, but the situation have been positively changed in 2009. The perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including political violence and terrorism (political stability and absence of violence) has improved in the last decade. The quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (government effectiveness) still have negative values, but the situation is better than it was in 2000. The ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development (regulatory quality) had the most spectacular development, from -0,1 to 0,62. The extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence (rule of law) have been improved, the value for 2009 is positive. The extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests (control of corruption) have been improved, but the values are still negative.
Considering the UE 27 countries, Romania is on the last position regarding voice and accountability, government effectiveness, regulatory quality, control of corruption, on the penultimate position regarding rule of law (before Bulgaria), and on the 23th place regarding political stability (before after Cyprus, United Kingdom, Greece, Spain).

Annex 2 Figure 2 Governance Indicators for UE - 2009



Data source: World Bank
http://info.worldbank.org/governance/wgi/sc_country.asp

The ranking for EU27 shows that the first five places are taken by

- ⇨ for voice and accountability (va): DK, SE, NL, LU, FI
- ⇨ political stability and absence of violence (ps): LU, FI, AT, SE, MT
- ⇨ government effectiveness (ge): DK, FI, SE, LU, NL
- ⇨ regulatory quality (rq): DK, FI, NL, SE, LU
- ⇨ rule of law (rl): FI, SE, DK, LU, NL
- ⇨ control of corruption (cc): DK, SE, FI, NL, LU

The ranking for EU27 shows that the last five places are taken by

- ⇨ for voice and accountability (va): LT, SK, LV, BG, RO
- ⇨ political stability and absence of violence (ps): RO, CY, UK, EL, ES
- ⇨ government effectiveness (ge): LV, EL, IT, BG, RO
- ⇨ regulatory quality (rq): IT, SI, EL, BG, RO
- ⇨ rule of law (rl): SK, EL, IT, RO, BG
- ⇨ control of corruption (cc): LT, EL, IT, BG, RO

Another important aspect that has to be considered in a country risk assessment is the corruption. This aspect is impossible to measure, but the perception of it could be surprised by a specific survey. Since 1995, Transparency International has published each year the corruption perception index (CPI), ranking countries on a scale from 0 (perceived to be highly corrupt) to 10 (perceived to have low levels of corruption). The CPI plays a critical role in branding the issue of corruption on the world's conscience, because it is seen as a powerful message and national governments have been forced to take notice and act in response.

This aspect of governance's quality places Romania on the lowest place comparing with the UE27 countries.

Annex 2 Table 4 Corruption perception Index – Romania comparing with 10 NMS and the rank in the UE27

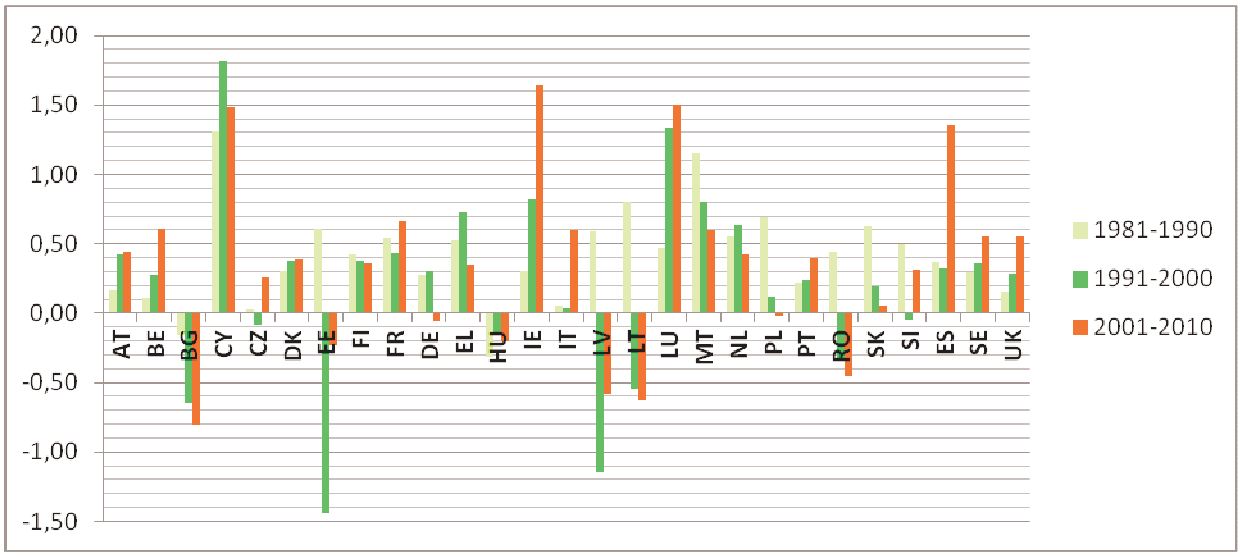
	2000	2005	2009	2010	rank 2000	rank 2005	rank 2009	rank 2010
Bulgaria	3,5	4	3,8	3,6	22	25	25	26
Czech Republic	4,3	4,3	4,9	4,6	19	21	20	21
Estonia	5,7	6	6,6	6,5	14	16	12	12
Hungary	5,2	5	5,1	4,7	16	18	18	20
Latvia	3,4	4,2	4,5	4,3	24	24	22	22
Lithuania	4,1	4,8	4,9	5	20	20	20	19
Poland	4,1	3,4	5	5,3	20	26	19	18
Romania	2,9	3	3,8	3,7	25	27	25	25
Slovakia	3,5	4,3	4,5	4,3	22	21	22	22
Slovenia	5,5	6,1	6,6	6,4	15	15	12	13

Data source: Transparency International
http://www.transparency.org/policy_research/surveys_indices/cpi/

9.3 ANNEX 3– DEMOGRAPHICAL ISSUES AND LABOR FORCE EVOLUTION

The total population of Romania is around 21,3 millions of persons, which places our country on the 7th place in a top 27UE, after Denmark, France, United Kingdom, Italy, Spain and Poland. There is a problem regarding the growth rate, which is negative from 1991 so far, with an average value of -0,3% for the period 1991-2000 and -0,5% for the period 2001-2010. Regarding the growth rate of the population, Romania takes the 24th place in a top 27UE, before Latvia, Lithuania, Bulgaria.

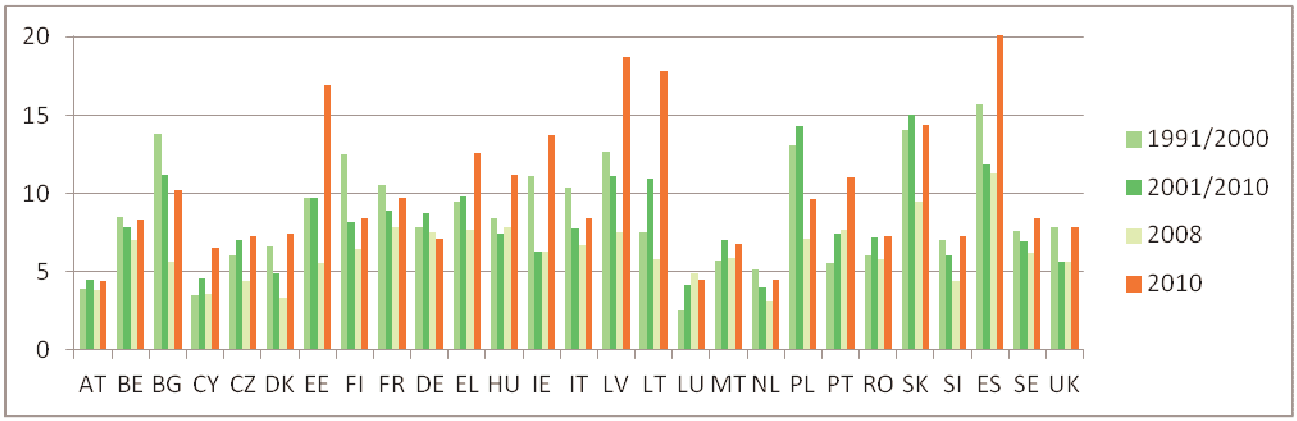
Annex 3 Figure 1 Population annual growth rate -- average (%) UE



Data source: EUROSTAT
http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

Regarding the unemployment rate comparison for UE27 countries, Romania has an average value of 6% for the period 1991-2000 and around 7% for the period 2001-2010, and takes the 12th place in a top 27, before Portugal, Hungary, Italy, Belgium, Finland, Germany, France, Estonia, Greece, Lithuania, Latvia, Bulgaria, Spain, Poland, Slovakia. The unemployment average rate is bigger than in the previous decade, but comparing with other countries, unemployment rate doesn't represent a problem.

Annex 3 Figure 2 Unemployment rate (average annual values for the period 1991/2000, 2001/2010 and the annual values for 2008, 2010) – UE



Data source: AMECO
http://ec.europa.eu/economy_finance/ameco/user/serie/SelectSerie.cfm
HDI

The Human Development Index (HDI) is an important indicator for country risk assessment, given that it expresses the measure of life expectancy, literacy, education and standards of living for countries

worldwide. The ranking for 2010 contains for the first 5 positions IE, NL, DE, SE, FR and for the last 5 positions PT, LT, LV, RO, BG.

The problem for Romania is coming from the age structure of the population – the population of 65 years and over increased for the last 10 years, while the population of 15-64 years and above 14 years decreased.

Annex 3 Table 1 Evolution of the main indicators of labour force

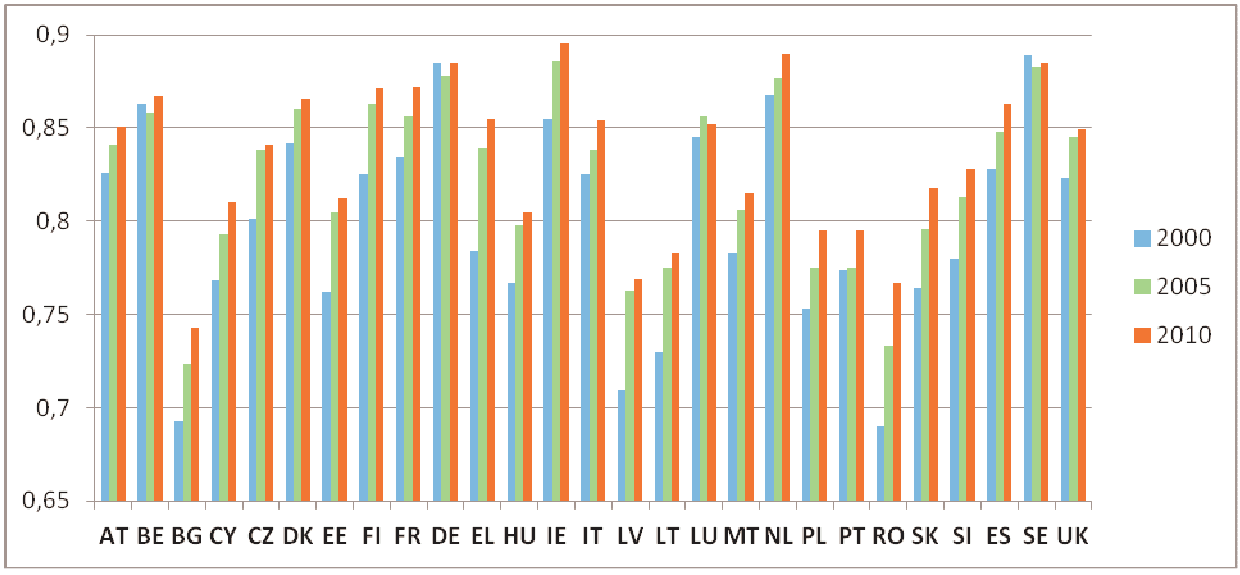
	2008	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***
Active population (ths)	9.150,4	9.120,1	9038	9078	9168	9.290	9415
activity rate (%)	42,6	42,5	42,2	42,4	42,9	43,6	44,3
growth rate (%)	0,6	-0,3	-0,9	0,4	01	1,3	1,3
Occupied population (ths)	8.747,0	8.410,7	8.411	8.578	8.708	8.845	8.995
occupied rate (%)	40,7	39,2	39,2	40,1	40,8	41,5	42,3
growth rate (%)	0,2	-3,8	00	02	1,5	1,6	1,7
Employees (ths)	5.232,7	4.879,5	4.776	4.825	4.880	4.940	5.010
growth rate (%)	1,4	-6,8	-2,1	01	1,1	1,2	1,4
Unemplyed persons (ths)	403,4	709,4	627	500	460	445	420
- with compensations (ths)	143,5	435,5	330	219	207	202	192
- unemployment rate %	4,4	7,8	6,9	5,5	05	4,8	4,5
The activity rate of population above 15 years	54,5	54,4	54,5	54,6	54,9	55,3	55,7
The activity rate of working age population (15- 64 years)	62,9	63,1	63,7	64,2	64,5	65,1	65,7

Employment rate of population above 15 years	51,4	50,7	50,5	51,1	51,6	52	52,5
Employment rate of population in working age (15-64 years)	59	58,6	58,8	59,9	60,4	61	61,7
Unemployment rate	5,8	6,9	7,3	6,4	6,2	6	5,8
real salary rate of growth (%)	16,5	-1,5	-3,5	-0,4	1,1	1,7	1,8

Data source: National Commision of Prognosis
http://www.cnp.ro/user/repository/prognoza_primavara_2011.pdf

Another important aspect is the quality of life, but, as any qualitative measure, is hard to commensurate. United Nations created an index of human development, used to rank countries by level of "human development" and separate "very high human development", "high human development", "medium human development", and "low human development" countries. The Human Development Index (HDI) is a comparative measure of life expectancy, literacy, education and standards of living for countries worldwide. It represents a standard means of measuring well-being. It is used to distinguish whether the country is a developed, a developing or an under-developed country, and also to measure the impact of economic policies on quality of life.
Romania occupied the final position in UE27 classification in 2000, but for the present takes the 26th place. This aspect confirms the fact that in Romania there are no long term policies for sustaining and improving life expectancy, literacy, education standard of living.

Annex 3 Figure 3 Human Development Index –EU 27



Data source: United Nations Development Programme

http://hdrstats.undp.org/en/tables/default.html

This weakness might be overcome by public financed programs for education and health and for improving the standard of living. HDI shows a standard means of measuring well-being. Used as a measure for the impact of economic policies on quality of life, it shows an improvement during the period 2000-2010.

9.4 ANNEX 4 - OVERVIEW ON ROMANIAN ECONOMY

GROSS DOMESTIC PRODUCT

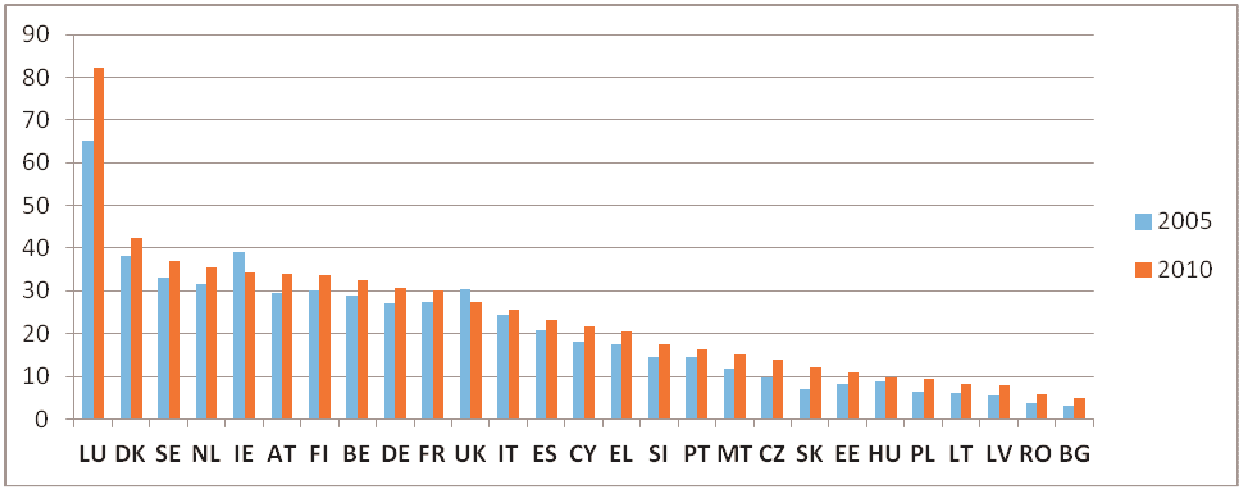
Annex 4 Table 1 Nominal GDP (mil.euro) - Romania comparing with 10 NMS

	2000	2005	2009	2010	2011	2012
BG	13704,3	21882,3	34932,8	36033,5		
CZ	61495,2	100190,1	137161,5	145937,8	157590,6	165700,8
EE	6159,8	11181,7	13860,8	14500,9	15537	16441,6
LV	8495,6	13012,2	18538,7	17970,8	18809,3	19765,7
LT	12377,3	20870,1	26507,7	27410,2	28677,4	30336,8
HU	51320,2	88645,8	92941,6	98445,8	105552	111426,6
PL	185713,8	244420,1	310485,5	353664,6	384344,9	411532,6
RO	40651,3	79801,9	117457,4	121941,2	128432,3	140195
SI	21434,8	28758,2	35384,4	36061	37199,6	38767
SK	22029	38462,4	63050,7	65905,5	69742,9	74306,5

Data source: EUROSTAT
http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

The total nominal Gross Domestic Product for the period 2000-2010 increases by 200%, with an average of 11% per year, but this is difficult to interpret as long as it is in current prices. The nominal growth rate of GDP in Romania has the minimum value in 2009 (-15,96%) and the maximum value in 2005 (30,69%), which shows the effects of the business cycle. A more realistic comparison between countries is done by considering the GDP per capita values.

Annex 4 Figure 1 GDP per capita (ths. euro) - Romania comparing with EU27



Data source: EUROSTAT
http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

GDP per capita indicates the weak position of Romania comparing with the 10 NMS: the final 7 places in the 2010 hierarchy are occupied by Estonia, Hungary, Poland, Lithuania, Latvia, Romania, Bulgaria, and the value for Romania represents 53% from the value for Estonia. The catching up process implies strong effort to increase GDP per capita, but the lags between countries remain substantial.

Annex 4 Table 2 GDP real rate of growth (%) - – UE27

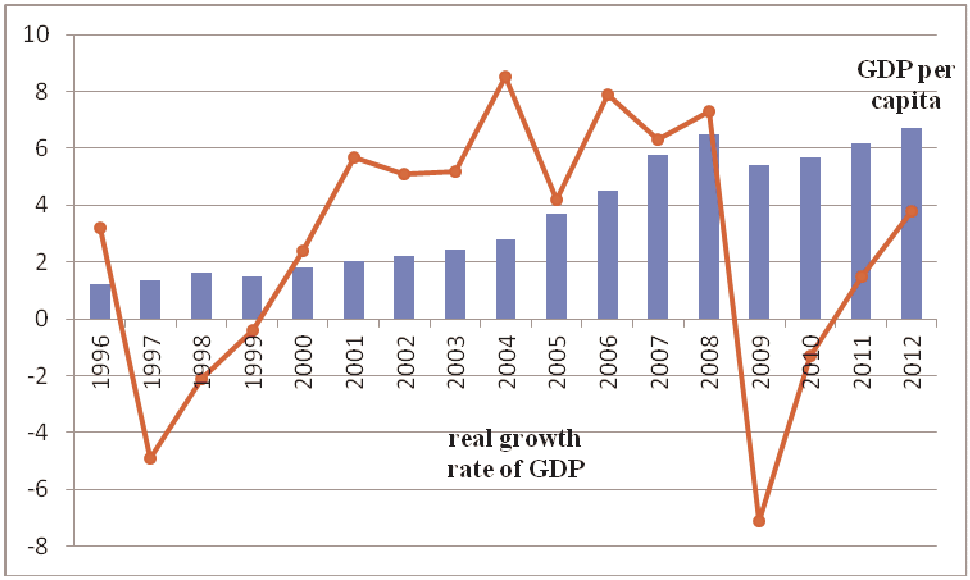
	2000	2005	2009	2010	2011	2012
SE	4,5	3,2	-5,3	5,5	3,3	2,3
SK	1,4	6,7	-4,8	4	3	3,9
PL	4,3	3,6	1,7	3,8	3,9	4,2
MT	:	4,7	-3,4	3,7	2	2,2
DE	3,2	0,8	-4,7	3,6	2,2	2
LU	8,4	5,4	-3,6	3,5	2,8	3,2
EE	10	9,4	-13,9	3,1	4,4	3,5
FI	5,3	2,9	-8,2	3,1	2,9	2,3
CZ	3,6	6,3	-4,1	2,4	2,3	3,1
BE	3,7	1,7	-2,8	2,1	1,8	2
DK	3,5	2,4	-5,2	2,1	1,9	1,8
AT	3,7	2,5	-3,9	2	1,7	2,1
NL	3,9	2	-3,9	1,8	1,5	1,7
FR	3,9	1,9	-2,6	1,6	1,6	1,8
IT	3,7	0,7	-5,2	1,3	1,1	1,4
LT	3,3	7,8	-14,7	1,3	2,8	3,2
PT	3,9	0,8	-2,5	1,3	-1	0,8
UK	3,9	2,2	-4,9	1,3	2,2	2,5
HU	4,9	3,2	-6,7	1,2	2,8	3,2
SI	4,4	4,5	-8,1	1,2	1,9	2,6
CY	5	3,9	-1,7	1	1,5	2,2
BG	5,7	6,4	-5,5	0,2	2,6	3,8
ES	5	3,6	-3,7	-0,1	0,7	1,7
LV	6,9	10,6	-18	-0,3	3,3	4
IE	9,7	6	-7,6	-1	0,9	1,9
RO	2,4	4,2	-7,1	-1,3	1,5	3,8
EL	4,5	2,3	-2	-4,5	-3	1,1

Data source: EUROSTAT

http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

The GDP growth rate is a better measure of the economy's development because it doesn't contain the inflation effects. All of the 10NMS except Poland, obtained negative real growth rate in 2009, which shows the economies' vulnerabilities in the context of financial and economic crisis. 2010 demonstrates again that Romania has real economic problems and the recovery plan has negative and serious consequences – the value of real GDP growth rate (-1,3%) puts Romania on final positions in a EU27 ranking, before Greece (-4,5%), but after Ireland (-1%), Latvia (-0,3%), Spain (-0,1%), Bulgaria (0,2%).

Annex 4 Figure 2 Evolution of GDP in Romania – GDP per capita (ths EUR) and real growth rate of GDP (%)

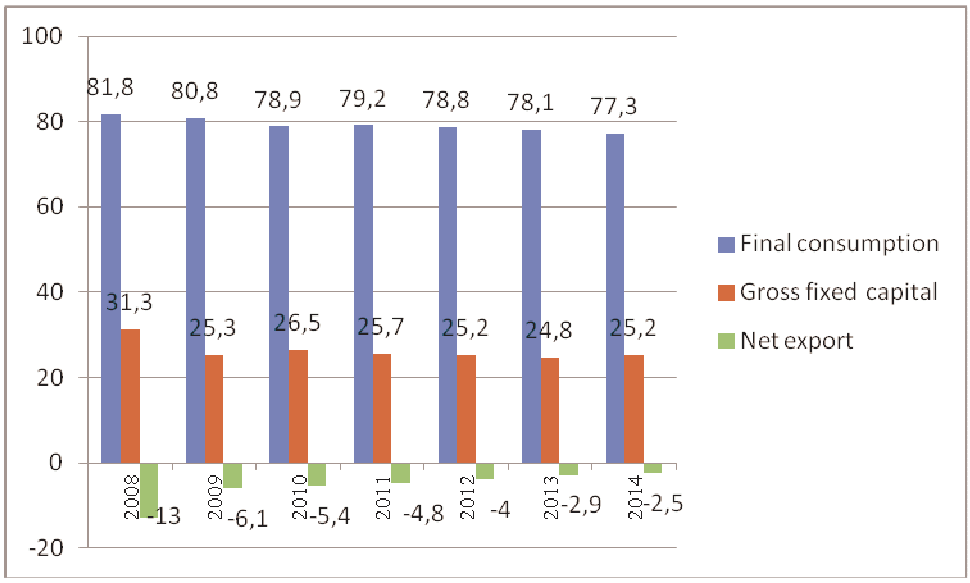


Data source: EUROSTAT
http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

The structure of GDP reveals the real problems and solutions of the economy. The sharp decline in 2009 was the consequence of the strong decrease of constructions, agriculture and services. On the other hand, in 2010 the real GDP growth rate was „saved" by industry, constructions remaining a sector with negative growth rate. For the next years, there is the prognosis of NCP which consists in positive real growth rate for GDP, the recovery process being sustained by constructions, industry and services.

Final consumption registered a strong decrease in 2009, based on sharp decrease of household consumption, the adjustment for public administration consumption was delayed by one year lag. Also gross fixed capital formation was sharply decreasing in 2009 and 2010, with negative and strong consequences on future economic development. The shocks for GDP growth rate were also coming from trade balance – exports were decreasing in 2009, the same being valid for imports, due to the final consumption decline.

Annex 4 Figure 3 GDP structure



Data source: National Commision of Prognosis
http://www.cnp.ro/user/repository/prognoza_primavara_2011.pdf

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