ECONOMIC VALUE ADDED VERSUS CASH VALUE ADDED: THE CASE OF COMPANIES IN TRANSITIONAL ECONOMY, POLAND

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Abstract

This paper examines the application of the increasingly popular economic value added (EVA) and cash value added (CVA) measures of financial performance of private and publicly-traded firms. EVA and CVA are measured for a sample of Polish firms. Since traditional accounting measures are not robust indicators of corporate performance of firms in transitional economies, these alternate measures provide better assessment of value/cash flow creation and solvency. The results suggest that Polish firms, though reportedly making accounting profits, are indeed unable to generate value to shareholders. Further, the cash flow measures indicate a great deal of solvency risk. Thus, we recommend the use of these EVA and CVA measures for evaluating performance of companies, especially, in transitional economies.

JEL Classification: O16
Keywords: Cash value added, Transitional economies, Economic value added, Solvency

1. Introduction

The goal of any privately or publicly traded company is to maximize shareholder value. To achieve this goal, management and the monitoring authorities rely on the use of specific performance indicators. To investigate if value is being maximized, the theories about the factors influencing company value need to be understood. In the 1990s, new ideas emerged as to how value added or profits created could be measured. In that regard, the use of traditional indicators may be inappropriate as these measures primarily focus on book value or profits. Book value does not take into account a number of variables which determine the value

creation of firms. Book value or profits relies on the specific accounting standards chosen for reporting purposes, which gives rise to potential manipulation of performance. This issue has been the subject of research under the heading of earnings smoothing and earnings manipulation, which verifies the effect of such creative accounting as a source of error in performance indicators using book value or accounting profits.

Consequently, following a critical approach to the concept of profits as an inaccurate tool for managing company value, new measures have been introduced. Among them, economic value added (EVA) and cash value added (CVA) are quite popular in the field of financial management since the 1990s. This paper addresses the issues associated with the application of EVA and CVA in the context of a transitional economy, Poland. In the absence of modern accounting traditions, and disclosure rules of more established markets, the use of EVA or CVA are perhaps more appropriate for judging performance of Polish firms.

The paper is organized into five sections. Section 2 is a brief description of the concepts to be applied. In section 3 we describe the methodology used in this particular country sample. The following section reports the findings. The paper is concluded in Section 5.

2. Economic value added in value-based management

The concept of EVA is closely related to economic profits in the main stream economics theory. Following a standard reference (Brealey and Myers, 2005) the concept of economic value added presents a company's performance in the context of value creation over a reporting period:

$$EVA_t = NOPAT_t - (WACC_{t-1} * KAP_{t-1}) \quad (1)$$

where,

EVA_t : the economic value added over a reporting period, t and t-1,

$NOPAT_t$: net operating profit after tax,

$WACC_{t-1}$ is weighted average cost of capital multiplied by, and

KAP_{t-1}: adjusted capital invested over the reporting period.

EVA is the net value added to the shareholders' value over a reporting period after adjusting the profits in relation to the opportunity cost of employing the capital for another year using the measure, WACC. A positive value on this measure means that the company has added value to the shareholders' wealth during a reporting period: interestingly, a negative value means that there is a reduction in the shareholders' value of the company during the reporting period. A value of zero signifies the break-even point, where profits earned equal the opportunity cost of outlaying capital.

EVA has come to form the basis of performance assessment of a firm. It is a measure of management's effectiveness using the scarce capital resource of the company. Therefore, it is a useful tool for any investor or analyst to apply EVA methodology as providing an external assessment measure of a company's performance: see Ehrbar (2000). It can also be used for ranking company performance in an industry for example: see www.eva.com. However, this measure does not take into account depreciation cash into the adjustment needed reflect cash availability. EVA may still be employed as a monitoring device for gauging the financial performance of a business, particularly when demand for capital is smaller than supply of capital when the company is relatively insensitive to changes in access to cash. For example, companies that are newly established would have huge investments, and thus have depreciation providing non-cash resource equal to the amount of depreciation, which is useful for financing purposes: see Cwynar and Cwynar, (2000).

CVA is cash value added as another indicator of company's performance in the context of value creation over a reporting period. This concept was developed by the Swedish consulting company FWC AB based in Göteborg: see Cwynar and Cwynar (2000). It refers to the value created by a company or a unit of a company. If shareholder value is positive, the CVA should exceed the real market cost of capital. The CVA is used in three ways. The first relies on adding the invested capital *and* depreciation to NOPAT in order to measure return on investment on a cash basis: recall that the EVA does not adjust for the depreciation. CVA may also be expressed as cash flow return (CFROI). The Swedish consultancy, FWC AB, offers CFROI as a variation of the CFA measure. CFA is expressed as follows

$$CVA_t = (CFROI - \text{real cost of equity}) * \text{gross investment cost} \qquad (2)$$

Valuation based on this concept reflects the real increase in company's value over a reporting period in cash flow terms. If a company has A positive CVA, it means it has added value to the shareholder's wealth while a negative value signifies a reduction of value.[1] A number of factors determine the CVA indicator: return on equity (CFROI), real cost of equity and gross investment, the third term varies over time. CFROI is defined as gross cash flow created over a year on invested capital: in other words it refers to the NOPAT adjusted for depreciation. CFROI expresses an internal return on investment. CFROI is a function of four factors: gross investment, gross cash flow over a year, cash generating period, and finally the value of assets before depreciation.[2] The gross investment category

[1] Kley, K.L., (2002). IAS und wertorientiertes Controlling, *Kostenrechnungspraxis*, 46 Jg., H.5, p. 277-281.

[2] Skoczylas, W., (2000). Koncepcja Cash Value Added w zarz_dzaniu warto_ci_ przedsi_biorstwa, *Przegl_d Organizacji*, Vol. 6 (No. ??): p. 29.

is also known in the literature as gross assets: Skoczylas, Koncepcja (2003).[3] The calculation method for gross assets is presented in Table 1.

Yet another element of CFROI is the period over which the invested capital is generated, which is described as an average depreciation period. Such a period is a ratio of historical cost of purchase to the scheduled annual straight-line depreciation charge. Different methods of calculating depreciation generate

Table 1: Gross assets calculating formula

Monetary components of current assets (less stock)
+ prepayments
+ fixed financial assets
= monetary assets
- non-interest bearing liabilities
= monetary net assets
+ stock
+ land
= undepreciated net assets
+ book value of fixed assets
- accumulated depreciation
= cost of acquisition or production of depreciated tangible fixed assets
+ adjusted for inflation
= adjusted for inflation of gross value of depreciated fixed assets
+ accumulated rent or lease payments
+independently produced or acquired intangible assets
= gross investment

Source:
T. Günther, Unternehmenwertorientiertes Controlling, Verlag Franz, München 1997, p. 214. after W. Skoczylas, Koncepcja Cash Value Added..., op. cit., p. 16.

different final results. Hence, it is advisable to replace the existing denominator in the formula with annual depreciation.

By not subtracting depreciation from profit and invested capital, as is the case with calculating the EVA, another formula for computing CVA is:

$$CVA = (ROGA - WACC) \times \text{gross assets} \qquad (3)$$

Where,

ROGA: Return on gross assets, which the return on equity invested in company's operations that is insensitive to depreciation,

[3] Those factors may be described in yet more detail, as more information is available in: W. Skoczylas, *Koncepcja Cash Value Added*,..., op. cit, p. 29-34.

ROGA: gross operating profits after tax divided by gross assets, and
GOPAT = NOPAT + Depreciation

Gross assets are total assets less non-interest bearing current liabilities, which is increased by accumulated depreciation. It can also be defined as invested capital in relation to its gross value (before subtracting accumulated depreciation).

It is now possible to change the formula for CVA, following the argument under which "CVA is a certain category of profit, which can be placed within a broader context, encompassing also the EVA, such as the residual profit or economic profit"[4] Thus, we have:

$$CVA = GOPAT - \text{Equity charges} = GOPAT - WACC * \text{Gross assets} \quad (4)$$

The cash value added is a measure based on cash. It is validated by the fact that NOPAT and invested capital (gross assets) are increased by depreciation. As a result of this correction, the accrual accounting category changes into a cash-based concept, thus this measure is a good way of representing cash-based assessment of performance of a company.

CVA is a measure of a company's capacity to generate cash. Companies generating a cash premium over expected levels create value. Thus, a company creating CVA is able to resolve the problem of insolvency, thus making this measure very useful to control for solvency issue. It also allows for a company's valuation based on the sum of invested capital and discounted cash value added. Thus, together with discounted free cash flows, CVA forms a basis for *ex-ante* solvency assessments. The cash value added has thus the potential to become a universal measure to be used. Since it is calculated on the basis of the financial reporting data, it has the potential to be used by any entity as information to measure this is readily available. Thus, a single concept helps us to calculate a measure likely solvency.

Contrasting the two measures, it may be said that EVA is a return on equity measure which is sensitive to the company's depreciation policy. It is so because the numerator, net operating profit after taxes (NOPAT) and the denominator, return on invested capital, are expressed as net values without taking into account the impact of depreciation on cash availability. Hence the EVA is a measure devoid of the cash dimension. If applied, EVA would send a misleading signal with respect to the real profitability of the company's investment: see Cwynar and Cwynar (2000).

The CVA remains therefore an alternative and improved measure to EVA expressed primarily in terms of cash terms. It includes depreciation effect on the NOPAT and invested capital. Hence, the cash value added combines two features:

[4] A. Cwynar, W. Cwynar, „Zarz_dzanie warto_ci_ spó_ki kapita_owej...", op. cit., p.193.

a residual income measure and a cash flow measure. But there are some critics (Cwynar and Cwynar, *Op cit.* pp. 189-95) who point out that the CVA does not bring in any significant improvements to the EVA calculation. They also stress that, although it accounts for depreciation, the CVA may fail to reflect the result expressed in cash from operating activities. Part of GOPAT may exist only on paper (revenues resulting in liabilities, deferred cash inflows). Moreover, in calculating the result, using the CVA, the impact of depreciation is not reduced as in the case of OFCF (operating free cash flowS) which is cash disbursements on investment in fixed assets or working capital in the given period. Instead a non-cash capital acquisition charge is subtracted from the profit. Another argument in favour of EVA is the historical character of cash flows taken into account in assessing the cash value added, which causes its value to present a misleading picture of a company's performance. Conversely, the only argument for the CVA is its stability over time, resulting in its insensitivity to variations in net asset value.

3. Data and methodology

The sample for applying the EVA and CVA consists of five companies within an industry. Phosphate, nitrogenous and potassium fertilisers as well as mixed fertilisers are produced in Poland in five companies:

- ZA Pulawy
- ZA in Tarnów-Moscice
- ZA Kedzierzyn
- ZA Police
- Anwil

All those chemical plants classified as large in terms of the number of their employees and as described in *The PKD 24.15 Artificial fertiliser and nitrates, had a* total of 9672 employees as at the end of 2002. The Police chemical works top the list with 3057 workers as at the first quarter of 2003.

The fertiliser industry faces difficulties resulting from high dependence on imported raw materials such as natural gas, phosphorite and potassium salts. The natural gas used by the Polish fertiliser producers is currently significantly more expensive than in Russia, and also more expensive than elsewhere in the EU when used in large industrial installations, particularly in the fertiliser industry. These difficulties date back to 2001. Ever since the 30% gas price increase in March 2001, these companies have been paying more than their foreign competitors. The jump in price was caused by the Regulation of the Ministry of the Economy of 20 December 2000 on the calculation of prices, and principles of settlements in the trade of gas fuels. Another reason for the present difficulties is the lack of timely restructuring and a decrease in fertiliser prices on foreign markets, coupled with high operating expenses, missed investment opportunities or

incomplete investment projects. The list of negative factors also includes a downturn of the global economy as well as a lack of co-operation among the companies, even though there does exist a network of relationships based on technological similarities. Internal product chains are also very short which means that the companies often lack raw materials for their production or are incapable of refining their products further in order to maximise profits. Since the external influence on the functioning of the entire group of companies is similar, both the internal and external conditions are comparable the overall performance depends to a large extent on managerial skills.

We need to calculate the cost of capital. This is not an easy task in the context of a transition economy such as Poland. Hence, some basic assumptions need to be made. We present an assessment method while other data are supplied by relevant sources. In assessing the cost of capital, a method of weighted average cost of capital was used: capital structure in the companies is based both shareholder's equity and outside capital. Shareholder's equity cost was assessed by the CAPM, the Capital Asset Pricing Model – which is one of the most widely used methods in financial economics. The CAPM model includes three factors that determine the cost of shareholders' equity. However, in the case of Polish companies, prescribing the value as in the CAPM seems to be difficult to accomplish.

The cost of shareholders' equity for the EKD 24 group, i.e. companies producing chemical products and artificial fibres, may be assessed by employing the formula:

$$E(R_j) = \text{Cost of Capital} = Rf_j + \beta(Rm - Rf) \quad (5)$$

Where,

$E(R_j)$: the expected return to equity holder of a j-th company,

Rf_j: the return on a long term Treasury bond in the economy as risk-free return,

β: the systematic risk of the j-th company share as given by the Market Model regression, and

$(Rm - Rf)$: the risk premium appropriate for the economy where the share is listed.

Risk-free return is expressed as the interest rate of long term Treasury bonds which, in the case of the Polish economy, would be 20-year Treasury bonds. Their return as at end of 2002 remained at approximately 6.2 per cent: source is www.mofnet.gov.pl. Since those instruments were not traded, the 10-year Treasury bonds were adopted for the purpose of calculating the risk-free return for the remaining years of the analysis. The bond return was 10.81 per cent as at the end of 2001, 11.88 per cent as at the end of 2000, and 9.53 per cent as at the end of 1999. For the years 1998-1999, risk-free rates of 19.84 per cent and 16.08 per cent were adopted respectively.

As discussed earlier, the risk premium category was adopted following Damodaran (2000). This source sets a premium level of 8.5 per cent for high-risk emerging markets. On the basis of the risk index transposed from the American economy, Beta or risk index is assessed using the industry average for companies listed on American markets as provided by Ibbotson Associates. De-leveraged Beta - calculated for the American SIC code – which is similar to the Polish EKD 24 - equals 0.62. Consequently, the company's cost of capital in the industry in question is presented in Table 2.

Table 2: Company capital cost for fertiliser producing companies in the years 1997-2002.

YEAR	1997	1998	1999	2000	2001	2002
(in %)	25.11	21.35	14.8	17.15	16.08	11.49

In order to calculate the cost of outside capital in the years 1997-2002, an average cost of borrowing from Poland's top twenty banks was adopted and the source is www.rzeczpospolita.com.pl. Since tax deductions on loans are available for companies, bank interest rates were adjusted for the CIT.[5]

The mean weighted cost of capital can be calculated on the basis of the assessed cost of shareholders' equity and outside capital. In practice, the cost equals the ratio of the shares of the types of capital involved to the cost of capital. The weights reflecting the structure of capital are based on book values, i.e. historical values: see Komajda.[6] The approach used in the paper relies on adopting the book values to calculate the weighted average cost of capital, and eventually the weighted average cost of capital for this particular group of companies.

The weights for each capital component may be arrived at on the basis of the book or market value of invested capital. The book value, however, seems to be more useful, as the market value of the capital may be difficult to calculate. Additionally, such value is subject to significant fluctuations, resulting from price changes on the equity market. An additional argument for the book value is that

Table 3: Outside capital cost in fertiliser producing companies in the years 1997-2002

year/cost component (in %)	1997	1998	1999	2000	2001	2002
cost of borrowing	23.53	23.73	19.98	20.1	19.27	11.88
CIT	36.0	34.0	30.0	30.0	28.0	27.0
cost of outside capital after tax	15.06	15.66	11.99	14.07	13.87	7.48

[5] Detailed procedure for calculating of the outside capital is presented in: T.Wa_niewski, W. Skoczylas, Teoria i praktyka..., op.cit., p. 330-333.

[6] E. Komajda, Koszt kapita_u w_asnego w przedsi_biorstwie, Przegl_d Organizacji No 6, 2001, p. 20-23.

Table 4: WACC - weighted average cost of capital of chemical industry, 1997-2002

Company (in %)	1997	1998	1999	2000	2001	2002
A	20.75	18.39	13.05	15.11	14.15	8.32
B	23.36	20.17	14.12	16.43	15.27	10.28
C	21.11	19.09	13.73	15.61	15.09	8.77
D	21.20	17.92	12.19	13.92	13.75	8.06
E	23.39	20.24	13.95	16.07	15.12	10.18

the debt share calculated according to the market values is usually smaller than in the case of the book values, which in turn relatively decreases its influence on cost of capital[7].

As seen on the basis of the weighted average cost of capital values presented in the table, the cost of capital decreased over the period in question. This decrease was caused by the Polish Central Bank's decision to lower interest rates.

4. Analysis and findings

In this section, we present the results of the analysis using the EVA and CVA. The results are presented in the tables 5 and 6. In Table 5 are the results for the five companies are given in Zloty (or PLN) in millions.

As the statistics in Table 5 clearly shows none of the companies generated value in any year because all the computed values are negative. This suggests that the companies generated net losses and cost the shareholders to lose their value. Existing performance indicators based on book value and profitability had shown that the companies were profitable. However, the use of a more sophisticated tool such as the EVA provides contrary results. Any market success is unlikely under this business model as the researched companies require asset

Table 5: Economic value added in five companies of heavy chemical industry, 1997-2002

Company (in mln PLN)	1997	1998	1999	2000	2001	2002
A	-140.6	-206.1	-828.4	-104.6	-253.8	-75.8
B	-263.7	-236.1	-174.8	-199.8	-176.7	-489.3
C	-125.3	-123.3	-91.8	-2.5	-1.8	-69.4
D	-19.06	-260.6	-138.7	-158.7	-141.8	-64.8
E	-134.7	-124.2	-81.8	82.2	-12.31	-89.9

[7] A. Duliniec, Struktura i koszt..., op. cit., p. 97.

Table 6: Cash added value in chemical industry companies in the years 1997-2002

Company (in mln PLN)	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
A	-92.6	-161.7	-24.3	-78.96	-213.5	-22.6
B	-206.6	-171.5	-96.25	-127.4	-173.8	-199.2
C	-90.6	-71.5	-16.7	15.5	-131.3	-61.6
D	-141.6	-186.1	-116.4	-54.9	-79.97	-5.5
E	-125.9	-99.7	-56.6	-63.4	-92.1	-24.8

restructuring. This result may be due to the fact that the firms have been privatized in recent years, and it may take several years before the firms actually create added economic value, though profitability is shown to exist by using accounting measures. In the years 1997-2002, the CVA in five companies presented in Table 6 was negative. The companies failed to generate cash premium over the required value. Cash from operating activities increased by NOPAT-after-taxes became lower than the cost of capital, which would result in potential default on payments. Negative value added as shown aggravates the insolvency of the companies in the period of 1997-2002. Negative CVA is an indicator of inability to meet liabilities. A negative CVA in the last researched year indicates the need for changes in the company's business strategy which may ensure solvency and value creation.

The company's solvency assessment on the basis of relying on CVA figures indicates a sophisticated approach to this important question. CVA based on NOPAT is a short-term measure incorporating a cash dimension of a company's performance and minimum return on equity. Since its calculation includes the operating profit with depreciation, the cost of capital is included in the capital charge. It is a measure which can be used *ex post*, when based on NOPAT, as well as *ex ante* if calculated on the basis of return on equity or investment. Positive cash value added allows the company to meet its liabilities and create shareholder value or in other words, achieve solvency. The negative CVA translates into default on liabilities, which is insolvency.

The EVA and CVA approaches used to assess company's performance led us to identify the lack of effective management in Poland. Further, it enabled the researchers to address the question of insolvency and value destruction in the five-year period tested. Both measures have been useful in helping us produce robust results. The application of both EVA and CVA to Polish companies enabled the researchers to address issues beyond the traditional accounting measures of performance. Certain issues pertaining to methodology needed had to be simplified: some problems regarding calculation of the cost of capital needed to be addressed. Adopting accumulated rather than annual depreciation in calculating the cash value added assisted in the research results. Measuring the cost of capital in Polish economy may cause distortions thus introducing potential errors into the computations, which in turn may create conditions for controversy of the results reported.

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5. Conclusions

The aim of the article is to present two measures for assessing company value. Those measures may be useful alternative to the use of accounting measures. The theoretical section of the article presents the economic value added and the cash value added measures as well as differences and similarities in their interpretations. The empirical section contains an EVA and CVA assessments in five largest fertiliser companies. Both measures indicate a lack of value generation in the companies in question.

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