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THE USE OF MARKET VALUE ADDED IN PERFORMANCE EVALUATION OF INVESTMENT CENTRES

Summary: The paper deals with the use of market value added in performance evaluation of investment centres. In the first part the essence of market value added is briefly depicted. Furthermore, the major value creation drivers affecting MVA are identified: return on sales, capital requirements in an investment centre, weighted average cost of capital and divisional growth. In the second part the relationships among these factors are examined and finally their impact on market value added generated in an investment centre is analyzed.

Key words: investment centre, responsibility accounting, market value added.

1. Introduction

Achieving goals of modern companies is possible due to the decentralization of managerial tasks and delegation of responsibilities. This approach to management in large, diversified organizations involves translating strategy from the top level in the organizational hierarchy to the lower levels and cascading superior objectives across various internal divisions known as the responsibility centres. In practice this kind of transformation is possible by means of responsibility accounting. Taking into account that the most important goal of any company is to create value for its shareholders, it is worth analyzing value creation in responsibility centres and examining their impact on the value of the company as a whole. It means that there is a need for detailed study of the areas in which value is created and those in which value is destroyed. Due to the fact that the value creation process involves the investment process, the performance evaluation in respect of value creation should be done primarily in the investment centres.

There are four main goals of the paper:

- 1) to establish the general formula, describing the relationship between market value added and four value creation drivers;
- 2) to derive from the general formula the condition for positive market value added;

3) to explain when market value added is positive and when market value added is negative;

4) to explain the differences in market value added in investment centres with positive and negative MVA.

The thesis of the article is that managers should analyze not only profitability and growth, but also capital requirements and cost of capital. All the factors should be analyzed simultaneously, because some of them may demonstrate harmful effects on the divisional value and as a consequence company value. The methodology adopted in the paper includes deductive reasoning based on numerical rearrangements and case study approach.

2. The essence of market value added

Market value added (MVA) is used to evaluate whether a company has created or destroyed value from the point of view of investors. In order to figure out market value added the market value of the company's total capital, both equity and debt capital, should be compared with the amount of capital employed. Thus market value added is the difference between the market value of a company and book value of invested capital:

$$MVA = MV - IC \quad (1)$$

where: *MVA* – market value added,

MV – market value of the company's total capital,

IC – book value of invested capital at time 0.

It is possible to transform the formula (1) into the following equation¹:

$$MVA_{t-1} = \sum_{t=1}^{\infty} \frac{EVA_t}{(1 + WACC)^t} \quad (2)$$

Economic value added is a single-period measure that is estimated using past accounting data and market value added is based on forward-looking stock prices and can be used to explain cross-sectional stock returns as a relative measure of valuation. Thus three explanations can be offered for MVA as a determinant of stock returns [Yook, McCabe 2001].

1. Market value added is a proxy for risk that affects equilibrium of expected returns.

2. Low MVA indicates that a firm did not effectively invest capital in the past, but will achieve above-average growth in the future as the mean-reverting hypothesis indicates. The firm can increase market value by developing appropriate strategic changes (for example, be acquired by another firm).

¹ For further elaboration see: [Nita 2007, p. 118] and [Cwynar, Cwynar 2002, p. 180-184].

3. If the market is temporarily underestimating firm's market value, this would lead to low MVA. Low MVA stock price is depressed compared to potential, and thus buying low MVA stocks should yield large excess returns in the future.

Market value added for the company as a whole can be broken down across various investment centres. The general idea of this decomposition is depicted in Figure 1. The main objective of such disaggregation is to examine whether a particular division, treated as the investment centre, creates value or destroys value from the point of view of entire organization.

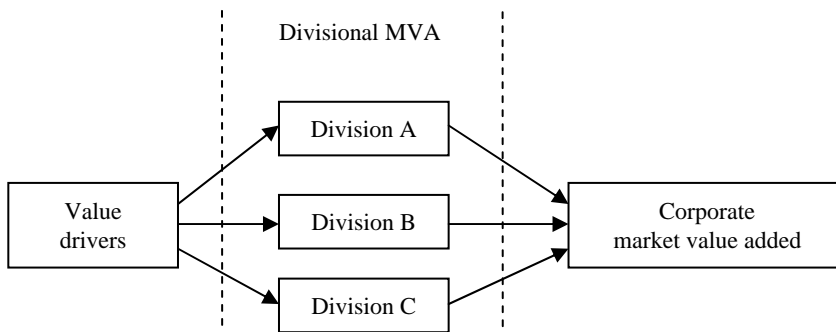


Figure 1. Divisional performance in respect of market value added

Source: author's own.

Market value reflects the market's opinion on how successful managers have been in investing the capital entrusted to them. Thus the higher the market value added, the better. Negative market value added means that the value of the investments undertaken by management is less than the capital contributed to their companies by the capital markets. This means that the shareholders' wealth has been destroyed. MVA increases only when invested capital earns a rate of return on invested capital greater than the cost of capital rate. Market value added is consistent with net present value and when newly raised capital is invested in value creating projects in terms of NPV, market value added increases. On the contrary, if the capital is invested in value destroying projects, market value added is reduced [Young, O'Byrne 2001, p. 29-30].

3. Value creation drivers and MVA in investment centres

In order to explain the use of market value added in the assessment of investment centre's performance it is needed to identify the basic factors affecting this metric. Traditionally, investment centres are monitored by means of rate of return on investment (ROI). Thus we can make an assumption that the two critical value drivers influencing market value added are capital employed and net operating profit after

taxes. These categories should be measured in relation to sales. The relationship between operating income and sales can be expressed in the following way:

$$ROS_t = \frac{NOPAT_t}{S_t} \quad (3)$$

where: ROS_t – rate of return on sales in period t ,
 $NOPAT_t$ – net operating profit after taxes in period t ,
 S_t – revenues from sales in period t .

Capital requirements of an investment centre can be expressed by means of the formula:

$$CR_t = \frac{IC_t}{S_t} \quad (4)$$

where: CR_t – capital requirements in period t ,
 IC_t – invested capital in period t .

Both measures are very useful to describe the investment centre's performance, because a manager of this centre is responsible for its operating costs and revenues as well as invested capital. The capital invested is the sum of net operating working capital and operating long term assets. Net operating working capital is the difference between operating current assets and operating current liabilities. Thus net operating working capital can be computed in the way shown in Figure 2.

As market value added represents value created over many years, it is needed to make an assumption in respect of the growth rate and cost of capital. Finally there are four basic value drivers affecting market value added: growth rate, weighted average cost of capital, return on sales and capital requirements. To evaluate the impact of those factors on market value added we need to quantify the relationship of MVA and all value drivers.

1		Cash
2		Accounts receivable
3		Inventories
4	[1] + [2] + [3]	Operating current assets
5		Accounts payable
6		Accruals
7	[5] + [6]	Operating current liabilities
8	[4] - [7]	Net operating working capital

Figure 2. Computation of net operating working capital

Source: author's own.

Taking into consideration the formula (2), illustrating the relationship between economic value added and market value added, it is possible to apply the formula for the present value of annual constant growth perpetuity and as a consequence to show MVA metric in the following way:

$$MVA_{t-1} = \frac{EVA_t}{WACC - g} \quad (5)$$

where: g – constant growth rate.

Economic value added is the difference between net operating profit after taxes and total cost of capital (capital charge); thus we can rewrite the equation (5):

$$MVA_{t-1} = \frac{NOPAT_t - WACC \times IC_{t-1}}{WACC - g} \quad (6)$$

Net operating profit after taxes in the current period is profit from the prior period increased by the constant growth rate. Thus the formula describing market value added in the current period may be rearranged to the following equation:

$$MVA_t = \frac{NOPAT_t \times (1 + g) - WACC \times IC_t}{WACC - g} \quad (7)$$

After further rearrangements and multiplying both nominators and denominators by revenues from sales we obtain the following equation for market value added:

$$\begin{aligned} MVA_t &= \frac{NOPAT_t \times (1 + g)}{WACC - g} - \frac{WACC \times IC_t}{WACC - g} = \frac{S_t \times (1 + g)}{WACC - g} \times \frac{NOPAT_t}{S_t} - \frac{S_t \times (1 + g)}{WACC - g} \times \\ &\times \frac{WACC \times IC_t}{S_t \times (1 + g)} = \frac{S_t \times (1 + g)}{WACC - g} \times \left(\frac{NOPAT_t}{S_t} - \frac{WACC \times IC_t}{S_t \times (1 + g)} \right) \end{aligned}$$

Finally, to see how the identified value drivers affect market value in the investment centre we can express market value added as a product of multiplication of the two components (compare in: [Brigham, Daves 2010, p. 380]):

$$MVA_t = \left(\frac{S_t \times (1 + g)}{WACC - g} \right) \times \left(ROS_t - WACC \times \frac{CR_t}{(1 + g)} \right) \quad (8)$$

The formula (8) can be explained in an easy way by means of Figure 3 that shows market value added in terms of the value drivers.

It turns out from Figure 3 that the total market value is the sum of the invested capital and market value added. MVA is a product of two components. The first component represents the present value of the increasing sales at the constant growth rate, discounted back to the present using weighted average cost of capital. Actually it is the market value added of a division that never requires any capital to be invested

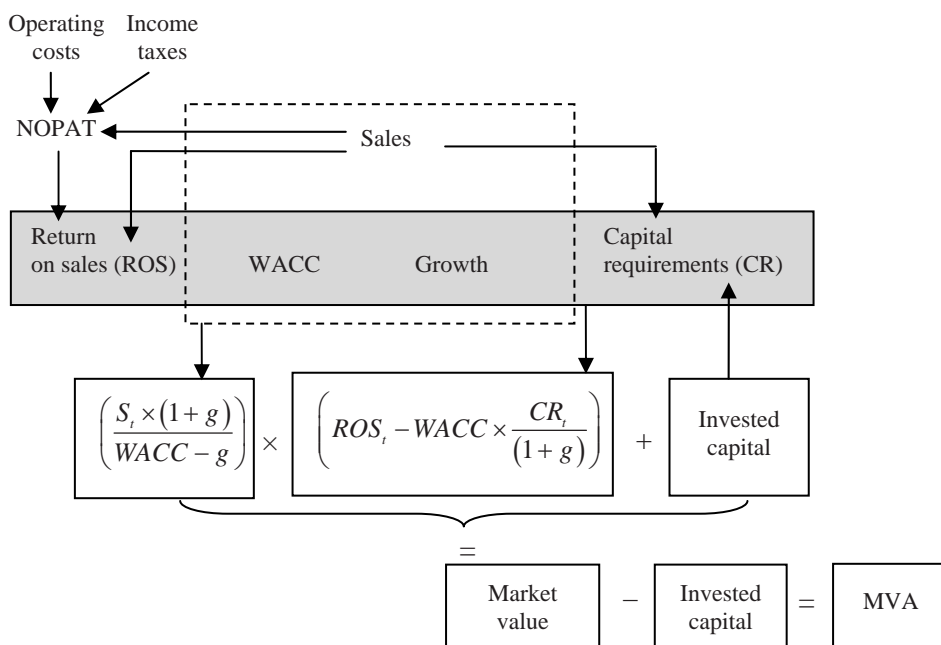


Figure 3. The impact of value creation drivers on market value added in the investment centre

Source: author's own.

and does not incur any operating costs. Obviously this situation does not happen in real life and the effect of costs and additional investment is represented by the second component.

It turns out that, providing the constant growth rate, market value added increases if return on sales, i.e. operating profitability, increases and on the other hand if capital requirements and weighed average cost of capital decrease.

4. Case study

The objective of this case study is to explain performance assessment by means of market value added in two investment centres. Table 1 presents the basic assumptions in respect of return on sales, capital requirements, growth rate and weighted average cost of capital as well as the final results of market value added calculation. For each division there are two alternatives under consideration that differ with regard to the growth rate. Market value added was computed by means of the formula (8).

It turns out that division B demonstrates strong positive market value added for the two cases and the higher grow rate causes market value added to be greater by 540 thousand zlotys. Division A has much higher capital requirements and as a result market value added for this division becomes negative and even smaller if the growth

Table 1. Market value added in respect of return on sales and capital requirements

Specification	Division A		Division B	
	Return on sales	8%	8%	6%
WACC	12%	12%	12%	12%
Capital requirements	75%	75%	20%	20%
Growth rate	4%	6%	4%	6%
MVA (in thousands zł)	-255.0	-260.0	1440.0	1980.0

Source: author's own.

rate increases from 4% to 6%. In order to explain the differences observed in this analysis, we should compute the rate of return on investment for each division according to the formula:

$$ROI_t = \frac{NOPAT_{t+1}}{IC_t} \quad (9)$$

The rate of return on invested capital is calculated in Table 2. Both divisions have the same weighted average cost of capital of 12%. The rate of return on capital employed in division A is less than WACC, so the division should postpone growth efforts until it improves the return on investments by reducing capital requirements, by for example reducing working capital and improving profitability expressed by means of rate of return on sales ROS. The rate of return on capital in division B is greater than WACC, so the division may expand its operations and continue with its future plans.

Table 2. Market value added in respect of ROI

Specification	Division A		Division B	
	Capital (in thousands zł)	2 250.00	2 250.00	600.00
Growth	4%	6%	4%	6%
Sales (in thousands zł)	3 120.0	3 120.0	3 120.0	3 180.0
NOPAT _{t+1} (in thousands zł)	249.6	254.4	187.2	190.8
ROIC	11.1%	11.3%	31.2%	31.8%
MVA (in thousands zł)	-255.0	-260.0	1 440.0	1 980.0

Source: author's own.

Thus, the difference between the rate of return on capital and weighted average cost of capital affects heavily market value added in a similar manner as in the case of economic value added.

In order to derive the condition for positive market value added one may transform the general formula (8). Taking into account the general formula (8) and making the

assumption that weighted average cost of capital (WACC) is greater than growth rate (g) in a very easy way it is possible to draw a conclusion that market value added is greater than zero if:

$$ROS_t > WACC \times \frac{CR_t}{(1+g)} \quad (10)$$

As a next step we can rearrange formula (10) by replacing return on sales and capital requirements in the following way:

$$\frac{NOPAT_t}{S_t} > WACC \frac{\frac{IC_t}{S_t}}{(1+g)} \quad (11)$$

Straightforward transformation draws to the following relationship:

$$\frac{NOPAT_t(1+g)}{IC_t} > WACC \quad (12)$$

Finally it turns out that market value added is positive if:

$$ROI_t > WACC \quad (13)$$

If relationship (13) is true market value added is positive, on the contrary – if relation (13) is not true, market value added is negative or equals zero.

It is possible to draw the same conclusion by taking into consideration formulas (7) and (9). The impact of this economic spread (ROI – WACC) on market value added can be proved by the following rearrangements:

$$\begin{aligned} MVA_t &= \frac{NOPAT_t \times (1+g) - WACC \times IC_t}{WACC - g} = \frac{NOPAT_{t+1} - WACC \times IC_t}{WACC - g} \\ &= \frac{ROI_t \times IC_t - WACC \times IC_t}{WACC - g} \end{aligned}$$

Finally, it turns out that market value added can be also expressed in the following way:

$$MVA_t = \frac{IC_t \times (ROI_t - WACC)}{(WACC - g)} \quad (14)$$

Formula (14) indicates that market value added depends on the spread between expected return on invested capital and the weighted average cost of capital. If ROI is greater than WACC, then the rate of return on capital employed is greater than the rate of return inventors expect, and as a result a division creates value for the entire organization and its shareholders. In this situation, an increase in growth rate (g) increases value. If ROI is equal to WACC, then the division is breaking even from the point of view of value creation. Division A demonstrates positive

incomes and cash flows, but these cash flows are just sufficient to satisfy investors, causing value to exactly equal the amount of capital that has been provided by investors. If the rate of return on invested capital is less than WACC, the economic spread is negative, a division is destroying value and as a consequence growth is harmful. The faster the growth, the lower the division's value (compare: [Brigham, Daves 2010, p. 380-381]).

The above rearrangements explain when market value added is positive and when negative as well as they explain the differences in market value added in the investment centres with positive and negative MVA. In the case study the return on investment was higher than the weighted average cost of capital in division B and this is the explanation why market value added in division B is positive. In division A the rate of return on investment is lower than WACC, so MVA is negative regardless of the growth rate. The differences in division with negative and positive market value added depend on the growth rate provided that the other factors remain the same. This is why MVA in division A with the growth rate of 6% is less than MVA in the same division, provided that the growth rate is just 4%.

5. Conclusion

On the basis of the above considerations and presented case study it has been shown that the market value added can be calculated across division in large diversified organizations. It has been explained that four basic value drivers affect market value added generated in an investment centre: rate of return on sales, capital requirements, growth rate and weighted average cost of capital. It turns out that in a division with negative economic spread between the rate of return on invested capital and WACC, increasing growth rate is harmful in respect of market value added. Large capital requirements have also negative impact on value creation, so divisional managers should take into account all the value creation drivers. Thus in practice managers should avoid focusing only on profitability and growth, because although the growth rate and expected rate of return on sales may be significant, a division may destroy its value and decrease value of the company as a whole.

Literature

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ZASTOSOWANIE RYNKOWEJ WARTOŚCI DODANEJ W OCENIE DOKONAŃ OŚRODKÓW ODPOWIEDZIALNOŚCI ZA INWESTYCJE

Streszczenie: Opracowanie dotyczy problemów wykorzystania rynkowej wartości dodanej w ocenie ośrodków odpowiedzialności za inwestycje. W pierwszej części artykułu zwięźle przedstawiono konstrukcję rynkowej wartości dodanej. Następnie zidentyfikowano podstawowe czynniki kreowania wartości z punktu widzenia miernika MVA. Zaliczono do nich rentowność sprzedaży, wymagania kapitałowe centrum inwestycji, koszt kapitału oraz stopę wzrostu. W drugiej części zbadano zależności zachodzące między tymi czynnikami oraz poddano analizie ich wpływ na rynkową wartość dodaną generowaną w centrum inwestycji.