DETERMINATION OF RESIDUAL VALUE WITHIN THE COST BENEFIT ANALYSIS FOR THE PROJECTS FINANCED BY THE EUROPEAN UNION

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This paper will be later used within the Doctoral thesis: "The Mechanism of Financing Investment Projects by Usage of European Structural Funds", which is currently under development at the University Babeş Bolyai Cluj Napoca, Faculty of Economics and Business Management, under the coordination of the prof. univ. dr. Ioan Trenca. An increasing debate is rising recently between the academic community, the business community, the private lending institutions(banks, investment funds, etc.) and the officials of the Romanian Government and of the European Union regarding the proposed method for calculation of the residual value in the European financed investment projects. Several methods of calculation of the Residual Value were taken into consideration and contested by different parties in order to prepare and to submit financial analysis studies for investment projects proposed to be financed within the European Regional Development Fund(ERDF). In this context, the present paper proposes to address the three main methods of calculation of the residual value and later to study its impact over the indicators, especially over the Internal Rate of Return, obtained in the financial analysis for an investment project proposed by a Romanian medium sized company. In order to establish the proper method which should be used for selection and calculation of the residual value previously published studies and official documentations were analyzed. The main methods for calculation of the residual values were identified as being the following: A. the residual market value of fixed assets, as if it were to be sold, B. accounting economic depreciation formula and C. by using the net present value of the cash flows. Based on these methods the research model was elaborated, and using the financial data of the proposed infrastructure investment was created a case study. According to the realized study a pattern was established for proper determination of residual value and for determination of IRR and methods A and C were proposed to be used. This paper tries to analyze a specific problem of the Romanian enterprises which access European funding, so it can be further used to improve the current methodology of the ERDF programme in Romania: Sectorial Operational Programme "Increase of Economic Competitiveness".

Key words: Cost benefit Analysis, Residual value, IRR, Investment, Structural Funds, Valuation

JEL Codes: G30, O16, G32, G38, F35, C63, C12

Introduction

The integration of the Romania into European Union brought new opportunities for the Romanian private enterprises both concerning the accession of their products and services to the single market and also accession of additional co-financing for funding their business infrastructure investments(Droj, 2010). The issue of attracting European Funds for financing infrastructure investments is also tackled by the author within the Doctoral Thesis: *"The Mechanism of Financing Investment Projects by Usage of European Structural Funds"* which is currently under development at the University Babeş Bolyai Cluj Napoca, Faculty of Economics and Business Management, under the coordination of the prof. univ. dr. Ioan Trenca.

European funding is considered to be one of the hot topics in Romania and all over Eastern Europe since its novelty and its expected capacity to improve the life of the newly integrated European citizens both by financing public and private strategic investments in various fields of

activities: public urban infrastructure, transportation services, agriculture infrastructure, social and educational infrastructure, tourism and business public and private infrastructure, human resources, etc. One of the main goals of these European Funding programmes are to European Union Cohesion policies. As its main instruments and for improvement of the competiveness of the "weaker" regions were established the European Regional Development Fund (ERDF) and the European Social Fund (ESF), otherwise known as the Structural Funds, as well as the Cohesion Fund. Through these instruments European Commission invests in thousands of projects across all of Europe's regions to achieve its primary task: to promote economic and social cohesion by reducing these disparities between Member States and regions (European Commission, 2009). The budget of the Cohesion Policy €347 billion EUR for 2007–2013, represents the single largest source of financial support at EU level for investment in growth and jobs, designed to enable *all regions* to compete effectively in the internal market.

In this context, the private companies benefit of increased opportunities for accessing European Funding which gives them a better chance for increasing their competitiveness and for extending distribution of their products and services on the entire European market and beyond. The most important production infrastructure financing programme for the Small and Medium Enterprises(SME) operating in Romania is considered to be the Sectorial Operational Programme "Increase of Economic Competitiveness" (further referred to as SOP IEC) which offers financial support for the consolidation and modernization of productive sector through investments(Guvernul României, 2009).

The SOP IEC aims to strengthen the strategic focus of the Economic and Social Cohesion policies across Romania, and to make the correct and appropriate linkages to the European policies and the Lisbon Strategy for growth and job creation. In order to be financed within this programme the SMEs have to present a business plan containing a cost benefit analysis study. This analysis has as main goals to establish if the proposed investment is sustainable and has potential for generating further economic and financial growth for the company, in particular, and for the society in general terms. One of the most important aspect for a proper realized cost benefit analysis is the calculation of the residual value. Gapenski (2005:592) considers the residual value "much riskier than the other flows". In this context this paper will cover the most relevant literature in the field and will try to estimate the differences between the most common methodologies used for obtaining a residual value in order to acquire an acceptable IRR.

The importance of the Residual Value – Literature Review and Research methodology

Seriously overlooked, recently, the establishment of a proper residual value for a proposed investment proves to be a key element for obtaining "acceptable" values for the indicators used in the financial analysis. Opinions regarding the most suitable method have been contradictory and transformed this issue in a problematic over the past years.

According to the "*Guide to COST-BENEFIT ANALYSIS of investment projects - Structural Funds, Cohesion Fund and Instrument for Pre-Accession*"(European Comission, 2008:36) the discounted value of any net future revenue after the time horizon of the project has to be included in the residual value. The same document concludes that this "is the present value at year n of the revenues, net of operating costs, the project will be able to generate because of the remaining service potential of fixed assets whose economic life is not yet completely exhausted". If a sufficiently long time horizon will be selected this value can be also 0 or it should have a negligible value. But in practice this is not always the case, and it should be recorded either "as negative investment or as a benefit the salvage value of fixed asset or any remaining capacity to generate net revenues". This is why the residual value is also considered to be the liquidation or terminal value(Damodaran, 2002:425) and is considered to have a big importance over the future value with direct implications in the determination of the IRR:

$$\sum_{t=1}^{t=n} \frac{CF_t}{(1+k_c)^t} + \frac{\text{Terminal Value}_n}{(1+k_c)^n}$$

The current literature recommends three possible methods for calculation of the residual value:
- Method A - first choice is by **considering the residual market value of fixed assets**, **as if it were to be sold** at the end of the time horizon considered, and of remaining net liabilities(European Commission 2008:36). In this case the residual value becomes also the terminal value that reflects the estimated value of the company at that point. This method was highlighted and analysed by several authors (Damodaran, 2002:426, Citybank 302, Livingstone and Grossman 2002:622, Kaliski et all, 2007:301, Helfert, 2001:53). This method is also based on respecting the International Valuation Standards (IVS) established by the International Valuation Standards Comitee(IVSC). Also the method is accepted by the Romanian Management Authority of the SOP IEC programme and is recommended to be used in 2011 SOP IEC call of proposals(Guvernul României, 2011). On the other hand the method is common in Romania to the practice imposed by ANEVAR(National Association of Romanian Valuers) which often use this method for enterprise or mobile goods valuation.
- Method B - by computing **the residual value of all assets and liabilities**, based on some standard **accounting economic depreciation formula** (usually different from depreciation for the determination of capital income taxes), method recognised by European Commission(2008:36) and Citibank(1994:300) and supported by members of several professional associations from Romania(especially CECCAR), but highly contested by the Romanian Management Authority of the SOP IEC programme and forbidden to be used under SOP IEC starting from 2011(Guvernul României, 2011). This method was one the most popular to be used, even if major project implementation specialists have drawn negative conclusions over its effectiveness.
- Method C - by computing **the net present value of cash flows** in the remaining life-years of the project. This method is also called the Gordon Growth Model and is appreciated by most of the specialists(Friedlob and Schleifer, 2003:212, Damodaran, 2002:426, Helfert 2001:231, Citybank 1994:301). Some specialists are also considering the Advanced Gordon Growth Model as it is presented below:

$$\text{Residual value (using Gordon Growth Model*)} = \frac{\text{Terminal year cash flow} \times (1 + \text{Growth rate})}{\text{Discount rate} - \text{Growth rate}}$$

On the other hand the supporters of this method have drawn several observations regarding the limits of the method, especially when concerning the fact that the growth rate cannot be maintained stable for a longer period of time and it depends also by external factors like fiscal and economic barriers or advantages. Also this method is not considered applicable by the specialists to a large number of companies for which seems impossible to maintain a high growth rate for several years in a raw or to have the type of products and activities on a longer period of time.
After the determination of the residual value, the results have to be used in the calculation of the IRR/C and IRR/K as an input in contradiction with the costs of the investments which have to be diminished. For example, in case of a infrastructure investment, the value of the initial investment(including the ERDF grant) is considered to be a contribution with negative value(sign -), the values of the cash flows can be either positive or negative(depending on their real value) and the residual value is considered to bring a positive outcome of the project(sign +), since it is considered to bring additional value for the investment.
The Internal Rate of Return (IRR) is defined as the discount rate that zeroes out the net present value of flows of costs and benefits of an investment, that is to say the discount rate of the equation below(European Commission, 2008:212):

$$NPV(S) = \sum [S_t / (1 + IRR_t)] = 0$$

The authors draw the conclusion that the Internal Rate of Return is an indicator of the relative efficiency of an investment, with known deficiencies, and it should be used with caution. The European Commission(2008:210) brings to attention the fact that: if the sign of the net benefits, benefits minus costs, changes in the different years of the project's lifespan(for example - + - + -) there may be multiple IRRs for a single project. In these cases the IRR decision rule is impossible to implement. Another setback for using IRR can be the fact that IRR contains no useful information about the overall economic value of a project, fact recognized even by the European Commision(208:211) which encourages also the usage of the Net Present Value Method as presented below, to correct false results of the IRR method:

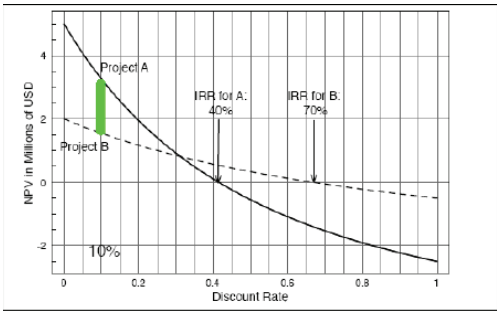

Fig. no 1 IRR and NPV of two mutually exclusive alternatives (Source: Ley, 2007)

Since the goal of this study is to determine which are the differences in the values of the IRR when considering the usage of different residual values(obtained through all presented three methods), in the following chapter we will set a case study using a project proposed by a Romanian production company which tries to access SOP IEC funding in 2011.

Case study – Evaluation of the residual value and of its influences over the IRR in case of a Romanian production company

As mentioned above, a production company which is intending to access European funding to co-finance its infrastructure investments has to fulfil several of the criteria established by the management authorities of the SOP IEC Programme. Some of these criteria are referring to the results of the financial analysis and especially of the results obtained by the Net Present Value and by the Internal Rate of Return Indicators. In the recent months contradictory discussions have been raising between all factors interested in the SOP IEC programme regarding the proposed method for calculation of the residual value in the European financed investment projects. The levels of the debates were extremely high, but no studies have been presented by the involved parties regarding the efficiency of the methods proposed over the final value of the IRR.

In order to test each method for obtaining the residual value Company Test A has been selected. Its activity is mainly production and its management are interested to expand the activity in the following years both as increasing the number of products on the market and also improving the existing products as highly qualitative ones with competitive prices in order to extend their current market abroad in Hungary, Bulgaria, Serbia and Republic of Moldova. The project consists in construction of a new high-tech production facility(4000 sqm) and acquisition of highly productive equipments in the field of plastic fibbers. The total value of the proposed project is considered to be 13,276,000 RON, approximately 3.3 million EUR from which 70% will be requested from ERDF funding.

In order to establish the IRR all three methods for calculation of the residual value have been evaluated, even if method B is not considered eligible by the Management Authority of SOP IEC.

By using **Method A**, respecting the International Valuation Standards (IVS), the investment was evaluated as if it were to be sold at the end of the time horizon considered, and were also evaluated the remaining net liabilities. By using the market price comparison method and the capitalization rate which is used within the field of investment was established that the terminal value is: 7,000,000 RON. In this case the terminal value becomes also the residual value that reflects the estimated value of the investment at that point. It is important to remark that this method is accepted by the Romanian Management Authority of the SOP IEC programme and is recommended to be used in 2011 SOP IEC call of proposals(Guvernul României, 2011). By this method the IRR=0.52% which is considered an excellent value and which recommends the project for financing. By this method the IRR=0.52% which is considered an excellent value and which recommends the project for financing.

Table 1. IRR determined by using residual value obtained through Method A

Anul	Costuri de investitii	Costuri operare	Costuri Totale	Beneficii totale	Coeficient actualizare	Costuri de operare actualizate	Beneficii totale actualizate	Valoare neta actualizata in an	Valoare neta actualizata cumulată
	4.843.000	0	4.843.000	0	0,994827	4.817.947	0	**-4.817.947**	**-4.817.947**
0	8.433.000	0	8.433.000	0	0,989681	8.345.976	0	**-8.345.976**	**-13.163.923**
1	0	1.285.673	1.285.673	2.125.500	0,984561	1.265.823	2.092.684	**826.861**	**-12.337.062**
2	0	1.328.173	1.328.173	2.224.500	0,979468	1.300.902	2.178.826	**877.923**	**-11.459.138**
3	0	1.503.173	1.503.173	2.397.000	0,974401	1.464.693	2.335.639	**870.946**	**-10.588.193**
4	0	1.538.173	1.538.173	2.454.500	0,969360	1.491.043	2.379.294	**888.251**	**-9.699.942**
5	0	1.606.673	1.606.673	2.585.500	0,964345	1.549.388	2.493.315	**943.928**	**-8.756.014**
6	0	1.671.273	1.671.273	2.724.500	0,959357	1.603.347	2.613.768	**1.010.421**	**-7.745.593**
7	-7.000.000	1.759.583	-5.240.417	2.871.500	0,954394	-5.001.423	2.740.542	**7.741.965**	**-3.629**
TOTAL	**X**	**X**	**X**	**X**	**X**	**15.417.825**	**11.479.758**	**X**	**X**
								RIR/C= 0,520%	

Source: own calculation

The Method B was later used, and the residual value was determined as an accounting residual value, according with the Romanian legislation. The residual value obtained was 2,824,308 RON.

Table 2. IRR determined by using residual value obtained through Method B

Anul	Costuri de investitii	Costuri operare	Costuri Totale	Beneficii totale	Coeficient actualizare	Costuri de operare actualizate	Beneficii totale actualizate	Valoare neta actualizata in an	Valoare neta actualizata cumulată
	4.843.000	0	4.843.000	0	1,062361	5.145.012	0	**-5.145.012**	**-5.145.012**
0	8.433.000	0	8.433.000	0	1,128610	9.517.568	0	**-9.517.568**	**-14.662.580**
1	0	1.285.673	1.285.673	2.125.500	1,198991	1.541.510	2.548.455	**1.006.945**	**-13.655.635**
2	0	1.328.173	1.328.173	2.224.500	1,273760	1.691.774	2.833.480	**1.141.706**	**-12.513.929**
3	0	1.503.173	1.503.173	2.397.000	1,353193	2.034.083	3.243.603	**1.209.521**	**-11.304.408**
4	0	1.538.173	1.538.173	2.454.500	1,437579	2.211.245	3.528.537	**1.317.293**	**-9.987.116**
5	0	1.606.673	1.606.673	2.585.500	1,527227	2.453.754	3.948.645	**1.494.891**	**-8.492.224**
6	0	1.671.273	1.671.273	2.724.500	1,622466	2.711.583	4.420.408	**1.708.825**	**-6.783.399**
7	-2.824.308	1.759.583	-1.064.725	2.871.500	1,723644	-1.835.207	4.949.443	**6.784.649**	**1.250**
TOTAL	**X**	**X**	**X**	**X**	**X**	**19.449.933**	**16.102.721**	**X**	**X**
								RIR/C= -5,870%	

Source: own calculation

The value of the IRR, after applying this method, became IRR=-5.87%, a negative IRR which is under the acceptable values for the programme. It also seems not to be correlated with the values of the NPV. From 2011 this method is a forbidden method to be used in realization of CBA in SOP IEC programme.

The third method used the Gordon Growth Model and was limited in the development of the growth rate by a contested measure: to limit the growth rate used in the formula to maximum 5%. In this case the residual value had a non realistic value of 798,467,395 RON and the IRR had been 75.20%, way over the maximum values accepted within a European funded project.

Table 3. IRR determined by using residual value obtained through Method C

Anul	Costuri de investitii	Costuri operare	Costuri Totale	Beneficii totale	Coeficient actualizare	Costuri de operare actualizate	Beneficii totale actualizate	Valoare neta actualizata in an	Valoare neta actualizata cumulată
	4.843.000	0	4.843.000	0	0,57077€	2.764.269	0	-2.764.269	-2.764.269
0	8.433.000	0	8.433.000	0	0,32578€	2.747.349	0	-2.747.349	-5.511.619
1	0	1.285.673	1.285.673	2.125.500	0,18595[illegible]	239.072	395.238	156.166	-5.355.452
2	0	1.328.173	1.328.173	2.224.500	0,10613€	140.967	236.100	95.133	-5.260.320
3	0	1.503.173	1.503.173	2.397.000	0,06058[illegible]	91.062	145.210	54.148	-5.206.172
4	0	1.538.173	1.538.173	2.454.500	0,03457[illegible]	53.186	84.871	31.684	-5.174.487
5	0	1.606.673	1.606.673	2.585.500	0,01973€	31.709	51.028	19.318	-5.155.169
6	0	1.671.273	1.671.273	2.724.500	0,01126[illegible]	18.827	30.691	11.864	-5.143.304
7	-798.467.395	1.759.583	-796.707.813	2.871.500	0,00643[illegible]	-5.122.620	18.463	5.141.083	-2.221
TOTAL	X	X	X	X	X	3.303.346	912.447	X	X
								RIR/C= 75,200%	

Source: own calculation

Conclusions

One of the most important aspects for a proper realized cost benefit analysis is the calculation of the residual value. In this paper three methods for calculation of residual values were analyzed, used and tested in the proposed case study. As observed method B is both forbidden by the Management Authorities of the financing programme and also obtains to negative IRR.
Method C is recommended to be used by the management authorities but contested by a part of specialists since its limitations both in general, as analyzed above and in particular: the limitation of the growth rate to be used within the feasibility study. The values obtained are quite high and might endanger the approval of the project. In these conditions and considering the obtained results within the case study I consider that the Method A, which is also proposed by the management authorities, should be used by Test Company A in order to calculate the residual value of the investment and further the IRR.
The general drawn conclusion of this paper, which will be also highlighted further in the PhD thesis: *"The Mechanism of Financing Investment Projects by Usage of European Structural Funds"*, is that a company which considers to access ERDF funding under SOP IEC programme should take in consideration Method A or Method C for obtaining its residual value in order to have an acceptable IRR.

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