



## **A Note on Economic Value Added (EVA)**

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# 1. What is EVA?

EVA is a practical refinement of economists' concept of residual income - the value remaining after a company's stockholders and all the other providers of capital have been compensated.<sup>3</sup> EVA is a performance measure and, when linked to management pay, provides a strong incentive for managers to select and implement value-creating investments.

In the late 1980s Joel Stern and G. Bennett Stewart III of the New York consulting firm Stern Stewart & Co. introduced the Economic Value Added (EVA<sup>4</sup>) performance measure. EVA is based on the idea of economic profit (also known as residual income): A company creates value when a certain investment project covers all operating costs and the cost of capital. EVA does not only consider the most visible type of cost – interest – but also the cost of equity. Only if the rate of return on capital is higher than the cost of capital, value is being created and the demands of capital markets are fulfilled. Using EVA for investment decisions arrives at the same investment decision as using free cash flows.<sup>5</sup> EVA's advantage is that it can be used for periodic performance evaluation and for management compensation, whereas Net Present Value applies to the whole period of the investment.

EVA is an absolute measure, based on accounting numbers. Besides there are absolute measures based on cash flows like CVA (Cash Value Added), and rate-of-return measures like ROI and ROCE (which are based on accounting numbers) and CFROI (based on cash flows).

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<sup>3</sup> See Hatch (1996), p2.

<sup>4</sup> EVA® is a registered trademark of Stern Stewart & Co.

<sup>5</sup> This effect is called Preinreich-Lücke-theorem.

## 2. Calculating EVA

To calculate EVA we need accounting figures from the balance sheet and the income statement. There have to be done some adjustments.<sup>6</sup> The EVA represents the company's profit after full cost of capital and is calculated as follows:

Calculation of EVA	
Net sales	
- Operating expenses	
=	Operating profit (EBIT, Earnings before Interest and Tax)
- Taxes	
=	Net operating profit after tax (NOPAT)
- Capital charges (Invested capital · cost of capital)	
=	EVA

NOPAT is net operating profit after tax and measures the profits the company has generated from its ongoing operations. It is similar to EBIT (Earnings before Interest and Tax, a common starting point in analysts' valuation models) less taxes. EVA can be interpreted as a company's NOPAT less the capital charges. Capital charges equal the company's invested capital times the weighted-average cost of capital (WACC). WACC equals the sum of each component of capital – short-term debt, long-term debt and shareholders' equity – weighted for its relative proportion, at market value, in the company's capital structure:

$$WACC = \frac{D}{D + E} \cdot i \cdot (1 - t) + \frac{E}{D + E} \cdot r$$

where  $i$  is the average interest rate,

$r$  is the required return on equity,

$t$  is the tax rate,

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<sup>6</sup> See p5 of this note.

D is the amount of debt capital,  
and E is the amount of equity capital.

Invested capital equals the sum of shareholders' equity, all interest-bearing debt and long-term liabilities. The underlying assumption is that the corporation is charged by its investors for the use of capital through a notional line of credit that bears interest at a rate of WACC. This capital charge is the minimum return necessary to compensate all the firm's capital providers for the risk of the investment. If managers do not consider this type of cost, they tend to choose investment projects which destroy wealth. This is the case if the rate of return on capital is lower than the cost of capital.

To find out strategies for companies to increase their EVA and create shareholder value, we have to transform our formula of EVA:

$$\mathbf{EVA = NOPAT - invested\ capital \cdot WACC}$$

$$\frac{EVA}{invested\ capital} = \frac{NOPAT}{invested\ capital} - WACC$$

$$\frac{NOPAT}{invested\ capital} = \text{RONA (Return On Net Assets)}$$

$$\mathbf{EVA = (RONA - WACC) \cdot invested\ capital}$$

EVA can also be calculated by taking the spread between the rate of return on net assets and the weighted average cost of capital, multiplied by the invested capital.

This definition shows us different strategies to increase EVA:

- Increasing returns on existing capital (while holding WACC and invested capital constant)
- Reductions in the cost of capital (WACC)
- New investments that earn returns greater than the WACC (profitable growth)

- Divestment of value-destroying activities (the reduction in invested capital will be more than compensated for by the greater spread between RONA and WACC)
- Sustain the competitive advantage (technological or cost leadership, for example) which enables the company to generate above-normal returns (RONA > WACC), for a longer period

### 3. The Major Accounting Adjustments

By calculating EVA a corporation's true economic profit should be visible. As economic profits differ from accounting profits, some adjustments have to be done: the EVA calculation attempts to adjust the accounting conversions that distort the measurement of true economic performance and evaluation. Adjustments can be classified into four categories<sup>7</sup>:

- Operating conversions

The objective of Operating Conversions is to eliminate all non-operating assets, such as real estate and non-operative plants.

- Funding conversions

Funding Conversions are used to adjust the invested capital for the leverage effect (operating leases) and the interest free short-term liabilities.

- Tax conversions

Tax Conversions constitute the adjustment for tax expenses. The tax-savings effect for debt has to be considered.

- Shareholder conversions

Shareholder Conversions involve adjustments to determine the economic value of equity. Expenses that encourage the future earning power such as cost for research and development, advertising, goodwill which has not yet been considered as well as expenses for training and further education are capitalized.

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<sup>7</sup> For more adjustments see Young/O'Byrne (2001) chapter 6.



## 4. Example of Calculating EVA

As an accounting manager of a company you have to calculate the company's EVA for the year 2007. Assume cost of capital of 10 % and a corporate tax rate of 35 % to calculate the tax shield on income taxes.

### Income Statement 2007:

Sales	1.900.000
Cost of Sales	1.200.000
Selling, general and administrative	300.000
Research and development	106.000
<b>Operating income</b>	<b>294.000</b>
Interest income	1.800
Interest expense	37.800
<b>Income before taxes</b>	<b>258.000</b>
Provision for income taxes	90.300
<b>Net income</b>	<b>167.700</b>

Balance Sheet for Year Ended December 31, 2007:

<b>ASSETS</b>	<b>2006</b>	<b>2007</b>
<b>Current assets</b>		
Cash and cash equivalents	30.000	60.000
Accounts receivable – net	250.000	250.000
Inventories	300.000	290.000
Other current assets	120.000	150.000
<b>Total</b>	<b>700.000</b>	<b>750.000</b>
<b>Property, plant, and equipment</b>		
Buildings	350.000	250.000
Machinery and equipment	800.000	1.100.000
<b>Total</b>	<b>1.150.000</b>	<b>1.350.000</b>
Accumulated depreciation	250.000	300.000
<b>Total net</b>	<b>900.000</b>	<b>1.050.000</b>
<b>TOTAL ASSETS</b>	<b>1.600.000</b>	<b>1.800.000</b>

<b>LIABILITIES</b>	<b>2006</b>	<b>2007</b>
<b>Current liabilities</b>		
Short-term debt	50.000	80.000
Trade accounts payable	200.000	220.000
Accrued expenses	200.000	200.000
Other current liabilities	150.000	160.000
<b>Total</b>	<b>600.000</b>	<b>660.000</b>
<b>Long-term liabilities</b>		
Long-term debt	370.000	420.000
Other long-term liabilities	120.000	130.000
<b>Total</b>	<b>490.000</b>	<b>550.000</b>
<b>Shareholders' equity</b>		
Common stock	250.000	250.000
Retained earnings	260.000	340.000
<b>Total</b>	<b>510.000</b>	<b>590.000</b>
<b>TOTAL LIABILITIES</b>	<b>1.600.000</b>	<b>1.800.000</b>



*[You will find a similar calculation of an EVA number in chapter 2, page 56 of Young and O'Byrne (2001) for the company Harnischfeger.]*

**Some “definitions”:**

Invested capital = Total assets – non-interest-bearing liabilities (NIBL)

With NIBL = total current liabilities – short-term debt

**NIBL** are short-term liabilities with zero cost of capital. In the case of supplier credits this might be questionable. But the financing cost for supplier credit is already included in the cost of sales.

Invested capital = long-term assets + short-term assets – NIBL

Invested capital = long-term assets + working capital requirement (WCR)

Sometimes the **WCR** doesn't include the whole cash position of the company but only the “operating cash” (cash hold for operating activities of the company). The rest of the company's cash position is called “excess cash” (cash not necessary for the company's operating activities). In this case, the excess cash has to be taken into account separately: Invested capital = long-term assets + WCR + excess cash.

Example: A Company needs 20' € cash for its operating activities (for example cash in a supermarket) but has cash worth 50' €. The WCR includes only the 20' € necessary for operating activities. Excess cash = 30' €.

**Calculating the invested capital:**

$WCR_{2006} = \text{current assets} - \text{NIBL} = 700.000 - (600.000 - 50.000) = 150.000$

Inv. capital<sub>2006</sub> = long-term assets + WCR = 900.000 + 150.000 = 1.050.000

Inv. capital<sub>2007</sub> = total assets – NIBL = 1.800.000 – (660.000 – 80.000) = 1.220.000

Average inv. capital = (1.050.000 + 1.220.000)/2 = 1.135.000

Capital charges = 10 % · 1.135.000 = 113.500

### Calculating NOPAT and EVA:

Operating income	294.000
+ interest income	+ 1.800
– provision for income taxes	– 90.300
– tax shield (= 37.800 · 0,35)	– 13.230
<b>= NOPAT</b>	<b>192.270</b>
– capital charges	113.500
<b>= EVA</b>	<b>78.770</b>

## 5. Benefits and limitations of using EVA

With the EVA as a performance measure, it is quite easy to see if a particular company, division or project is creating or destroying shareholder value. Traditionally, different measures like profitability ratio, asset utilization ratios and operating ratios have been used to evaluate performance. EVA makes managers focus their efforts on shareholder value. The simplicity of EVA makes it applicable to almost every corporation. In addition, EVA is a powerful tool for creating strong, sustainable, and cost-efficient incentives for managers' compensation.<sup>8</sup> As an empirical survey shows, EVA is the most important performance measure for

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<sup>8</sup> See Young/O'Byrne (2001) p133.

Germany's DAX100 companies. The popularity has been increasing in the last decade.<sup>9</sup>

Performance measure	1999/2000	2002/2003
EVA (and similar versions)	39 %	54 %
DCF	4 %	9 %
CVA (and similar versions)	3 %	7 %
CFROI (and similar versions)	3 %	5 %
ROE	9 %	6 %
RORAC, RAROC	4 %	1 %
ROI, RONA, ROIC, ROCE	22 %	6 %
ROS and other profitability ratios	2 %	3 %

The numerous accounting adjustments to correct for the perceived inadequacies of standard financial reporting practice can make the calculation of EVA complicated. As there are no generally-accepted rules who tell us which of the adjustments have to be made, the results may differ and the EVA of one company might not be comparable to another corporation's EVA.<sup>10</sup>

## 6. Frequently Asked Questions

### **Does EVA really reflect value creation during a period?**

Yes and no. The sum of all future discounted EVAs reflects the Market Value Added (MVA). Together with the assets in place, we have the market value of a company. However, one should bear in mind, that EVA calculations are based on accounting numbers. If they do not correctly reflect value creation (e.g., expensing R&D), then EVA cannot be better than the underlying accounting figures without adjustments. Hence, be careful when interpreting EVA as the correct amount of value that has been created during a year.

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<sup>9</sup> See Aders/Hebertinger (2003) p15.

<sup>10</sup> See Weaver (2001).

**Is the sum of the segments' EVAs equal to the company's EVA?**

Yes, if two conditions are fulfilled. First, segments have to be consolidated properly. Second, the company's EVA must not include additional adjustments at the corporate level. In this case, the company's EVA equals the sum of the segments' EVAs.

**What is the right cost allocation procedure, if companies have significant joint resources?**

Calculating EVA at the divisional level requires the allocation of costs of joint resources, like for instance IT systems. Allocating these costs to divisions or segments is always arbitrary and depends on the purpose of the allocation procedure. While the literature has developed procedures that have been proven to be optimal under certain circumstance, for practical purposes, it is frequently important to find an allocation procedure that is acceptable for all divisions. Distributing costs equally to the divisions can be a solution, if the joint resource is used equally by the divisions. If the sizes of the divisions are different or if divisions make different use of joint resources, an allocation procedure that is based on divisional size or usage might be better. If the usage of the joint resource can be properly measured, transfer prices might be a solution.

**What is the "best" value-based performance metric?**

There is no clear answer to this question. The main advantage of all value-based performance metrics is that they take into account some form of cost for using capital. This is the main departure from financial accounting numbers, where only cost of debt is considered. The profit impact of this change is huge. Assume that a company with assets of € 10 billion is financed 50 % with equity and 50 % with debt. If the cost of equity is 10 %, then the difference between EVA and net income would be € 500 million (50 % x € 10 bn x 10%). Compared to that, differences *between* different value-base performance metrics are relatively low in most cases. Hence the question regarding the best value-based performance metric is of lower importance compared to the question whether or not to apply a value-based performance measure.

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