MEASUREMENT OF VALUE CREATION: ECONOMIC VALUE ADDED AND NET PRESENT VALUE

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Abstract

There are some major frameworks within value based management system. This paper analyses the two most basic approaches – economic value added (*EVA*) and discounted cash flows (*DCF*) techniques – that are used to measure value creation of companies. These models are frequently applied in company's valuation and investment project valuation. *EVA* and *NPV* measures are consistent with the maximization of the value of the company. Investments, cash flows, economic life and capital cost are financial market's actuality, where value and profitability should be measured. Therefore *DCF* models are applied there and companies' economic data can be obtained from here.

Each investment is evaluated of future decisions over its useful life based on the expected cash flows. The result is net present value (*NPV*) and a positive *NPV* show that investment creates value. *EVA* is calculated over a defined calendar period. It measures an entire company's current economic performance. A positive *EVA* signals value creation. The concept of *NOPAT* is basic to both approaches. Each approach requires a variety of adjustments to the accounting information. Although *DCF* and *EVA* approaches can provide the same present value expression, there are differences between these approaches. Some of them are technical and therefore *NPV* analysis is the business analysts' preferred method to estimate value and to make long-term decisions.

Keywords: company valuation, investment project valuation, value creation, discounted cash flow, economic value added, net present value.

Introduction

The problems of estimation the financial and economic performance of a company were investigated by most researchers for many years. Recently, measurement of companies' value creation is ever present in the business and scientific fields. Nowadays a value based management serves as a tool for economic value monitoring.

The **purpose** of this paper is to show the conceptual equivalence between *EVA* and *NPV* approaches to valuation and decision-making. Discounting of cash flows under the free cash flow valuation is mathematically equivalent to the discounting of economic profits under *EVA* framework.

Research methodology: systematic and comparative analysis of scientific literature; analytical research employing the financial valuation methods.

In accordance with modern finance theory primary role of managers in decision making is to maximize company value, or the wealth of shareholders, by the efficient allocation of resources. To reach this objective company value is traditionally estimated by financial performance measures, such as profits, earnings and cash flows from operations. The empirical literature shows that earnings usually dominates most other measures in explaining stock returns, although the more recent literature indicates that earnings should not be relied on. Research into the information content of other estimates, in particular cash flows, has increased because of the limitations in earnings figures. There are a number of issues (Bacidore et al., 1997; Bromwich and Walker, 1998; Christensen et al., 2002) that applied accounting measures of performance. Although accounting profits and ratios derived from them are among the most commonly used performance measures, they are often criticized for not taking into consideration the cost of capital and for being influenced by accounting conventions. One recent innovation in the field of performance and value creation measurement is variant of residual income known as economic value added (*EVA*). During the 1990s was applied *EVA* model and the further researches (Anand et al., 1999; Bhattacharyya and Phani, 2004; Kyriazis and Anastassis, 2007; Pal and Sura, 2008) are designed for value-based management approach. *EVA* being the difference between after-tax operating profits and cost of capital is promoted as a measure of a company's real profitability.

There are a several academic empirical studies (Weissenrieder, 1997; Shrieves, 2001; Tham, 2001; Sandias et al., 2002) that examined the relationships between *NPV* and *EVA*. The study using European data by Peixoto (2002) and the latter finding implies that *EVA* may perform well as a measure of evaluation of management performance when the goal is the maximisation of shareholders' wealth.

Damodaran (1999) examined the *DCF* model and considered ways in which value can be created or destroyed in the company. Also he looked at two of the most widely used value enhancement measures, *EVA* and cash flow return on investment (*CFROI*), and considered where these approaches yield similar results to those obtained from traditional valuation models, and where and why there might be differences. Damodaran showed that there is little that is new or unique in these competing measures, and while they might be simpler than traditional *DCF* valuation, the simplicity comes at a cost that is substantial for high growth firms with shifting risk profiles.

A scientific work by Fernandez (2001) has offered contradictory results regarding the superior informational content of *EVA* over the traditional measures of performance, and the necessity for its application.

The determinants of value

The value of any asset is a function of the cash flows generated by that asset, the life of the asset, the expected growth in the cash flows and the riskiness associated with the cash flows (as discount rate). Building on one of the first principles in finance, the value of an asset can be viewed as the present value of the expected cash flows on that asset. If are viewed to a firm as a collection of assets, this approach can be extended to value a firm. However to value a firm it is needed to measure not just the cash flows from investments already made, but also estimate the expected value from future growth (Damodaran, 1999).

In every *DCF* valuation there are two critical assumptions we need to make on stable growth. The first relates to when the valuated firm will become a stable growth firm, if it is not one already. The second relates to what the characteristics of the firm will be in stable growth, in terms of return on capital and cost of capital.

To value any firm first of all we must estimate how long high growth will last, how high the growth rate will be during that period and the cash flows during the period. Finally we must estimate a terminal value and discount all of the cash flows back to the present to estimate the value of the firm.

The pattern of value creation

To create a value it has to do as follows:

(1) To increase the cash flows generated by assets in place. It is done by liquidating the poor investments, by improving the operating efficiency, by reducing the tax burden, by reducing net capital expenditures on assets in place and by reducing non cash working capital.

(2) To increase the expected growth rate in earnings. It is done by increasing the reinvestment rate, by increasing the return on capital, by optimizing the pricing decisions and by making acquisition strategy.

(3) To increase the length of the high growth period. It is done via competitive advantages, such as "Brand name" advantage and cost advantages, switching cost concept, legal protection on patents, licenses and etc.

(4) To reduce the cost of capital applied to discount the cash flows. It is done by changing operating risk, by reducing operating leverage, by changing the financing mix and by changing financing type.

Besides above mentioned actions those firms can take to increase value there are two other levels distinguishing between actions that are how quickly they create value and how much control the firm has over the value creation.

The traditional *DCF* model provides for a rich and thorough analysis of all of the different ways in which a firm can increase value, but it can become complex as the number of inputs increases. It is also very difficult to tie management compensation systems to a *DCF* model since many of the inputs need to be estimated and can be manipulated to yield the results that one wants. (Damodaran, 1999)

In the last decade, while firms have become more focused on value creation, they have remained suspicious of market gyrations. While they might understand the notion of *DCF* value, they are unwilling to tie compensation to a value that is based upon dozens of estimates. In this environment new mechanisms for measuring value that are simple to estimate and use, do not depend too heavily on market movements and do not require a lot of estimation, find a ready market. The two mechanisms that seem to have made the most impact are *EVA* and *CFROI*. Each approach has its proponents and each is claimed to be an improvement on traditional approaches.

The economic value added

During the 1990s residual income (*RI*) has been refined and renamed as *EVA* by the Stern Stewart consulting organization. Although the *EVA* model was thoroughly applied by Stern Stewart & Co., for the first time, in the 19s, a similar concept had been contemplated by economists for many years before that. It was the famous economist Alfred Marshall in 1890, who first spoke about the notion of economic profit, in terms of the real profit that a company makes when it covers, besides the various operating costs, the cost of its invested capital.

Based upon the above meaning of economic profit, Stern Stewart & Co. developed the concept of the *EVA* model. The basic difference between the notions of economic value and *RI* concerns the method for calculating profits and invested capital. The *EVA* concept extends the traditional *RI* measure by incorporating adjustments to the company financial performance measure for distortions introduced by generally accepted accounting principles (*GAAP*). There are three basic inputs that are needed for economic value added (*EVA*) computation: the capital invested, return on capital and the cost of capital.

Adjustments are made to the chosen conventional company profit measure in order to replace historic accounting data caused by the application of the *GAAP* with a measure of economic profit and real asset values. Various accounting adjustments in the financial statements of the companies result in the capitalization of much discretionary expenditure (research & development, marketing & advertising) by spreading these costs over the periods in which the benefits are received. Therefore adopting *EVA* should reduce some of the harmful side-effects arising from using financial measures. Also because it is a restatement of the *RI* measure, compared with return on investment (*ROI*), *EVA* is more likely to encourage goal congruence in terms of asset acquisition and disposal decisions.

Also if the *EVA* model with the adjustments that Stern Stewart & Co. proposes is closer to the real economic value of the company, then its application will enable management to monitor and control more efficiently the use of invested capital.

Stern Stewart & Co. developed *EVA* with the aim of producing an overall financial measure that encourages managers to concentrate on the delivery of shareholder value. According to Stern Stewart & Co. the aim of managers of companies, whose shares are traded in the stock market, should be to maximize shareholder value. It is therefore important that the key financial measure that is used to measure company performance should be congruent with shareholder value. They claim that, compared with other financial measures, *EVA* is more likely to meet this requirement and also to reduce dysfunctional behavior.

According to Stern et al. (1997), *EVA* is not just another performance measure, but can be the main part of an integrated financial management system, leading to decentralized decision making. Thus, the adoption of *EVA* should indirectly bring changes in management, which in turn can enhance company value. An UK study by El-Shishini and Drury (2004) reported that 23% of the responding organizations used *EVA* to evaluate divisional performance. In fact, companies, which have adopted *EVA* as the basis of management performance measurement, have experienced a significant increase in their shareholders' wealth.

Regarding the relative explanatory power of the measures under comparison, *EVA* seems to dominate net income, operating income and *RI*. This is in line with the theory behind *EVA*, which should equal the present value of all *EVA*'s expected to be earned by the company in the future and therefore should be more highly correlated with market value added (*MVA*) than the traditional accounting measures.

Economic value added and net present value

One of the foundations of investment analysis in traditional corporate finance is the net present value (*NPV*) rule. The *NPV* of a project, which reflects the present value of expected cash flows on a project, is a measure of surplus value on the project. Then taking projects with positive *NPV* will increase the value of firm, whereas taking projects with negative *NPV* will reduce value.

According to Damodaran (1999) *EVA* is a throwback to the *NPV* rule. The present value of the *EVA* by a project over its life is the *NPV* of the project. As he showed the *NPV* of the project is the present value of the *EVA* by that project over its life. It is noted, however, that when the salvage value is large and/or the present value of depreciation tax benefits is greater or lesser than the present value of the capital invested, the present value of *EVA* will not yield the correct *NPV* for the project.

However, Stern et al. (1997) argues that *EVA* is a more useful all-purpose corporate tool than *NPV*.

The linkage between *EVA* and *NPV* allows linking the value of a firm to the *EVA* by it. The value of a firm can be written as the sum of three components such as the capital invested in assets in place, the present value of the *EVA* by these assets and the expected present value of the economic value (economic profit) that will be added by future investments. The present values are computed on the basis of the perpetuity assumption. Furthermore, the present value of the *EVA* by the investments made in future is discounted back to the present using the cost of capital. The firm could also have been valued using a traditional *DCF* model with expected free cash flows to the firm discounted back at the cost of capital (as discount rate).

According to Drury (2004), *EVA* is the long-term counterpart of the discounted *NPV*. Thus, given that maximizing *NPV* is equivalent to maximizing shareholder value, then maximizing the present value of *EVA* is also equivalent to maximizing shareholder value and Stern Stewart's & Co. claim that *EVA* is congruent with shareholder value would appear to be justified. Consequently, if company managers are evaluated on the basis of the long run present value of *EVA*, their capital investment decisions should be consistent with the decisions that would be taken using the *NPV* rule.

Like *NPV*, *EVA* measures the degree to which a company is successful in earning rates of return that exceed its cost of capital (Anand et al., 1999). Shareholder value is enhanced (1) by investing in all of those projects which give a positive *NPV*; (2) by managing total factor productivity of existing business through *EVA* and benchmarking; and (3) by harvesting all those existing products and projects whose return on capital is more than the cost of capital.

Mathematically, discounted *EVA*, or the economic profit (*EF*), for few periods is equal to result, which obtained when discounting cash flows, i.e. *NPV*. We (Burkšaitienė, 2000) obtain this result from a sample of Corporation by estimating the business value (Table 1 and Table 2).

Table 1. Discounted cash flow (*DCF*) valuation

Discounted Cash Flow Valuation Summary		Free Cash Flow			
			Free Cash Flow	Discount Factor	PV of FCF
Operating Value	7120682				
Excess Market Securities	1337	1998	-2560178	0,893	-2285873
Non-Operating Assets	9097613	1999	-598580	0,797	-477185
Excess Pension Assets	0	2000	-1029130	0,712	-732514
		2001	-282687	0,636	-179653
Entity Value	16219632	2002	-290208	0,567	-164672
		2003	-683717	0,507	-346392
Debt	8533378	2004	-1143257	0,452	-517151
Capitalized Operating Leases	0	2005	-331479	0,404	-133879
Retirement Related Liability	878599	2006	-1976594	0,361	-712780
Preferred Stock	11066	2007	-2305655	0,322	-742359
Minority Interest	1328405	Continuing Value	39666145	0,322	12771437
Stock Options	0				
Equity Value	5468184	Operating Value			6478979
		Mid-Year Adjustment Factor			1,099
Most Recent Shares Outstanding	900821,00	Operating Value (Disc to Current Month)			**7120682**
Value per Share	6,07				
Most Recent Close Price	0,00	Present Value of Non-Operating Cash Flow			-71113445
Value Difference	-100,0%	Present Value of Minority Interest Payments			1217264
		Current Month			4

Table 2. Economic profit (*EF*) valuation

Economic Profit Valuation Summary		Economic Profit			
			Economic Profit	Discount Factor	PV of EP
Operating Value	7120682				
Excess Market Securities	1337				
Non-Operating Assets	9097613	1998	192560	0,893	171928
Excess Pension Assets	0	1999	205462	0,797	163793
		2000	-85389	0,712	-60778
Entity Value	16219632	2001	-1012443	0,636	-643426
		2002	-842061	0,567	-477808
Debt	8533378	2003	-890386	0,507	-451097
Capitalized Operating Leases	0	2004	-1045696	0,452	-473020
Unfunded Pension Liabilities	878599	2005	-1426681	0,404	-576213
Preferred Stock	11066	2006	-1479315	0,361	-533456
Minority Interest	1328405	2007	-1808803	0,322	-582386
Stock Options	0	Continuing Value	-19925428	0,322	-6415455
Equity Value	5468184				
		Present Value of Economic Profit			-9877917
		Invested Capital (beginning of forecast)			16356896
Most Recent Shares Outstanding	900821				
Value per Share	6,07	Operating Value			6478979
Most Recent Close Price	0,00	Mid-Year Adjustment Factor			1,099
Value Difference	-100%				
		Operating Value (Discounted to Current Month)			**7120682**
		Present Value of Non-Operating Cash Flow			-71113445
		Present Val of Minority Interest Payments			1217264
		Current Month			4

As Damodaran (1999) showed there are several implications that arise from the fact that the value of a company can be written in terms of the present value of the *EVA* by both projects in place and expected future projects.

(1) It is the good news for proponents of *EVA*. A policy of maximizing the present value of *EVA* over time is equivalent to a policy of maximizing firm value, and is thus consistent with traditional corporate financial theory.

(2) It is the notion that the *EVA* approach requires less information than a *DCF* valuation, or that it provides a better estimate of value is false. The *EVA* approach should yield the same value as a *DCF* valuation, and it requires more information, not less. The *DCF* valuation requires cash flows and a discount rate to arrive at a value, whereas the *EVA* approach requires these inputs and an additional one – the capital invested in the firm.

(3) It is often claimed that the *EVA* valuations provide insights on value enhancement because of its focus on excess returns defined in terms of return and cost of capital. A *DCF* model where growth is linked to the reinvestment rate and the return on investments accomplishes the same objectives and arrives at the same results.

Conclusions

- Various approaches can be used to overcome the short-term orientation arising when accounting profit-related measures are used to evaluate company performance and to create value for shareholders. One possibility is to improve the accounting measures, and *EVA* represents such an approach. *EVA* is

computed by making accounting adjustments to the conventional company profit calculation. These adjustments represent an attempt to approximate economic income. Incorporating a cost of capital charge is also a further attempt to approximate economic income.

- Ideally, company performance should be evaluated on the basis of economic income by estimating future cash flows and discounting them to their present value. This calculation could be made for a company at the beginning and the end of a measurement period. The difference between the beginning and ending values represents the estimate of economic income.

- Conceptually, free cash flow, *EVA* and *NPV* approaches to valuation and decision-making are equivalent. We demonstrate that the discounting of cash flows under the *DCF* valuation approach is equal to the discounting of future economic profit for few periods under the *EVA* approach. Thus applying the *DCF* approach or the economic profit (*EF*) approach the value of the company will be the same given the same projected financial performance. The *DCF* approach focuses on the periodic total cash flows obtained by deducting total net investment and adding net debt issuance to net operating cash flow, whereas the *EVA* approach requires defining the periodic total investment in the company.

- Both *NPV* and *EVA* are related to shareholder value and the use of both these approaches may be effective tools in fact to create value for investors. Both approaches show that value is created only if the company can earn in excess of investor required returns when measured by the cost of capital. From an analytical perspective, the two approaches can be viewed as ways to obtain the same result – measuring value creation. From a managerial perspective, the two approaches are means to achieve the company's objective – creating value.

- In conclusion, a company can increase its value by increasing cash flows from current operations, increasing expected growth and the period of high growth and by reducing its structure of financing cost. The value of the company obtained by discounting free cash flows to the company at the cost of capital is identical to the value obtained using the *EVA* approach.

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