THE RELATIONSHIP BETWEEN ECONOMIC VALUE ADDED AND CASH CONVERSION CYCLE IN COMPANIES LISTED ON THE WSE

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Abstract

Economic Value Added (EVA) a profitability measure and a Cash Conversion Cycle a liquidity and profitability measure are presented in this article. These ratios represent the dynamic approach to management of companies. The relationship between them may be considered as an advanced approach to management in a current economy based on intangible assets and know- how and capital allocated fast and efficient according to information common access.

Introduction

The purpose of this article is to identify the relationship between economic value added EVA and cash conversion cycle CCC in companies listed on Warsaw Stock Exchange. These are measures used by the most qualified managers to make decisions that increase the profitability of the company and its market value. The economy is changing from atoms to bits (Mauboussin and Kawaja, 1999) suggesting the change in assets structure and the way of managing them. Economic value added is a measure that determines the profitability of the company in terms of more than average value generated by the company for shareholders. This approach refers to the internal needs of people who require more to enter a higher level of satisfaction. This measure is connected with a philosophy of doing business. Cash conversion cycle on other hand is a measure that combines liquidity and profitability, because the faster the conversion of funds, the quicker cash is released for the next cycle, thus liquidity is increasing. Profitability reflected in CCC is the number of possible conversion cycles during a year, and so the more such cycles, the greater the profitability. In this article, cash conversion cycle will be considered as a measure of liquidity of the company. Looking for the relationship between economic value added and cash conversion cycle authors would like to define the influence of liquidity measure CCC on value connected with capital and its cost represented by EVA.

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Financial Internet Quarterly „e-Finanse" 2012, vol. 8, nr 2
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Economic Value Added (EVA)

The concept of economic value added was developed by Stern & Stewart Company consulting firm in the 90's and is derived from the concept of residual income as defined in the late nineteenth by A. Marshall. According to Marshall the company's earnings must be sufficient to cover operating expenses in addition to the cost of the entire capital, including the cost of equity. Residual category of profit differs from EVA category because of the necessity to adjust one of the categories of operating profit as a basis for calculating EVA, the value of invested capital and its cost. These adjustments were made to obtain a more useful formula of EVA and so it better reflect economic reality, including the incentive schemes. The adjustments do not appear in the conception of Marshall.

Economic value added system is based on three interrelated pillars: the valuation of the company, the generated value-added measurement and incentive system for directors and employees. The economic value added takes into account these three areas. EVA contributes to the growth of wealth for shareholders, because the proper functioning of economic value added system requires the use of all these elements. Such a measure is a comprehensive tool for assessing the profitability of investment for investors, because it ensures the consistency between the controlling of company's operational performance and share price in the market. According to Ehrbar (2003) "EVA enables to model, control, assess, communicate and remunerate financial decisions in line with one index and creates common language for all workers".

EVA increase in shareholder value can be measurable as EVA conception adjusts accounting results to the specified company and eliminates accounting disruptions. This causes profit to be treated as economic category (Johnson and Soenen, 2000) and the outcoming level of EVA is reflected in the valuation made by the market. For this reason, the company's performance measurement basing on the company value is important for investors and management.

There is no single method of calculating the value of the EVA ratio. It is not because the measure is not a standard one. It requires adjustments to the specifics of a particular company, for example Ehrbar (2003) points to a distinct methodology for estimating EVA for banks, and their data if an investor makes an external analysis. The main problem is the calculation of EVA, and getting all necessary information to this calculation. It is not possible to estimate the EVA based on partial data, for example, without access to the future lease payments, capitalized expenditures on research and development, the provision for LIFO method of inventory valuation, to (Nowicki, 2005).

Generally, the EVA is calculated using the formula:

$$EVA = NOPAT - IC \times WACC, \tag{1}$$

where   NOPAT = operating profit before paying interest, net of tax,
         WACC = weighted average cost of capital,
         IC   = value of capital invested by the owners and creditors.

The developers of economic value added concept defined the approximately 160 possible adjustments to determine value of capital in EVA category, ie. the transformation of the accounting value of economic categories. They shall be made depending on the type of company, type of operating, or financial assets. But in order not to destroy the simplicity of this concept there should be as little as possible adjustments. Too complicated measure will not be welcomed by investors, because it will prevent them simply from control whether their funds are managed effectively or not.

Economic value added is therefore a system which provides the basis for decision-making in the company by its management and assessment of the situation of the company by investors. This measure may be a criterion for assessing the business because:

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1. it is a measure less susceptible to accounting manipulation than categories based on profit,
2. Economic Value Added is a measurable indicator, and so easy to compare, giving investors and the boards the opportunity to evaluate and choose between the projects being considered,
3. a method based on EVA is a tool for valuation of shares, and therefore it can be used to make decisions by rational investors,
4. the level of EVA is based on incentive scheme of managers and employees so that the primary objective in management of the company was the increase in wealth of shareholders, thus this method integrates evaluation with periodical results and enables unification of decision processes (Cwynar, 2002),
5. the level of EVA can be shaped using a variety of tools - by shaping the capital structure, sales volume, reduce costs, etc. It follows that every individual can make decisions that contribute to the improvement of this indicator.

Cash Conversion Cycle

Management of working capital seems to be less important than the optimal structure formation in the context of long-term finance in enterprises. Current assets and liabilities reflect the operating aspect of a business, the usage of static liquidity ratios in a company statement can be more entitled since it is easier to calculate and interpret it. Also the level of current assets is often managed by the people occupying non-financial positions in enterprises and they are not able to link the decisions connected with magazines to the liquidity and profitability in the end. Inventory and its level is established by the production department according to engineering decisions. The level of sales is the result of negotiations with contractors. Negotiations with a client can be done by a different team that negotiations with subcontractors. If it is not synchronized it can cause a problem with liquidity. Cash and its level are not subject to control, very often money disappear immediately used to pay liabilities. Generalizing the above phenomena is highlighting the problem of liquidity management in the enterprise. Such management requires knowledge and managerial skills but also the cooperation of many departments in the implementation of a coherent financial policy.

Financial analysts use the indicators of liquidity in order to determine short-term financial position of the company. However, the current ratio may not indicate the ease of settlement of liabilities because the liquidation of inventory and exchange it for cash is often impossible (especially when stocks is production in progress). For financial analysis there were some ratios introduced, which define a more restrictive level of liquidity in the company. By excluding inventory from the current ratio formula the receivables, cash and short-term deposits, as part of current assets are left, and they can be defined as the most liquid. This indicator, called quick ratio indicate the extent to which the company is able to regulate their short-term obligations excluding the inventory.

Liquidity ratios are considered to be to static (Largay and Stickney, 1980) and (Aziz and Lawson, 1989) in order to determine whether a decrease or increase in value of a ratio has a positive or a negative impact on the profitability of the company. The concept of static balance has been supplemented by a profit and loss account and cash flow. The dynamics of the company is a reflection of its actual performance, movements of the business and financial flows. Production, distribution and collection of receivables should be synchronized with each other.

In the model proposed by Richards-Laughlin (1980), the conversion cycle is defined as the sum of the conversion of receivables and inventory conversion period minus the period of deferred payment obligations:

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$$CCC = RCP + ICP - PDP \qquad (2)$$

where RCP = cycle receivables turnover = 360 / receivables turnover ratio,
       ICP = cycle inventory turnover = 360 / inventory turnover ratio,
       PDP = deferred repayment period = 360 / turnover ratio of commitments.

$$CCC = \frac{365AR}{X} + \frac{365I}{Y} + \frac{365CL}{Z} \qquad (3)$$

where AR = receivables,
       I   = stocks,
       CL   = obligations to employees and suppliers,
       XYZ = in connection with the variety used in their calculations are defined below based on the analysis made by Bieniasz and Czerwińska-Kayzer (2008).

Cash conversion cycle is regarded as one of the best measure of assessing the effectiveness of working capital management and its impact on the liquidity of the company (Wędzki, 2003). The cash conversion cycle is a cycle where the company purchases inventory, sells the inventory on credit as an account receivable, and then collects the account receivable or turns it into cash. The company needs cash to pay its own bills. The cash conversion cycle looks at the time tied up in converting inventory and receivables to cash, as well as the amount of time the company is given to pay its bills without incurring any penalties.

While the formula associated with the calculation of the period in which the firm uses external cash or contractors funds (Bieniasz and Czerwińska-Kayzer, 2008) expressed in the form of cash conversion cycle seems simple. Cash conversion cycle determines the number of days on which the company must commit additional resources beyond current commitments, to fund operating activities (Gabrusewicz, 2005). Data connected with the calculation of the components of CCC may be balance sheet data at the end of the period or it may be calculated as an average. Authors decided to use the data for the end of a year because of the technical reason connected with the data set. The period of repayment in accordance with the concept of cash conversion cycle should be calculated as liabilities to suppliers and employees, and not as total current liabilities. In addition, the revenue can be specified as net, excluding VAT or gross (Wędzki, 2003) for the sake of comparability with other parameters. The size of the costs may include cost of sales (Gabrusewicz, 2005; Wędzki 2003) as the sum of the costs of products, goods, materials, cost of sales and technical management or production cost (Shoot, 1997) as the sum of direct costs and faculty at no cost of sales and management. Cash conversion cycle shows that the smaller its value the faster company recovers its cash invested in the sold products, and more cash level will be due to higher liquidity. A high value of ratio indicates that the company recovers the money in long term and therefore this indicator may show problems with liquidity.

Management of working capital in the context of the cash conversion cycle seems to be a new skill and it requires from managers not only new knowledge but also the opportunity to make decisions. It seems that the point of view of manager to the working capital management is one of the more rational solutions. In every company the position of working capital manager should be introduced. It can be concluded that the purchases and sales of the company arise spontaneously. On the one hand purchases arise by negotiating contracts. The stronger the position of company on the market, the better metrics of company assessment and those terms can be longer and vice versa. Generally, the payment period for invoices of suppliers formed spontaneously as a result of interaction of market traders with different potentials. On the other hand, the sales department sells goods produced by the company while negotiating terms and discounts for early payment of

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invoices. Also, in a spontaneous manner determined here the level of claims and the average payment period for invoices is established. The procurement department may suggest extension of the deadline for payment and the sales department to shorten it. Such a situation would incidentally decrease liquidity ratios, as the level of current liabilities, expressed in the form of trade credit will increase and the level of receivables will fall. However, this situation does not necessarily mean the company troubles as if it could be suggested by the current ratio. To manage the liquidity of a company the synchronization of decisions is required and it can be done if a system as EVA of conscious management is developed in a company.

In the case of stable economic conditions for a well-established company in the market, predictions of required current assets level are easier, and thus the safe level of materials or finished products may be lower. Lack of inventory management, however, may need to raise additional funding in this category. This funding could come from current liabilities and suppliers short-term loans or equity. Long-term debt is usually connected with the investment project and is rather less possible that working capital will be financed using external funds. Inventory financing from external sources effects of increasing financial costs, and thus reduces net profit, which causes a drop in profitability. Such a situation will effect in increasing the cost of equity and a decrease in return on equity. This situation also affects negatively such indicator as EVA.

Generally it can be concluded that the longer the cash conversion cycle, the more capital must be involved in the business, and the weighted average cost of capital of a company is higher. Such a situation can lead to a decline in profitability and investment attractiveness of companies, and in turn they may be not able to issue low interest instruments to finance development.

Economic Value Added and Cash Conversion Cycle Relationship

Literature describing the relationship between liquidity and profitability of the company indicates the character of this relation . Although generally with an increase in liquidity ratios increases also the profitability of the enterprise, but at some point the relation is changing and further increase in liquidity ratios may lead to bankruptcy. This dependence is presented in Figure 1.

Figure 1: The relationship between liquidity and profitability
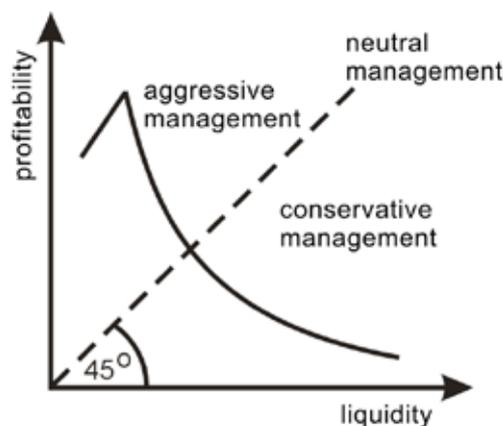
Source: Gajdka, J., Walińska, E. (1998). Zarządzanie Finansowe. Teoria i praktyka.
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Measuring the profitability through economic value added and liquidity through cash conversion cycle is a new way of dynamic management in companies and it can lead to wider applications of

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the dynamic management of the company. The authors have observed (Bolek and Wolski, 2010) no statistically significant relation between liquidity measured by traditional liquidity ratios and the CCC therefore. It has been shown (Bolek and Wolski, 2010) that with the increase in liquidity ratios (decrease CCC) profitability grows too (ROA ROE). These two observations made authors to look for a new and dynamic model of measuring the effectiveness of business. Based on research conducted by Bieniasz and Czerwińska-Kayzer (2008) the shorter the cash conversion cycle the better metrics of company assessment of business performance measured by current and quick liquidity ratios are. Kamath (1989) found that the current and quick ratios were negatively correlated with the CCC but were not negatively correlated to the profitability measure, while the cash conversion cycle was negatively correlated to it. Lyroudi and McCarty (1993) examined the relationship of current and quick ratios with the cash conversion cycle for small US companies and found that the cash conversion cycle was negatively correlated to the current ratio, the inventory conversion period and the payables deferral period, but positively related to the quick ratio and the receivables conversion period. On the other hand profitability measured as ROE or ROA represents the accounting constrains of a business that is more than financial documents can present. Especially we should consider know-how, human capital and the value of a trade mark – these categories are not valued and introduced to balance sheet mostly.

Weighted Average Cost of Capital is a measure of capital used to finance assets in a company. It can be calculated according to following formula:

$$WACC = \frac{E}{V} Re + \frac{D}{V} Rd \, (1 - Tc) \qquad (4)$$

where: Re = cost of equity,
Rd = cost of debt,
E = market value of the firm's equity,
D = market value of the firm's debt,
V = E + D,
E/V = percentage of financing that is equity,
D/V = percentage of financing that is debt,
Tc = corporate tax rate.

The cost of equity can be measured using ROE, but when we want to consider market assessment of company it is necessary to use market data and calculate it ie. using the Capital Asset Pricing Model according to the following formula:

$$r_a = r_f + \beta_a (r_m - r_f) \qquad (5)$$

where: r_a = expected rate of return,
r_f = risk-free interest rate,
β_a = beta of the security,
r_m = expected market return.

The final model should be presented basing on the assumption, that the capital structure (Miller and Modigliani, 1961) is optimal. Basing on this EVA should reflect the cost of equity on market conditions and therefore should be a better measure than ROA and ROE since investors asses the business not only using the accounting data. Going further the market should be efficient is this way of thinking, too.

If cash conversion cycle is a dynamic way of measuring the liquidity and it provides the managers with clear information about receivables, inventory and payables turnover it may be considered as

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a better measure of liquidity (and also efficiency if we take into account the number of cycles in a year). We cannot compare Google and General Motors easily because we cannot compare bits with atoms (Mauboussin and Kawaja, 1999) and the models CR in relation to ROE should be changed especially that capital now-a-days is flowing much faster and easier so the information does.

As it was suggested economic value added system is based on three interrelated pillars: the valuation of the company, the generated value-added measurement and incentive system for directors and employees. This system can be joined with cash conversion cycle to build more developed system considering the receivables, inventory and payables management, not only production. Economic value added is in accordance with the formula No. 1 difference in operating profit net and product of invested in the company capital and the weighted average cost of capital. Cash conversion cycle is in accordance with the formula No. 2 the number of days in which cash from liabilities, stocks and receivables returns to the company, thus forming a profit.

It follows from formula No. 1 that the larger the net operating profit, the greater EVA is, and so the lower the CCC the better metrics of company assessment and cash faster returns to the company in terms of investment in working capital and more of these cycles can be performed during the year. In addition, EVA depends on the size of the capital invested and then the larger capital invested with the same size of operation the smaller EVA is. Depending on the strategy of financing current assets in the enterprise, some of them may be financed by long-term capital (conservative strategy), then the CCC should be relatively long because the level of inventories and receivables is high and financed not only by short-term liabilities (zero working capital) but also equity. The relationship between EVA and CCC should be strong in the conservative strategy, while an aggressive strategy, where the liabilities finance assets, such relationship should be weaker because the long-term capital is not involved in the financing of current assets. The relationship between EVA and CCC is based on net operating profit, which should show a negative correlation with the CCC (NOPAT increases, decreases CCC). It can therefore be hypothesize that the shorter the CCC the higher the EVA. Taking into account the function of liquidity and profitability, it may be expected that beyond a certain minimum liquidity there will be the opposite effect and decrease in CCC will be accompanied by decrease EVA.

Research

Data

The test was based on data taken from the balance sheets of firms in the database Notoria. The study included years 1997-2009. Based on available information two indices were calculated, the first is economic value added ratio (EVA). The second indicator is a cash conversion cycle CCC. All data were calculated based on the annual balance sheet unconsolidated. The criterion for selection of companies in the sample was a company belonging to the WIG index. Second, technical criterion was the availability of data for the year. However, if during the period the data were not available, the company has not been eliminated from all the observations.

Methodology of research

The authors decided to divide the sample into four sub-sample. For this purpose, observations in each year were sorted by increasing liquidity index. Then the data were divided into four attempts with a similar content of observation. In each subsample 10 portfolios were selected. For all portfolios, the average liquidity ratio CCC/365 and the EVA were calculated using ROE as a cost of capital. Then average rates for portfolios were counted with the same numbers from subsequent years. On such an analysis of aggregated data correlation and regression were calculated. CCC/365 ratio was calculated based on the rate of CCC, where CCC/365 is expressed as the cash conversion cycle throughout the company's fiscal year.

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The results

In the first instance the correlation analysis was performed. The relationship between the EVA and CCC/365 was calculated in four successive portfolios designated as A, B, C and D. The results of the analysis are presented in Table 1.

Table 1: Pearson correlation analysis

	CCC/365 A	CCC/365 B	CCC/365 C	CCC/365 D
EVA A	-0,181	x	x	x
EVA B	x	-0,477	x	x
EVA C	x	x	0,067	x
EVA D	x	x	x	0,187

Source: Own study

The results of the analysis are presented in accordance with the expectations of the authors. Although none of the indicators is statistically significant, the correlation between indicators has expected direction, but the conclusion is very weak because of lack of statistical significance, and it can be easily challenged. Authors will follow the research using market beta in future to calculate the equity cost and expect the result to be significant than.

In the first two subsamples with increasing liquidity (and therefore the decline CCC/365) profitability grows. In two consecutive subsamples with an increase in profitability decreases liquidity(increase in CCC/365). This confirms the expectations formulated on the basis of theoretical considerations and it is consistent with the previously presented model.

To confirm the results of correlation the linear regression analysis was performed. Table 2 presents the results.

Table 2: Linear regression analysis model built on A, B, C and D portfolios

Model	non-standardized coefficients			R-squared
	B	Standard error	t	
CCC/365 A = a + b EVA A				
(constant)	-0,249	0,020	-12,356	0,033
EVA A	-9,747E-8	0,000	-0,520	
CCC/365 B = a + b EVA B				
(constant)	0,006	0,001	7,173	0,227
EVA B	-5,311E-8	0,000	-1,533	
CCC/365 C = a + b EVA C				
(constant)	0,090	0,001	61,345	0,004
EVA C	1,005E-8	0,000	0,189	
CCC/365 D = a + b EVA D				
(constant)	0,282	0,007	38,761	0,035
EVA D	3,062E-7	0,000	0,538	

Source: Own study

Regression analysis confirmed the earlier observations.

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Conclusions

In this article the authors present analysis of two dynamic indicators, economic value added EVA and cash conversion cycle CCC. The research was done to proof the hypothesis that along with the falling CCC (increase in liquidity) EVA will increase. Despite the low parameters of the model this relationship can be confirmed.

This model is presented as a new way of assessing the current business, based not only on fixed assets but also on know-how and intangibles. Not all of them are taken into account when preparing the balance sheet. EVA can be the measure of market assessment of the profitability of a business. Cash conversion cycle represents the dynamic measure of liquidity of company and also provides the information about the company performance. It can be joined with EVA system to make company performance more efficient in a world where capital can be allocated fast and requires the highest efficiency, too.

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Financial Internet Quarterly „e-Finanse" 2012, vol. 8, nr 2
www.e-finanse.com
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