MODERN INDICATORS DERIVED FROM VALUE CREATION AND DISCOUNTED CASH FLOW METHODS

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***Abstract**: The manner in which resources are allocated, the generation of cash through present resources and the allocation of new liquidities derive from a company's cost-benefit analysis, which is part of management control. The modern financial theory changes the company management objective of maximizing profit with the objective of maximizing its value. The traditional return measures are considered to be insufficient to express the economic reality. Traditional cost-benefit indicators exclude opportunity costs, effects of inflation and risks. The financial experts claim firm value maximization as the main objective of a company's management. The emergence of modern return measures derived from firm value maximization reflects the changes in the economic environment, their emergence creating a dispute over the most appropriate approach regarding value creation. The fact that the data required for their calculation is taken directly from accounts makes them sensitive to accounting distortions. The emergence of modern cost-benefit indicators derived from value creation provides new perspectives on the return. Firm value can grow by generating a higher level of cash flow, by reducing financing costs and by extending the growth period. The value created can be measured by using both modern indicators derived from the theory of value creation and discounted cash flow methods. The value created can be calculated by using discounted cash flow models, which, moreover, are very complicated and take into account a lot of variables. The alternative to these methods is represented by modern cost-benefit indicators that have a more simple calculation methodology, and the forecast of calculation factors is narrower and easier to accomplish.*
In this article, we will present the connection between discounted cash flow methods and the indicators derived from value creation, based on the business finance theory, which says that firm value will increase if projects with positive net present value are accepted, while it will be destroyed if projects with negative net present value are accepted.

***Keywords**: modern return measures; economic value added; discounted cash flow model; the net present value; the internal rate of return; cash flow return on investment.*

***JEL Classification**: G32; M21.*

1. Introduction

Since the 1990s, the traditional return measures are considered to be insufficient to express the economic reality. The financial experts claim firm value maximization as the main objective of a company's management. The emergence of modern return

measures derived from firm value maximization reflects the changes in the economic environment, their emergence creating a dispute over the most appropriate approach regarding value creation. The cost of financing sources is one of the primary factor in foundation financing policy, having the greatest impact on company results and hence on its value (Pirtea, Boțoc, and Nicolescu : 2010).
The value created can be measured by using both modern indicators derived from the theory of value creation and discounted cash flow methods. Modern performance indicators require less information than the traditional approach of discounted cash flow, and some believe that they are better at expressing value.

2. Modern Performance Indicators Derived from Discounted Cash Flow Methods

The Discounted Cash Flow Method is a standard procedure of the modern financial theory that provides perspectives on how a company can create value. This model is widely used in investment finance, real estate development and corporate financial management, which is why in practice it enjoys great importance and is considered to be the basic method of estimating firm value. Since 1929, the discounted cash flow analysis gained popularity, it being used for estimating shares. The Discounted Cash Flow Method is expressed formally in modern economics by Irving Fisher in 1930 and John Burr Williams in 1938.
Firm value is the sum of all future discounted cash flows at the risk of bearing debt. Firm value can also be regarded as the sum of the value of all assets – where asset value is given by the discounted cash flow resulting from the operation of the asset (Damadoran, A., 2002). In other words, cash flow resulting from a company's businesses is discounted at a rate that equalizes their risk. The formula for calculating firm value by using the discounted cash flow method is:

$$VF = \sum_{n}^{i-1} \frac{CFi}{(1+a)i} + \frac{RV}{(1+a)n}$$

where: VF = firm value; CF_i = cash flow in year i; a = discount rate; RV = residual value at the end of the period; n = life cycle of investment expressed in years.
To evaluate a company, both cash flows generated by the business and the expected growth value are needed. Therefore, the following should be considered:

- Free Cash Flow - is the monetary expression of business operations result, representing in fact the cash that returns to investors: shareholders, debt holders, preferred shareholders etc. It can be derived from the operating cash flow from which the cash required for the business development and the development of production capacity. The variables will be estimated based on a strategic analysis of the company's development potential, which must take into account the internal and external potential of the company.
- Expected Growth - it can be obtained based on the reinvestment coefficient multiplied by the return on capital. The reinvestment coefficient is calculated as the ratio of the net operating result, which is invested in net capital expenditures and non-cash working capital.
- Discount Rate - it is established based on the Weighted Average Cost of Capital model. The Weighted Average Cost of Capital is the weighted average of all costs involved in investment, equity and loan capital respectively. It reflects the cash flow risk. A common problem in practice is the cost of equity. To determine

the cost of equity, we may use the dividend discount model and the capital asset pricing model. The first model is the traditional method used and is based on the discount of dividends with the shareholders' required return, and the second shows the investors' risk premium through the relationship between the expected return and the risk assumed.

- Asset lyfe cycle – residual value - the life cycle of every project has a finite number of years, upon which the forecast is based, which is why it is very important, both in terms of cash flow estimation for a well-determined period, and terminal value estimation.

In the discounted cash flow analysis, all future cash flows are estimated and discounted to give present value, and their sum is represented by the net present value.

The most common techniques using discounted cash flow is the net present value and the internal rate of return. These include the discount technique, their limitation being that they do not take into account depreciation. These dynamic methods for allocating capital resources are often used in the USA and UK, both in the public and private sector.

The Net Present Value is a discounted cash flow technique that indicated cash inflows and outflows discounted at the present value. It can be used both to analyze a business and for future projects or divisions of a company.

It is said that there is no difference between what net present value and discounted cash flow represent. Using these two methods is different from what is aimed to calculate:

- discounted cash flow method is used to evaluate complex investments that may have different assumptions regarding cash flow, multiple equations, inflows and outflows
- net present value is used to analyze projects with a well-defined life cycle including cash inflows and outflows that are easy to estimate.

The Internal Rate of Return equalizes the cash inflows and outflows at the present value. This dynamic analysis method is generally used to allocate capital resources for a certain project.

The Internal rate of return calculated with the net present value determines the expected rate of return and the discount rate that should correspond to the risk level of the project. In both cases, an internal rate of return may determine the expected total rate of return, and the discount rate should correspond to the risk level of the project.

The discount used as single technique, with no attachment to other evaluation criteria, may lead to certain projects, desirable at first sight, but not profitable. Therefore, multiple discount criteria, as well as traditional estimation criteria should be used in assessing the efficiency of an investment.

Modern performance indicators are said to achieve the same thing as the dynamic methods of investment assessment, i.e. discounted cash flow methods. Discounted cash flow methods are very complex because of the multitude of variables to estimate, and a bonus management system can not be drawn on their basis, as it is very difficult and not recommended, because the accounting data might be manipulated by executives in their own interest. Modern performance indicators are easier to calculate, use and understand, as the estimates made for their calculation are fewer and do not depend on market movements. Next, I will present two most

famous modern indicators for measuring performance: Economic Value Added and the Cash Flow Return on Investment.

Economic Value Added is considered to be the most common indicator for measuring shareholder value. Economic value added is a measure that allows managers to see whether they gain a proper return (Harper Collins, 1991). If the return is lower than the expected one for similar investments, resulting in a negative indicator, the company faces share price decrease and capital flight. One way to calculate the economic value added is to multiply equity by the difference between return on equity and its cost:

EVA = (Retur on equity – cost of equity) x Invested capital

To increase firm value, each project accepted must have a positive net present value, i.e. the internal rate of return generated by the project will be higher than the cost of equity. In practice, we do not employ the internal rate of return for measuring performance, but the traditional rates of return to estimate the rate of return on equity, although it does not indicate the real return (Storrie and Sinclair, 1997).

Cash Flow Return on Investment is defined as the gross annual cash flow related to the capital invested on business units (Lewis and Günther, 1997). Cash Flow Return on Investment corresponds to the average internal rate of return for a short period of an investment, based on the cash inflows and outflows of investments and their recovery. The calculation formula for this indicator is as follows:

CFROI = Cash flow/ Market value of capital employed

or solution in formula: $I = \sum_{n}^{i=1} \frac{CFi}{(1+CFROI)^{n}} + \frac{W^{n+1}}{(1+CFROI)^{n+1}}$

where: W – expected residual value of non-depreciable assets; I – Gross investment in operating assets; CF – gross cash flow; n – lyfe cycle of investment

3. Critical Review of Modern Performance Measurement Indicators

3.1. Economic Value Added versus Discounted Cash Flow Method

The rule of net present value is one of the analysis fundamentals of investment decisions in corporate finance. Economic value added is a return to the net present value rule. (Damadoran, 2002). It is well known that in order to increase the value of economic value added, projects with positive net present value should be accepted, otherwise, the adoption of projects with negative net present value decreases the value of the indicator. The cost of capital and the inflation are common aspects considered in the calculation of economic value added and net present value, and the adjustments made do not give place to accounting distortions.

Discounted cash flow / net present value and economic value added, in theory, have the same mathematical result. (Stewart, 1990). Stewart also stated that the economic value added formula is a modification of the discounted cash flow formula through a mathematical construction in which all adjustments made in calculating economic value added to the discounted cash flow must result net zero. He also mentions regardless of the starting capital used in calculating economic value added, the results are always the same.

Present value of economic value added of a project over its life is the net present value of the project.

Otherwise, a connection between economic value added and discounted cash flow model can be made (Damadoran, 2002). The amount of capital invested in assets

held, the present value of economic value added and the present value of economic value added of future projects is, in fact, the firm value:

$$\text{VF} = \text{Invested capital assets held} + \sum_{\text{i=1}}^{\text{n}} \frac{\text{EVAi assets in place}}{(1+\text{a})\text{i}} + \sum_{\text{i=1}}^{\text{n}} \frac{\text{EVAi future projects}}{(1+\text{a})\text{i}}$$

where: VF – firm value; n – life cycle of investment expressed in years; EVA – economic value added; a – discount rate;

Delimitations between net present value / discounted cash flow and economic value added:

- this equivalence between net present value and economic value added is sensitive to the book value of capital when calculating the economic value added. An increase in the book value of capital, which attracts a higher cost of capital, has as result a lower economic value added. The change of the two variables, as well as the fact that the market value of capital is always the same, regardless of the initial book value, shows a lack of relevance in determining the value (Storrie, Sinclair, 1997).
- the level of residual value and depreciation tax benefits make economic value added and net present value give different results. This is possible when the present value of invested capital is lower than the residual value or the present value of benefits from depreciation.
- the equivalence of the two methods is real before making the adjustments required for the calculation of economic value added, after that, they will lead to different results.
- firm value (seen as the sum of invested capital and the present value of economic value added) may decrease, even though the economic value added grows on the background of the operational risk increase and cost of capital supplementation.
- economic value added is a well-known measure, used for both performance assessment and for employee compensation. Discounted cash flow methods are useful in strategic planning (capital resources allocation) and assessment. It provides a picture of the necessary cash flows for business requirements and facilitates the understanding of short- and long-term risk.

Thus, the discounted cash flow methods are not used to measure performance and an employee bonus system based on it would be extremely difficult and unsatisfying. In evaluation, under certain conditions, the equivalence of economic value added and discounted cash flow methods can be met, but it does not express performance. Conversely, it comes into question whether the economic value added can be used for the same purpose for which discounted cash flow method is. Economic value added can neither provide a picture of the necessary cash flows for business requirements, nor an understanding of short-term and long term risk. Economic value added indicates whether the initial capital produces positive or negative levels, a measure that can have high levels with low initial capital, while the discounted cash flow analysis can indicate that the proposed strategy may lead to value destruction. When analyzing a company, one must take into account both the economic value added and net present value, and the internal rate of return and return on investment. The shareholder wealth is first considered, followed by the expected return. The economic value added and the return on investment are used to measure performance, while the net present value and the internal rate of return are used to determine a project's return. Future decisions of the company are based on the

economic value added and net present value, which provide information on the firm value maximization. It must be well defined that no decision should be taken based solely on rates of return, because they provide related data. Maximizing internal rate of return and return on investment is a wrong objective if it aims to increase shareholder return.

3.2. Cash Flow Return on Investment versus Internal Rate of Return/ Discounted Cash Flow Method

Cash Flow Return on Investment is an indicator similar to the internal rate of return (Damadoran, 2002). Cash Flow Return on Investment can be seen as both an after-tax rate of return on existing assets, and a rate that adjusts net present value of the cash flow generated by existing assets equal to the cost of investment.

Internal Rate of Return is calculated based on net cash flows generated by the project based on the initial investment (also taking into consideration the terminal value). Internal rate of return is compared with the cost of capital. This can be calculated as a nominal or real rate, depending on the nominal or real cost of capital. Mathematically, we can say that the Cash Flow Return on Investment has the same determination. It calculates a real internal rate of return based on the project's gross investment (initial investment) with the assumption that gross cash flow surplus in monetary terms is maintained throughout the entire life cycle of the project.

To highlight the relationship between firm value and cash flow return on investment expressed by using discounted cash flow, a number of variables should be taken into account, such as: gross investment, tax, growth rate, cost of capital and reinvestment needs of the company. Firm value expressed by using cash flow return on investment is as follows (Damadoran, 2002):

$$\mathrm{FV} = \frac{(\mathrm{CFROIxigross\ investment} - \mathrm{depreciation})\mathrm{x}((1 - \mathrm{tax}) - (\mathrm{capital\ expenditure} - \mathrm{depreciation}) - \Delta\mathrm{WC})}{\mathrm{cost\ of\ capital} - \mathrm{sustainable\ growth\ rate}}$$

where: FV – firm value;ΔWc – changes in working capital.

One can see that firm value is influenced by both cash flow return on investment of assets held and the way this rate handles the cost of capital.

Delimitations between cash flow return on investment and internal rate of return / discounted cash flow method:

- cash flow Return on Investment is built on the premise that real cash flow does not increase over time, and the internal rate of return can also be calculated based on net cash flows that fluctuate over time. It is easy to conclude that Cash flow Return on Investment cannot be used for projects in markets with high growth potential;
- cash flow Return on Investment can be used in both retrospective and prospective analysis, and the internal rate of return can be calculated only for future projects;
- when the assessment of return is based on Cash flow Return on Investment, managers can increase the rate of return by subtracting gross investment, resulting in a lower firm value. Thus, an increase in the Cash flow Return on Investment may result in a decrease in firm value if it is done at the expense of an increase in value or by increasing risk.

4. Conclusions

Based on these theoretical approaches it can be concluded that:

- the financial theory regarding firm value argues that firm value will increase if accepts projects with positive net present value are being accepted. Economic value added and Cash flow Return on Investment are similar methods to consider net present value.
- if the main objective of the firm is to maximize value both in its strategy and culture, then any method used to increase value can work.
- economic value added is regarded as the present value of the expected economic profit, so it is considered to be the new equivalent to the net present value.
- cash flow Return on Investment can be seen as the after tax rate of return of existing assets, as well as the rate that adjusts net present value of cash flows generated by existing assets equal to the cost of investment.
- net present value and internal rate of return are used in the evaluation and strategic analysis of the company; economic value added and Cash flow Return on Investment are useful in evaluating performance; they can not provide information on understanding of short-term and long-term risk.

Modern performance measurement indicators are easier to calculate, and data considered in their calculation are fewer compared to discounted cash flow methods. However, they are insufficient for assessing firm value, as they do not take into account all the necessary variables in determining value. For a complete analysis of a company, both modern performance measurement indicators and discounted cash flow methods are required.

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