CHAPTER 3

EVA AND MVA AND ADJUSTMENTS TO FINANCIAL STATEMENTS TO REFLECT VALUE CREATION

3.1 INTRODUCTION

The concept of economic profit was introduced in Chapter 2 and it was explained why it was preferred to accounting profit as a shareholder value performance measure. Applying this cash flow based view of performance measurement, the concepts of EVA and MVA were developed in order to reflect corporate performance more accurately. These two concepts are described and explained in this chapter. Different approaches or equations are used where possible in order to gain different perspectives on the subject, and the link between EVA and MVA is explained. The chapter shows that MVA is basically the present value of all the EVA that a company is expected to generate in future.

The discussion of EVA and MVA is followed by an overview of the latest research supporting EVA as the best internal determinant of MVA. After initial strong support for EVA and MVA, researchers and practitioners who argue that claims of the superiority of EVA and MVA are unfounded have increasingly begin to criticize these concepts.

A summary of the most important benefits of the implementation of an EVA system is given and in conclusion there is a discussion of some criticisms offered by different researchers and practitioners on EVA as a measure of shareholder value creation.

3.2 DEFINITION OF EVA AND MVA

A company's total market value is equal to the sum of the market value of its equity and the market value of its debt. In theory, this amount is what can be "taken out" of the company at any given time. The MVA is the difference between the total market value of the company and the economic capital (Firer, 1995:57, Reilly and Brown, 2003:591). The economic capital, also called IC, is the amount that is "put into" the company and is basically the fixed assets plus the net working capital.

MVA = Market value of company – IC

From an investor's point of view, MVA is the best external measure of a company's performance. Stewart (1991:153) states that MVA is a cumulative measure of corporate performance and that it represents the stock market's assessment from a particular time onwards of the NPV of all a company's past and projected capital projects. The MVA is calculated at a given moment, but in order to assess performance over time, the difference or change in MVA from one date to the next can be determined to see whether value has been created or destroyed.

EVA is an internal measure of performance that determines MVA. Stewart (1991:153) defines EVA as follows: "A company's EVA is the fuel that fires up its MVA." EVA takes into account the full cost of capital, including the cost of equity. The concept of EVA is a measure of economic profit and was popularized and originally trade-marked by Stern Stewart Consulting Company in the 1980's.

The calculation of EVA is very similar to that of the well-known "residual income" measure used as a benchmark of divisional performance for some time. Horngren, Datar and Foster (2003:790) and Garrison, Noreen and Seal (2003:616) compare EVA to residual income and other performance measures and describe the growing popularity of EVA.

EVA is calculated as follows:

EVA = (ROIC – WACC) x IC

where

ROIC = Return on invested capital
WACC = Weighted Average Cost of Capital
IC = Invested Capital (at the beginning of the year)

The ROIC minus the WACC is also called the "return spread". If the return spread is positive, it means the company is generating surplus returns above its cost of capital and this translates into a higher MVA. Lehn and Makhija (1996:34) describe EVA as follows: "EVA and related measures attempt to improve on traditional accounting measures of performance by measuring the economic profits an enterprise – after-tax operating profits less the cost of the capital employed to produce those profits."

Millman (2003:40) refers to the difference between accounting profits and EVA as follows: "GAAP ignores the cost of capital, the money that stockholders have invested in a company. EVA, by contrast, measures success as delivering a return above the cost of capital."

EVA can also be defined as the difference between the net operating profit before interest, but after tax (NOPAT) and a capital charge based on the WACC multiplied by the IC:

EVA = NOPAT – (WACC x IC)

The link between MVA, the cumulative measure, and EVA, which is an incremental measure, is that MVA is equal to the present value of all future EVA to be generated by the company.

MVA = present value of all future EVA

So, for example, Company Z has invested capital amounting to R100 million at the beginning of the year. This is financed by 60% equity and 40% debt. The debt has an interest rate of 12% before tax. The tax rate is 30% and the WACC 15%. The net income for the year before interest and tax is R30 million.

ROIC is R30 million / R100 million x (1 – tax rate of 30%) = 21%.

EVA = (ROIC – WACC) x IC
= (21% - 15%) x R100 million
= 6% x R100 million
= R6 million

Applying the second formula given for EVA, the result is the same:

EVA = EBIAT – (WACC x IC)
= R21 million – (15% x R100 million)
= R6 million

where

EBIAT = Earnings before interest, after adjusted tax

If the future EVAs are expected to remain indefinitely at R6 million per year, the MVA can be calculated as follows:

MVA = EVA / WACC
= R6 million / 15%
= R40 million

If the future EVA is expected to improve, the present value of the future improvement in EVA can be defined separately. For the majority of new companies, the biggest component of their current value will be the "future growth value" (FGV). Stern *et al*. (2001:214) define total value as follows:

Total value = Capital + PV (EVA)
= Capital + EVA/c + PV (Expected improvement)
= COV + FGV

where

PV	=	Present value
c	=	Cost of capital
COV	=	Current Operations Value
FGV	=	Future Growth Value

The formula above basically replaces MVA with the present value of future EVA and then splits the PV (EVA) into two components: the current portion of EVA added to invested capital to give COV and the future growth portion of EVA called FGV. This specific formula is useful when new companies are evaluated, as they may not necessarily have a high current EVA, but do have a high future expected EVA.

Adsera (2003:82) has suggested an adjustment to the EVA to value start-up companies that typically destroy value before they create it. He points out that these companies may be very valuable and that an appropriate valuation model should take into account changes in financial structure and a drop in the cost of debt once financial risk diminishes and the company matures.

Berry (2003:95) discusses the application of EVA in the IT environment where investments with an initial negative EVA, combined with strong expectations of a positive future EVA are typical. He points out the difficulty of quantifying and justifying the returns from IT investments in such a way that they are ”intellectually honest.”

The use of the formula Value = COV + FGV provides new insights regarding market expectations, because the market value of listed companies is available and their COV can be determined after calculating the current EVA. Eedes (2001:4) points out that if the market value is higher than the COV, this indicates that the FGV is positive and that the market has a positive expectation about future EVA growth.

This assertion is borne out by the example of the local company M-Cell, which had a market value of R46,9 billion on 31 December 2000. It had a COV of R7,8 billion and an FGV of R39,1 billion. The high (positive) proportion of the FGV relative to the market value of 83% indicates that the market had very high growth expectations for M-Cell's future EVA. In a follow-up survey by Eedes (2002:2), the FGV ratio to market value for M-Cell was found to be 63%. This was perhaps due to the increase in market price and an adjustment of market perceptions regarding M-Cell's future EVA growth.

Eedes (2001:5) also investigated companies with a negative FGV. He cites Sappi as an example of a company with a current positive EVA in 2001 and a large negative FGV. From this, he deduces that the market is not misled by a current positive EVA, but does indeed expect dramatic decreases in EVA in future.

It can also be concluded from the discussion above that there are basically only three ways in which a company can increase its MVA (Stewart 1991:137; Ernst & Young 1994:10; Firer 1995:57; Davidson 2003:49):

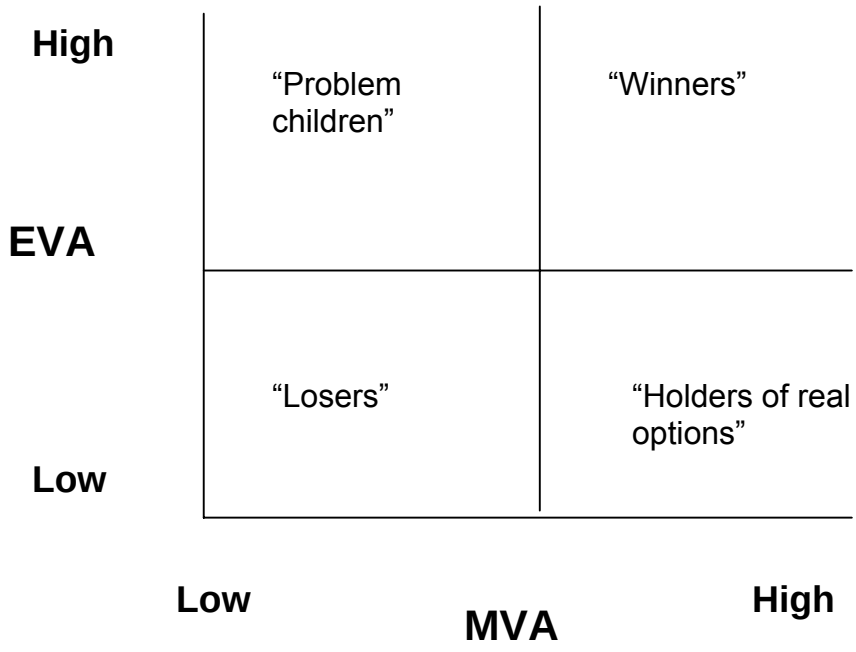
- by making new investments in projects with a positive return spread (a positive EVA);
- by expanding current projects earning a positive EVA; and
- by scaling down or eliminating projects that have a negative EVA.

If a company is not operating at its optimal financial gearing level, the WACC can be lowered by changing the proportion of debt relative to equity, so that the capital structure is closer to optimal. This also unlocks value for the company as a whole, including shareholders.

Fatemi *et al.* (2003:14) have investigated the link between the remuneration of top management and EVA and MVA. They categorize companies according to their ability to generate EVA and MVA. Companies with a high EVA and MVA are called "winners", companies with a high EVA and low MVA are "problem children", companies with a low EVA and a high MVA are "holders of real options", and

companies with a low EVA and MVA are typified as “losers”. The four categories are set out in Figure 3.1.

Figure 3.1: EVA and MVA grid



Source: Adapted from Fatemi *et al*. (2003:14)

Fatemi, *et al.* (2003:14) have found that when EVA is achieved at the expense of MVA (the “problem children” group), there is a penalty in the compensation for top management.

3.3 RESEARCH IN SUPPORT OF EVA AS A DRIVER OF MVA

3.3.1 The pioneering studies of Stewart

According to Stewart (1991:215), financial analysts Stern Stewart & Co. started tracking the best 1000 industrial and services companies in the USA in 1989 after he had become disillusioned with the rankings of the magazine *Business Week* at the time. These rankings were based on market capitalization and not on performance. Stern Stewart & Co. began to rank companies based on MVA. As they had expected, the new rankings were dramatically different from the *Business Week* rankings.

Taking the Stern Stewart 1000 companies as a point of departure and eliminating some companies for various reasons, such as incomplete information, some research was performed by Stern Stewart & Co. on the EVA and MVA of 613 companies in the USA. The companies were ranked in terms of average EVA for 1987 and 1988. The study was based on the average EVA and MVA for each of 25 groups of companies (making up the 613), as well as on changes in EVA and MVA. The groups were made up according to the rankings in terms of average EVA.

The research found that for companies with a positive EVA, there was a very high level of correlation (as indicated by r^2) between the level of EVA and the level of MVA, both for the average values used and the changes in values. The averages (per group of 25 companies) of the 1987 and 1988 EVA values showed an r^2 of 97% relative to the 1988 MVA values. The relationship for the changes in values was even better than that for the average values.

For the groups of companies with a negative EVA, the correlation between the EVA and MVA levels was not as good. Stewart's (1991) explanation for this is that the market value of shares always reflects at least the value of net assets, even if the company has low or negative returns. The potential for liquidation, recovery,

recapitalisation or a takeover sets a floor on the market value (in other words, the market value does not drop far below the net asset value).

3.3.2 Finegan's extensions of the EVA and MVA applications

Finegan (1991:36) extended the initial analysis discussed above to include other measures. He focused on the middle 450 companies (actually 467 companies out of the original 613) where the MVA's were "tightly clustered" and compared the exploratory power of EVA to that of more conventional measures such as EPS, growth in capital, return on capital and even growth in cash flow.

The results of the regression of MVA against EVA and other common performance measures showed that EVA outperformed the other measures quite considerably with an r^2 of 61% compared to the second best other measure, which was return on capital with an r^2 of 47%. The exploratory power of EVA was found to be six times better than that of growth in EPS.

Finegan (1991:36) then repeated the analysis on changes in MVA and again found EVA to be superior to the other measures. The r^2 of changes in EVA was 44% compared to an r^2 of 35% for changes in return on capital, which was the measure that came closest to EVA in terms of its explanatory power. In this analysis, the r^2 of EVA was about three times better than that of changes in EPS growth.

3.3.3 Stern's comparison of EVA with popular accounting measures

Stern (1993:36) argues that the key operating measure of corporate performance is not popular accounting measures such as earnings, earnings growth, dividends, dividend growth, ROE, or even cash flow, but in fact EVA. The changes in the market value of a selected group of companies (specifically their MVAs) were shown to have a relatively low correlation with the above accounting measures.

His research showed that the r^2 for the relationship between MVA and different independent variables ranged from 9% for turnover growth to 25% for ROE rates. In comparison, the r^2 for EVA relative to MVA was 50%. All the results were based on averages and they are set out in Table 3.1.

Table 3.1: MVA *vs*. other financial performance measures

Correlation with MVA:	**r^2**
EVA	50%
ROE	25%
Cash flow growth	22%
EPS growth	18%
Asset growth	18%
Dividend growth	16%
Turnover growth	09%

Source: Adapted from Stern (1993:36)

3.3.4 Lehn and Makhija's work on EVA, MVA, share price performance and CEO turnover

Lehn and Makhija (1996:36) conducted a study to find out how well EVA and MVA relate to share price performance and also to see whether chief executive officer (CEO) turnover (the number of new CEOs during a given period) is related to EVA and MVA. They selected 241 large US companies and gathered information about them for the four years 1987, 1988, 1992 and 1993. About two thirds of the companies were operating in the manufacturing industry.

Six performance measures were computed per company for each of the four years, namely three accounting rates of return; ROA, ROE and return on sales (ROS), share returns (dividends and changes in share price) and EVA and MVA.

Both EVA and MVA were expressed as ROE values. All six measures showed a positive correlation with share returns. EVA showed a slightly better correlation with share returns than the other measures.

Their findings regarding EVA, MVA and CEO turnover revealed that the CEOs of companies with high EVAs and MVAs have much lower rates of dismissal than CEOs responsible for low EVAs and MVAs. As expected, a strong inverse relationship was found between share prices and CEO turnover. The CEO turnover rate for companies with share returns above the median was found to be 9,6%, compared to a 19% turnover for companies with share returns below the median.

In their study of the relationship between EVA, MVA and corporate focus, Lehn and Makhija (1996:36) differentiated between companies that focus on their core business and ones that diversify and become conglomerates in the hope of exploiting economies of scale. Their research showed that companies with an above median focus earn an average share return of 31,2%. Firms with a below median focus earn 25%. These findings prove that a greater focus on business activities leads to higher levels of EVA and MVA.

Lehn and Makhija (1996:36) have concluded that EVA and MVA are effective performance measures that contain information about the quality of strategic decisions and serve as signals of strategic change.

3.3.5 O'Byrne's findings on EVA's link to market value and investor expectations

O'Byrne (1996:119) used nine years of data (for the period from 1985 to 1993) for companies in the 1993 Stern Stewart Performance 1000 to test the exploratory power of capitalized EVA (which is EVA divided by the cost of capital), NOPAT, and FCFs relative to market value divided by IC. Initial findings showed that FCF explained 0% of the change in the market value divided by the capital ratio, while

the r^2 was 33% for NOPAT and 31% for EVA. It looked as if NOPAT and EVA had almost the same explanatory power.

Two adjustments were made to the original model. The first adjustment allowed for the fact that the EVA multiples were bigger for companies with a positive EVA compared to companies with a negative EVA. The second adjustment allowed for different capital multiples for different capital sizes, in other words, a bigger multiple was used for companies with more invested capital. This adjusted model showed that EVA explained 31% of the variance in market values, compared to the 17% explained by NOPAT.

After making a further adjustment by analysing the changes in the variables, changes in EVA explained 55% of the five-year changes in market value, compared to the 33% explained by NOPAT. The corresponding figures for ten-year changes in market value were 74% explained by changes in EVA compared to 63% explained by NOPAT.

O'Byrne (1996:119) concluded that EVA, unlike NOPAT or other earnings measures, is systematically linked to the market value and that EVA is a powerful tool for understanding the investor expectations that are built into a company's current share price.

3.3.6 Uyemura *et al*.– EVA and wealth creation

Uyemura *et al*. (1996:98) used a sample of the 100 largest USA banks for the ten-year period from 1986 to 1995 to calculate MVA and to test the correlation with EVA as well as four other accounting measures, namely net income (amount), EPS, ROE and ROA. The results of their regression analysis are set out in Table 3.2.

Table 3.2: Correlation of different performance measures with shareholder wealth

Performance measure	r^2
EVA	40%
ROA	13%
ROE	10%
Net income (amount)	8%
EPS	6%

Source: Uyemura *et al*. (1996:98)

The analysis above clearly shows that EVA is the measure that correlates the best by far with shareholder wealth creation. In an alternative approach where changes in the performance measures were regressed against standardized MVA, the results were not very different. Standardized EVA (EVA divided by capital) again had an r^2 of 40%, while for ROA it was 25%, for ROE 21%, for net income 3% and for EPS 6%.

3.3.7 Grant's analysis of relative EVA and relative capital invested

Grant (1996:44; 1997:39) studied the relationship between MVA divided by capital and EVA divided by capital for 983 companies selected from the Stern Stewart Performance 1000 for 1993 and 1994. The results for 1993 showed an overall r^2 of 32% for all the companies. For the 50 largest USA wealth creators, the r^2 was 83%. For the 50 biggest USA wealth destroyers, it was only 3%.

When the same tests were repeated for 1994 it showed that the r^2 was 74% for the 50 largest wealth creators and 8% for the 50 largest wealth destroyers. This is in line with the findings of other researchers. These findings revealed a high level of correlation between MVA and EVA for companies with a positive EVA, but low levels of correlation for companies with a negative EVA.

Grant (1996) found that the real corporate profits should be measured relative to the amount of capital needed to generate that level of profitability. This insight led him to use standardized values for EVA and market value, instead of absolute values. He concluded that his empirical results indicate that EVA has a significant impact on a company's MVA. The value of a company responds to variations in both the near-term EVA outlook and movements in the long-term EVA growth rate.

3.3.8 Dodd and Chen's investigation of the explanatory power of EVA

Dodd and Chen (1996:27) used the 1992 Stern Stewart 1000 database as a starting point and added some supplementary data for the ten years from 1983 to 1992. They gathered complete data for 566 USA companies and set out to test the claim that EVA is a superior measure of shareholder value performance.

Although they did find a correlation between share returns and EVA (an r^2 of 20%), it was not as high as the r^2 of share returns and ROA, for which the r^2 was 25%. The r^2 for the other accounting measures tested, namely EPS and ROE, were very low (between 5% and 7%).

Based on the data of this large number of companies over as long a period as 10 years, it appears that EVA does not relate well to share returns. The results obtained imply that 80% of changes in share returns could not be accounted for by changes in EVA. In this specific study, and bearing in mind that unadjusted data were used, the ROA showed a better explanatory ability than EVA did.

Dodd and Chen (1996:27) also found that residual income, which is similar to EVA, except for the adjustments required to deal with the so-called accrual accounting distortions, gave results almost identical to those achieved using EVA. The r^2 of residual income relative to share returns was 19%, compared to EVA's r^2 of 20%.

Even when more complete multiple regression models were used, the results for the two measures were almost the same. The r^2 for EVA-based measures was 41%, compared to a similar r^2 of 41% for residual income based measures. Dodd and Chen concluded that EVA and residual income performance measurement systems would, in general, yield similar results.

3.3.9 Milunovich and Tsuei's study on the use of EVA and MVA in the USA computer industry

Milunovich and Tsuei (1996:111) investigated the correlation between frequently used financial measures (including EVA) and the MVA of companies in the USA computer technology industry (so-called "server-vendors") for the period from 1990 to 1995. The results of the study are set out in Table 3.3.

Table 3.3: Correlation of different performance measures with MVA in the USA computer technology industry

Performance measure	r^2
EVA	42%
EPS growth	34%
ROE	29%
Free cash growth	25%
FCF	18%

Source: Milunovich and Tsuei (1996:111)

Cleary EVA demonstrated the best correlation and it would be fair to infer that a company that can consistently improve its EVA should be able to boost its MVA and therefore shareholder value.

Milunovich and Tsuei (1996:111) argue that the relatively weak correlation between MVA and FCF is due to the fact that FCF can be a misleading indicator.

They point out that a fast-growing technology startup company with positive EVA investment opportunities and a loss-making company on the verge of bankruptcy can have similar negative cash flows. They concluded that growth in earnings is not enough to create value, unless returns are above the cost of capital. They are of the opinion that EVA works best as a supplement to other measures when one is evaluating shares and that EVA sometimes works when other measures fail.

3.3.10 Makelainen's evidence in support of EVA and related measures

Makelainen (1998:15) studied the evidence of the correlation between EVA and share prices and reviewed the work of Stewart (1991:215) and several other researchers up to 1997. However, she concentrated primarily on the study done on Finnish data by Telaranta (in Makelainen, 1998:15). Teleranta (in Makelainen, 1998:15) used 42 Finnish industrial companies, of which 26 were listed for the full period between 1988 and 1995, to test the ability of different measures to explain market movements.

Teleranta (in Makelainen, 1998:15) used MVA, market-to-book ratio and excess return on shares as dependent variables. As independent variables he used two versions of economic profit (residual income) and three versions of the Eduard-Bell-Ohlson figure (close to residual income) as well as traditional accounting based performance measures such as earnings before interest, taxation, depreciation and amortization (EBITDA), operating profit, NOPAT, net earnings and cash flow.

The results of Teleranta's (in Makelainen, 1998:15) study showed that the level of economic profit (as expressed by the r^2) explained 31% of the level of MVA. Of all the measures used by Teleranta (in Makelainen, 1998:15), economic profit was the measure closest to EVA. The next best measure was NOPAT, which explained 30% of MVA. When the changes in the measures were considered, the change in economic profit was still correlated best with changes in MVA with an r^2 of 17%. NOPAT was second best again, with an r^2 of just below 17%.

Teleranta (in Makelainen, 1998:15) concluded that economic profit was the best variable to use to explain market movements, but that there was little difference compared to other measures. Although the explanatory power revealed by his results is lower than that shown in the results of other earlier research by other researchers, the general result was more or less in line with their findings. It must also be borne in mind that Teleranta (in Makelainen, 1998:15) used data for a period that included a recession, and therefore the data included a considerable bias against EVA. Makelainen (1998:15) mentions that many Finnish corporate managers took the results of Teleranta's (in Makelainen, 1998:15) study very seriously.

3.3.11 Hall's study of the relationship between MVA and EVA for South African companies

Hall (1998:198) investigated the relationship between MVA and EVA, as well as other financial ratios such as ROA, ROE and EPS in South Africa. The study was done on the top 200 companies listed on the JSE for the period from 1987 to 1996. The sample included only industrial sector companies (financial, investment and mining sector companies were excluded). Companies with thinly traded shares were also not included in the sample, as this would have affected the reliability of the estimated WACC calculations.

Hall's (1998:198) study found relatively low correlation coefficients on the whole. The highest correlation was that between MVA and discounted EVA, with inflation adjustments to the data. He ascribes the low correlation to the fact that no distinction was being made between companies that create wealth and those that destroy wealth. He cites Grant (1997:44), who had done a similar regression exercise and found a more significant correlation after splitting his sample between the top 50 wealth creators and the worst 50 wealth destroyers.

Based on his findings that EVA shows the best correlation with MVA, Hall (1998:198) also analysed the value drivers of EVA and proceeded to do stepwise regression between EVA and a number of independent variables. The value

drivers (building blocks of EVA) contributing most to the value of EVA were found to be profit ratios such as return on capital employed (ROCE), NOPAT divided by sales, and earnings before interest and tax divided by sales. The investment rate (change in the capital employed divided into the NOPAT), WACC and the company tax rate were all found to have a meaningful impact on EVA. Interestingly, the impact of balance sheet ratios was found to be insignificant.

Hall (1998:205) recommends that companies develop a "value-based management framework" through which management can improve shareholders' wealth most efficiently. Based on the findings of his study, he asserts that profitability ratios play the biggest role in determining the value of EVA and therefore suggests that all possibilities for improving these profitability ratios should be exploited first, as a matter of priority, before other remedial actions are embarked upon.

3.3.12 Kleiman's findings supporting better performance where EVA is adopted

Kleiman (1999:80) argues that research on EVA and other accounting performance measures up to 1999 could not conclusively prove whether EVA or EPS affected market returns most. He judged both EVA and EPS to be more or less equally effective in explaining share returns.

The study of Kleiman (1999:80) set out to determine whether companies that adopt EVA as a performance measure add more value for their shareholders than their industry competitors do. He limited his study to companies that had implemented EVA. His sample was 71 companies that had adopted EVA during the period from 1987 to 1996. For the sake of comparison he also identified the "closest-matched industry firm", namely the firm that was the closest in sales to the EVA company in the year prior to the adoption of EVA.

The results of the study showed that EVA companies earned an extra total return of 28,8% over four years versus the median industry competitor. In total, EVA

companies created USA $124 billion more in share market value than their median competitors. This evidence was found to be robust (at a 99% confidence level) across the entire sample.

Companies that had adopted EVA showed greater improvement in operating profit margins. These improvements were attributable more to a decrease in assets, for example, sales of property, plant and equipment) rather than extensive cost cutting. In summary, the improvement in the financial ratios of EVA companies was consistent with improvements in EVA and superior share market performance.

3.3.13 Gates's study on strategic performance measurement systems

Gates (2000:44) performed a study on companies that had adopted strategic performance measurement (SPM) systems in order to evaluate management's success in improving operating efficiency and adding value for shareholders. The survey focused on the SPM practices of publicly traded industrial and service companies based (mainly) in the USA and Europe. Of the 113 companies that responded, more than a half said they had formal SPM systems and more than two thirds said they expected to have such systems in place within three years.

Gates (2000) wanted to find out what the most popular measures in these SPM systems were. For instance, were those measures mainly financial or were they non-financial or a mix of both? Regarding the emphasis of the SPM system, companies were almost evenly divided: 41% said they used a value-based approach and 40% said they used a balanced scorecard approach. There was also no significant difference between the share price performance of companies with "value-based" SPMs and those with balanced scorecard-type systems.

The balanced scorecard approach introduced by Kaplan and Norton (1996:9) suggests that companies should not only look at financial performance, but also that they should have a balanced approach consisting of the following critical performance areas:

- financial (how should we appear to our shareholders?);
- customer (how should we appear to our customers?);
- internal business process (to satisfy our shareholders and customers, what business processes must we excel at?); and
- learning and growth (to achieve our vision, how will we sustain our ability to change and improve?).

It was significant that, according to the response to the survey, most, if not all, companies wanted to adopt SPM systems that are strongly correlated with their shareholders' return on their investment. The most frequently mentioned SPM's that respondents expected to use during the following three years were cash flow, ROCE, economic profit and total shareholder return.

The percentage of respondents who wanted to adopt operating margin for the next three years dropped from 35% to 21%, while that of those who mentioned earnings fell from 23% to 16%. This bears out the increasing preference for EVA and EVA surrogate measures such as economic profit and ROCE.

3.3.14 Milano: EVA in the "new economy"

Milano (2000:119) investigated the use of EVA in the so-called "new economy", which is characterized by the expansion of the Internet and the advance of telecommunications technologies. These in turn provide new channels for media distribution and communication. With the ever-increasing emphasis on information, the rules of business are constantly changing. New market entrants break into existing markets at a much more rapid rate than before and talented human capital is flowing into businesses.

EVA has increasingly come under fire from critics who claim that EVA is not suited to a new knowledge-based environment where companies operate without buildings and machinery, with very little working capital (sometimes with a

negative balance) and very little or no current profits. However, Milano (2000:119) argues that EVA is indeed suitable for new emerging companies, even more so than was the case with their older predecessors. He points out that although the nature of the companies is changing, the principles of economic valuation remain the same.

In valuing a new economy company such as Yahoo (worth US $100 billion in 2000; about twice the value of McDonalds), EVA presents a much simpler approach than the FCF method. The difficulty in applying the FCF method lies mainly in determining the terminal value of the company being valued at the end of the "planning horizon", which could be, for example, 15 years. This is very hard to do for a new economy company such as Yahoo.

Milano (2000:119) argues that the EVA approach to valuation is much more straight-forward than the FCF method because it shows a greater percentage of the value occurring in the earlier years, when forecasting can be done with greater accuracy. His studies showed that in a typical FCF analysis of a new economy company, 80% to 99% of the value is determined by the terminal value. When the EVA approach is applied to the same company and time horizon, only 20% to 50% of the value was in the terminal value.

Milano (2000:119) highlights the importance of the FGV in the determination of the value of new economy companies and points out that it is mainly driven by four factors:

- EVA margins (EVA as a percentage of sales, for example, 59% for Yahoo and 44% for Microsoft in 2000);
- high growth rates (in EVA);
- low current market shares; and
- the ability to differentiate.

Milano (2000:119) concludes that the future of EVA appears to be promising as the new economy unfolds. He claims that EVA would be the tool used by

successful companies moving towards decentralized decision-making, rapid innovation and the sense of ownership.

3.3.15 Kramer and Peters: EVA as a proxy for MVA

Kramer and Peters (2001:41) tested the ability of EVA to serve as a proxy for MVA across 53 industries in the USA. They wanted to discover whether the criticism that EVA was not suited to a new economy company with a small asset base was justified. Data obtained (purchased) from Stern Stewart & Co. for the period from1978 to 1996 was used and the 1000 large non-financial companies were divided into 56 industries. Three industries were left out because of outlier values.

The results of the study showed that for only 11 industries the correlation of EVA and MVA was better than for NOPAT and MVA, when the coefficient for EVA (in the linear regression function) was positive at the same time. This means that no marginal benefit accrues from using EVA as a proxy for MVA, instead of NOPAT, which is readily available.

Regarding the question about the suitability of EVA for new economy companies, the measure “fixed asset turnover” (FAT) was used as a determinant of the kind of company involved. A low FAT ratio would indicate a more industrial type of business with more tangible assets, while a high FAT ratio would indicate a more knowledge-based business. The study showed that there was no support for the contention that EVA is less likely to capture the performance of knowledge-based organizations.

3.3.16 Hatfield: How EVA affects R&D

Hatfield (2002:41) argues that EVA changes the accounting landscape fundamentally by treating R&D as a strategic capital cost rather than as an expense. As indicated in Section 2.4.3, R&D expenses are normally written off in the period when they are incurred, in accordance with the conservative accounting

convention, GAAP. However, in determining EVA, R&D is capitalised and written off over the period during which there are expected to be benefits from successful research efforts. This change in the treatment of R&D has reinforced its role as an investment. The capitalisation of R&D is seen a visible sign that a company views R&D as a bridge to the future, not as a cost centre that needs to be limited or reigned in.

The focus on EVA encourages scientists and engineers to concentrate their efforts and ideas on projects that have a well-defined EVA-based payoff and can create value for the organisation. For a scientist, an EVA approach emphasises the importance of the cost of capital in R&D efforts such as product and process development.

EVA not only affects the way in which R&D is budgeted, it also provides a framework for technology valuation, affects R&D portfolio management and influences the generation of technical ideas. To summarize, Hatfield (2002:47) states that the real value of EVA to R&D lies in the fact that one system, EVA, can be utilized to manage a diverse set of issues confronting technology management, from financial metrics to portfolio decisions and people issues.

3.4 CRITICISMS OF EVA AND MVA

3.4.1 Kaplan and Norton's preference for the balanced scorecard

Kaplan and Norton (1996:47) developed the "balanced scorecard" approach to performance measurement in order to encourage business units to link their financial objectives to corporate strategy. This approach emphasizes the importance of performance at different levels, which includes financial performance, but does not focus exclusively on the financial results.

The vital areas of performance suggested by Kaplan and Norton (1996) are financial, customer, internal business process and learning and growth

performance. They do acknowledge the fact that using EVA is a uniform, consistent and feasible approach that treats all managers fairly because the same measure is used for all of them. Their criticism of EVA and other financial measures is that these measures fail to recognize that different business units may have quite different strategies. Therefore it is highly unlikely that one financial measure, such as EVA, will be appropriate for all the business units in a company.

3.4.2 De Villiers's view of the effects of inflation on EVA

De Villiers (1997:285) studied the effects of inflation on EVA while using different weights for three classes of assets, namely non-depreciable assets, depreciable assets and current assets. He contends that it is one of EVA's disadvantages that EVA is based on accounting profit. Because accounting profit is a poor proxy for economic profit, this discrepancy is magnified by inflation, resulting in inaccurate EVA calculations.

Working on the premise that a company consists of a number of projects, its "true EVA" can be determined by subtracting the WACC from the internal rate of return (IRR). The IRR of a project represents its true economic return. Using a theoretical company consisting of different projects, each with the same IRR, De Villiers has demonstrated that the calculated EVA differed from the "true EVA" to varying degrees, depending on the rate of inflation and the mix of assets used.

Given that the EVA measure is widely used for strategic decisions such as resource allocation and manager performance measurement and remuneration, De Villiers (1997:285) cautions managers about the use of EVA in times of inflation. He suggests the use of a variation of EVA, AEVA (Adjusted EVA), but acknowledges that more research on the topic is needed in order to "operationalise" the concept.

3.4.3 Kramer and Pushner's findings against EVA

Kramer and Pushner (1997:41) studied the strength of the relationship between EVA and MVA, using the Stern Stewart 1000 companies for the period between 1982 and 1992. They found that although MVA and NOPAT were positive on average, the average EVA over the period was negative. This illustrated the significant impact of the cost of capital and the high future growth expectations for EVA.

The regression between the levels of MVA and the levels of EVA yielded an r^2 of 10%, which was significant, but left a large part of the MVA unexplained. Kramer and Pushner (1997:41) then proceeded to run regressions of MVA for the same period and lagged levels of EVA and NOPAT. They found that in all cases, NOPAT explained more of the total variation in market value than EVA did.

When the regression above was expanded to incorporate changes in MVA and changes in EVA and NOPAT, it was found that changes in EVA were negatively related to changes in MVA, while the correlation between changes in MVA and changes in NOPAT was positive. These authors suggest that this means that the market is more likely to react favourably to profits than to EVA, at least in the short term. They found no clear evidence to support the general idea that EVA is the best internal measure of shareholder value creation. In fact, from their studies it seems as if the market is more focused on profits than on EVA. They also suggest that compensation schemes must rather be tied to profits than to EVA.

3.4.4 Makelainen's criticism regarding EVA and wrong periodization

Makelainen (1998:21) criticizes EVA (and ROI) on the basis of "wrong periodization" of the returns of a single investment. EVA underestimates the return in the beginning and overestimates the return at the end of the period. For this reason, growth companies with heavy initial investment and long payoff periods, such as high-tech, telecommunication and pharmaceutical companies, may

initially have a negative EVA. This negative current EVA is expected to change over into positive EVA and add to shareholder wealth in the long run.

Makelainen (1998:21) also criticized EVA with regard to the fact that it is distorted by inflation and quotes the work of De Villiers (1997:285) to support her arguments. Makelainen (1998:21) concludes her criticism of EVA by stating that in most cases, the impact of wrong periodization and inflation is relatively small and that it can be overcome by making some adjustments.

3.4.5 Biddle *et al's* lack of support for EVA

Biddle *et al*. (1999:69) state that numerous claims have been made about EVA and MVA, most based on "anecdotal evidence" or "in-house studies". They endeavored to present "independent research" covering a sample of more than 600 companies for the period from 1984 to 1993.

Their findings showed that current period accounting earnings (also called net income, or NI) is significantly more highly associated with market-adjusted annual share returns (an r^2 of 13%) than are residual income (an r^2 of 7%) and EVA (an r^2 of 6%). The r^2 of cash flows from operations was an almost insignificant 3%. Their results do not support EVA as being superior to earnings in its association with share returns.

Biddle *et al*. (1999:69) actually reworked some previous research by O'Byrne (1996:119) (see Section 3.3.5) when they applied some adjustments in a consistent manner; they found a better correlation between net income and firm value (r^2 of 53%) than with the EVA regression (an r^2 of 50%). Again no support was found for the contention that EVA dominates earnings in terms of its relevance for value.

The median values of EVA and residual incomes calculated for the period from 1988 to 1997 was not very different from the above results. Biddle *et al*. (1999:69)

conclude that the net effect of Stern Stewart Consulting Company's accounting adjustments is not significantly large on average.

3.4.6 Brealy and Myers: EVA's bias towards certain projects

Brealy and Myers (2000:329) state that one of the main problems with EVA is the fact that it does not measure present value. EVA depends on current (adjusted) earnings and therefore favours projects with quick paybacks relative to those that have paybacks over longer periods. This criticism of EVA is similar to that by Makelainen (1998:21), who termed this attribute of EVA "wrong periodization".

Companies in the pharmaceutical sector are typical examples of this problem. It normally takes 10 to 12 years from the time when a new drug is discovered to the time when it is finally approved and starts yielding its first revenue. The same criticism is valid for startup companies that have a big initial outlay in research and development. These companies may have a negative EVA in the startup years, even if the expected NPV of the future cash flows is positive.

Brealy and Myers (2000) also criticize EVA because it requires accurate measurement of economic income and investment, which in turn, require considerable changes to income statement and balance sheet amounts.

3.4.7 Keef and Roush's comments on the incompatibility of EVA and MVA

Keef and Roush (2002:20) call MVA a "hybrid statistic" on account of the fact that the two measures used to determine it, namely market value and equity book value (invested capital), do not share the same attributes. They assert that the book value of equity is an *expost* measure because it consists of investments made in the past. On the other hand, market value is an *exante* statistic because it is the present value of future cash flows. What matters most is not the amount invested, or the value created or destroyed in the past, but in fact the current wealth (market value) and how it will change in future.

Keef and Roush (2002:20) also point out that MVA does not accommodate size and therefore underrates smaller companies that add a lot of value relative to the amount invested in assets, for example, Dell Computer, which had a 1998 MVA of US $25,7 billion on an asset base of only US $0,5 billion. Based on this argument they suggest that a standardized MVA would be more appropriate.

Another criticism they level at MVA is that the MVA is actually different for each shareholder, depending on when the shares are acquired. Even Stern Stewart Consulting Company acknowledges that there is no such thing as an MVA applicable to all shareholders.

Keef and Roush (2002:20) advise CEOs not to use MVA, but rather to seek to maximize the risk-adjusted return, as "this is what interests shareholders and measures wealth creation in a competitive market" (Keef and Roush, 2002:21).

3.4.8 Ramezani *et al*.: EVA's failure to account for growth opportunities

Ramezani *et al.* (2002:56) investigated the relationship between growth, corporate profitability and value creation. They acknowledge that modern "value-based approaches" such as EVA and MVA reduce ambiguity about the question of whether growth enhances shareholder returns. However, they believe that whether the value-based performance measures are truly in line with shareholder interests remains an open question.

Ramezani et al. (2002) argue that MVA was introduced to overcome some of the criticism of EVA. They mention, for instance, that EVA does not account for growth opportunities inherent in a company's investment decisions. They criticize MVA on the grounds that it may be biased by over- or under-valuation of a company's growth opportunities as reflected in its stock price.

3.4.9 Paulo: Questionable basis for the calculation of EVA

Paulo (2002a:52; 2002b:500) argues that EVA is based on the capital asset pricing model (CAPM), which relies on the efficient market hypothesis (EMH). In an efficient market, the real rate of return (RRR) theoretically equals the internal rate of return (IRR), resulting in an EVA of zero. Therefore EVA attempts to measure something that, by definition, cannot exist.

Paulo (2002a:53) states that arbitrage and competitive forces ensure that abnormal profits cannot occur consistently. On average, a positive EVA is offset by a negative EVA and the occurrence of EVA would be random and statistically non-significant. Within an EMH world, EVA is regarded as a fiction.

Even in a non-EMH world, the basis for the calculation of EVA is questionable, because it relies on the CAPM and beta to calculate the cost of equity. The historic volatility of security markets has proved to be much higher than what could be justified in terms of the CAPM. Using the CAPM and beta is therefore an undesirable way to calculate the cost of capital and is not a method that should be used for valuation purposes.

Paulo (2002a:54) argues that WACC was originally developed by the legal fraternity to ensure that all contributors of financial capital obtained a fair return. WACC is not concerned with the value of the firm or with maximizing shareholder value. He concludes that the validity of EVA should be questioned because it relies on an inappropriate input, namely WACC.

3.4.10 Ooi and Liow: Some limitations of EVA for property companies

Ooi and Liow (2002:29) found in a survey of property companies in Singapore that the EVA of property assets and businesses tends to be understated if the capital appreciation component is not taken into account. If they rely solely on EVA as a performance measure, companies may make the poor decision of divesting themselves of their property businesses.

A too narrow focus on the EVA of property companies (which may have a low or negative EVA) would result in a situation where top managers' compensation would be very low, if it is tied to EVA. Ooi and Liow (2002:29) argue that over-reliance on EVA could deter the long-term sustainable growth of a property company. They state that EVA is merely a measure of capital efficiency and that it reveals nothing about a company's relative capacity to create new wealth within its industry.

3.4.11 Copeland's preference for expectations-based management to EVA

Copeland (2002:48) did a survey on data from the S&P 500 companies from 1992 to 1998 and found little correlation between their short-term total return to shareholders and their short-term EPS, growth in earnings, EVA, and their percentage change in EVA. However, he found a highly significant correlation between the total return to shareholders and analysts' expectations of earnings. This expectations-based measure (expected earnings) showed an r^2 of 42% relative to the total shareholders' return.

Copeland (2002:51) argues that a business unit that earns more than its cost of capital (one that has a positive EVA), only creates value (in terms of market value) if it earns more than expected. So, for example, if a company has a WACC of 15% and it is expected to earn 30% but actually earns 25%, it under-performs in terms of the expectations and therefore destroys value. The reason for this is that the expectation of a 30% return has already been discounted into the current share price.

Copeland's (2002:53) concludes that EVA can still be used in setting up a budget that includes a capital charge for own capital, which in turn provides the incentive to manage both the income statement and the balance sheet. However, he cautions against overly optimistic or pessimistic claims based on EVA alone.

Furthermore, Copeland (2002:53) has found that attempts to establish objective measures of company or business unit performance are useless. In the application of expectations-based management, he suggests that the communications between company management and investors and analysts be done in an objective, unbiased way in order to facilitate value maximization and a long-term focus.

3.5 ADJUSTMENTS TO FINANCIAL STATEMENTS

In the calculation of EVA and MVA, it is a basic requirement that the investor's point of view is taken, rather than that of the accountant. This means that the full cost of IC should be taken into account in determining EVA and MVA. NOPAT needs to be adjusted accordingly in order to apply the investor's perspective consistently. Stern (1993:36) refers to these adjustments as "accounting anomalies".

The asset values and profits reflected by the accounting statements – drawn up according to GAAP – do not conform to the investor's point of view due to the (mostly conservative) accounting treatment of a number of accounting items. Some of these accounting items were discussed in Chapter 2 when the reasons for the vulnerability and weaknesses of accounting measures were given.

The adjustments required to the book values of assets in order to convert them to the amount of IC (taking the investor's point of view) stem from the fact that the accounting items mentioned in the previous paragraph do not reflect the investor's point of view. The same applies for the adjustments to NOPAT. The accounting figures have a conservative bias that causes both the IC and the profit to be understated.

According to Ehrbar (1998:164), about 160 adjustments can be made to the financial statements in order to calculate EVA, but for most companies just a few important ones (not more than ten), those that have the most significant impact,

will suffice. In the following sections the necessary adjustments for each accounting item are discussed. The most important adjustments are:

- R&D costs;
- marketing costs (related to launch of new products);
- strategic investments;
- accounting for acquisitions (goodwill);
- depreciation;
- restructuring costs;
- taxation;
- marketable investments;
- off-balance sheet items;
- free financing; and
- intangible capital.

After the adjustments required have been explained, an example is given to illustrate typical adjustments applied to the financial statements of a company. In conclusion, the link between EVA and MVA, as well as the link between EVA, MVA and NPV is presented.

3.6 SPECIFIC ITEMS TO BE ADJUSTED

In this section the background to and reasoning behind the most important adjustments are discussed, as well as the way in which the financial statements are affected by these adjustments.

3.6.1 R&D costs

According to GAAP, research costs should be written off in full during the financial period when they are incurred. The same applies for development costs, which may only be deferred, or capitalized, if there is a strong expectation that they may

lead to significant cash benefits in future. The result of this requirement is that the bulk of the total amount of R&D costs of any given company is written off immediately, which could create the erroneous impression that the investment is worthless.

This conservative outlook causes both invested capital and profits to be understated. For companies with a high proportion of R&D costs, for instance those in the pharmaceutical sector or high-tech companies, the understatement of assets and profits using GAAP could be substantial.

The EVA approach requires R&D expenditure to be capitalized in the balance sheet as an asset and amortised over an appropriate period. It is suggested that the capitalized amount should be written off over the payoff period for projects that prove to be financially viable (Stewart 1991:116).

Research quoted by Ehrbar (1998:168) has concluded that the appropriate period of amortisation could be as short as three to four years for scientific instrument companies, but up to eight years or more for pharmaceutical companies. He also states that Stern Stewart Consulting Company use five years – which is the average useful life of R&D expenditure for all industries – in making adjustments for the Performance 1000 companies. (As indicated in Section 3.3.1, the Performance 1000 companies are the top American companies rated according to MVA by Stern Stewart Consulting Company).

It is important to note that the impact of the adjustment tends to be greater for fast-growing companies that invest heavily in R&D. For such companies there is a substantial difference between the full R&D expense (incurred), written off while applying GAAP, compared to the amount amortised based on the capitalized R&D amount. The adjustment becomes insignificant when the company reaches a steady-state growth, in which case the R&D incurred and the amount amortised would be equal.

Another argument in favour of the R&D adjustment is that chief executive officers (CEOs) whose bonuses are based on earnings have a disincentive to invest in

R&D. On the other hand, if bonuses and pensions are based on EVA instead of earnings, there is little or no temptation to cut R&D expenditure, as this would have no immediate effect on EVA. As a matter of fact, Ehrbar (1998:169) states that the initial capitalization and subsequent amortisation of R&D expenditure in future years tends to make managers feel accountable for results and to ensure that researchers evaluate prospective projects objectively.

3.6.2 Marketing costs

In applying the same principle as with R&D expenditure, Stewart (1991:116) reasons that the new product development and up-front marketing costs incurred to capture an initial market share should also be capitalized and amortised over an appropriate period. He suggests that the lives of successful new products can be used as the amortisation period.

Security companies, for instance, install security systems “for free”, expecting the monthly fee paid by the home-owner on an ongoing basis to more than make up for the initial cost. Cellular phone companies also sell cellular phones at selling prices below cost, but in doing so, gain new customers using the same principle. GAAP requires these marketing costs to be written off as incurred, but from an investor’s point of view, they should be capitalized.

Other examples include the cost of designing and promoting luxury cars, such as the Infinity (Nissan) and the Lexus (Toyota). These costs should be capitalized and amortised, instead of being written off when incurred. Another example is the huge amount – “hundreds of millions of dollars” – (Stewart 1991:116) that Gillette spent to develop and market the new spring-suspended razor, the Sensor. Stewart (1991:116) asserts that the full amount which has been written off by Gillette should be seen as a form of capital investment. He is of the opinion that the fact that there was uncertainty about the future payoff of the projects was irrelevant on the grounds that “management’s strategy, if successful, anticipates and requires a payoff over an extended period of time” (Stewart 1991:116).

3.6.3 Strategic investments

Strategic investments are investments that normally yield no immediate increase in profits and EVA, but that are expected to have some payoffs only from a certain point in future. Typical examples are investments to establish new developing markets and investments in new technologies and capabilities to exploit the worldwide web and e-commerce opportunities.

There is some reluctance on the side of managers to go ahead with an investment, for example, the construction of a plant that may take a number of years to complete and thereafter will take another few years to begin operating at full capacity. The capital charges on an investment like this will reduce EVA dramatically in the years before the plant becomes profitable.

The problem with strategic investments is that if the immediate impact on profitability and EVA is ignored, there is no guarantee that discipline will be exercised in making the investment (while capital discipline is one of the hallmarks of EVA). Companies hardly ever determine whether the returns on strategic investments in later years live up to the initial expectations. For this reason the term “strategic” has become a byword for unsuccessful projects that never pay off.

The adjustment for strategic investments suggested to overcome the peculiarities of this item is firstly to “hold back” the investment in a “suspension account”. If this is done, the capital charge on the investment (or balance in the suspension account) is not taken into account determining EVA until the time when the investment is expected to deliver operating profits.

In the interim, before the investment becomes profitable, the capital charges that would have been calculated on the investment (now in the suspension account), are simply added (or deferred) to the suspension account. The suspension account then reflects the full opportunity cost of the investment, including an “accrued interest”.

As soon as the investment starts producing NOPAT, the capital in the suspension account is taken into account in the EVA calculation. This approach encourages managers to expand their long-term view and to explore investments with deferred payoffs. The managers are still accountable for the capital they invest, even though they are not penalized in the short term. It is suggested that companies formulate their guidelines for strategic investments beforehand and do not diverge from them.

3.6.4 Accounting for acquisitions (goodwill)

Goodwill usually refers to an intangible asset that may be bought (like a patent), or developed internally by a company, or it may originate from an acquisition transaction. Goodwill on acquisition is defined as the excess amount a company pays above the "fair value" of the assets of the acquired company. The amount of goodwill may typically be payable for technological knowledge, patents, R&D projects in progress or simply the good standing the company and its brands have established with customers.

The accounting treatment of goodwill is the following: in the USA the amount of goodwill is capitalized if the "purchase" method is used and than it is amortised over a maximum period of 40 years. The accounting treatment for South African companies is the same, but the maximum amortisation period is 20 years.

The problem with the amortisation of goodwill is that profits and ROA and ROE are initially understated because of the amount written off against profits annually. In subsequent years, the ROA and ROE are ultimately overstated when the capitalised goodwill in the balance sheet is written off completely.

Stewart (1991:114) suggests that the proper economic treatment of goodwill is to write it off over its estimated economic life. However, because goodwill consists mostly of assets with indefinite lives such as brands, reputation and market position, they recommend that it is kept on the balance sheet at the original amount and not written off at all.

From the investor's point of view, the full capital cost of the acquisition investment should be shown if the goodwill is capitalized and not amortised. The cash flow value of the investment is then reflected irrespective of the accounting treatment and managers are allowed to concentrate on earning returns above the cost of capital on the investment in the long run (indefinitely).

In the USA, another approach is allowed in dealing with goodwill, the "pooling-of-interest" method. When this approach is used, the balance sheets of the two companies are added together and goodwill is not accounted for at all. In this instance, it is also recommended that goodwill be capitalized and not written off, so that the full capital costs of the acquisition are recorded for the purposes of calculating EVA.

3.6.5 Depreciation

For most companies, the straight-line method of depreciation, applied according to GAAP, does not distort profits or the calculation of EVA. However, where a company has a significant proportion of older, long-lived equipment, the situation becomes more complicated. Under this scenario, using the straight-line method of depreciation can cause a strong bias against investment in new equipment.

Using the straight-line method of depreciation, the EVA capital charge becomes smaller and smaller as the book value of the assets decreases, causing the old assets to look much "cheaper" than new ones. Managers tend to be reluctant to replace old assets with new ones because of the higher cost attached to the new assets.

Using the sinking-fund depreciation method, instead of the straight-line method, can eliminate this distortion. When depreciation is calculated according to the sinking-fund method, the annual amounts of depreciation start small and then get progressively bigger, much like the capital portion of a mortgage payment.

The sum of the annual sinking-fund depreciation and the EVA capital charge will then remain constant from one year to the next, as with a mortgage payment. This change in the method of depreciation eliminates the bias against investment in new assets. It also more closely reflects the real-life situation where a plant and equipment with a long lifetime depreciate little in the first few years and then lose value at an accelerating pace.

3.6.6 Restructuring charges

Restructuring charges refer to the loss made on an investment that fails to live up to expectation. According to GAAP, the loss on the investment should be written off in the income statement, normally causing a large decrease in profits. It can be said that the GAAP treatment in restructuring charges focuses on past mistakes.

According to Ehrbar (1998:175), the investor's view is much more positive: "Viewed from the executive suite, a restructuring should be thought of as a redeployment of capital that is intended to improve profitability going forward by reducing ongoing losses from past mistakes." The appropriate treatment of restructuring charges can best be described by way of an example.

Company X has (among other assets) a factory of R100 million that yields no (zero) operating profits. The factory can be sold for only R40 million and this amount can then be paid out to shareholders as a dividend. The loss on the sale of the factory (R60 million) is written off to reduce earnings. If the cost of capital is 20%, the capital charge for the factory is R20 million (R100 million x 20%) and the EVA is minus R20 million (zero profit less the capital charge of R20 million).

From a manager's point of view, it does not make sense to sell the factory, as this would cause GAAP earnings to drop by R60 million, fixed assets to decrease by R100 million and a decrease in the scope of operations. If the factory is not sold, it is still breaking even profit-wise, so there is no incentive to sell.

From an EVA point of view, the treatment of the potential loss on the factory changes as follows: it is now called “restructuring charges” and is shown as an investment in the balance sheet at R60 million, instead of being written off. The capital decreases by the amount of the dividend to be paid out, R40 million, and not by the full R100 million. The EVA changes as follows: operating profits remain at zero, while the capital charge is 20% on R60 million (R12 million), giving a negative EVA of R12 million.

Selling the factory would cause the EVA to improve from R20 million negative to R12 million negative. Hence, a manager whose remuneration is linked to changes in EVA would be inclined to sell.

3.6.7 Taxation

Most companies determine profits in one way for financial reporting and then present a different taxable profit, on which the tax payable is based, to the Receiver of Revenue. The taxable profit is usually lower than the accounting profit, mainly because of timing differences, of which depreciation is a good example.

If a company uses accelerated wear and tear for income tax purposes (or qualifies for tax allowances on capital assets) while using straight-line depreciation for accounting profit purposes, the taxable profit is lower than the reported accounting profit. Timing differences like these give rise to deferred tax, which is reflected on the balance sheet. The result of this is that the actual tax paid in a given year is not the same as the tax charge or debit in the income statement (normally it is lower).

From an investor’s point of view, a growing, going-concern company will probably never actually pay deferred tax. When calculating NOPAT and EVA, only tax actually paid in cash must be taken into account. The adjustment required therefore entails determining the amount of all deferred tax deducted from earnings in the past and then adding it back to equity, so that the IC and the cost of capital can be calculated.

When managers are charged for tax actually paid, there is an incentive for them to do proper tax planning in collaboration with the tax department in the company before they take investment decisions. This ensures optimal tax management early on in the process, instead of involving the tax experts at a later stage when the decisions have already been made.

3.6.8 Marketable investments

Some companies may hold investments in cash, marketable securities, loans or shares. These passive investments should not be included as part of the invested capital because they do not contribute to the operating profit. It follows logically that the income from these investments should not be included in operating profits, but should be added to profits after the calculation of NOPAT.

3.6.9 Off-balance sheet items

Although GAAP limits off-balance sheet financing, for instance, by requiring the capitalization of financial leases, there are still some items that do not appear on the balance sheet, when in fact they should. These off-balance sheet items should be included in the amount of invested capital. Typical items such as uncapitalised (operational) leases and securitized debtors should be brought back into the balance sheet to reflect the full amount of IC for the purposes of determining EVA.

If managers consider only the interest rate on an uncapitalised lease, the lease will appear to be cheaper than it really is at the WACC. In this instance, managers should be careful not to confuse the financing decision with the investment decision.

3.6.10 Free financing

In determining the amount of IC, all free financing items, such as accrued expenses and non-interest-bearing accounts payable, should be subtracted from the total assets. The cost of capital is then applied to the net assets used in operations in order to calculate the capital charge and EVA.

3.6.11 Intangible capital

Recent developments in finance and the circumstances under which firms operate (so-called new economy) require a fresh approach from modern companies – an approach which is quite different from the traditional approach that helped companies to be successful in the past. Glassman (2000:119) puts it as follows: "In sum, new tools, new accounting, and a new mindset are necessary to promote the kinds of capital investments – in software, capabilities, customers, people, and brands – that create value in today's marketplace."

Heavy investment in IT infrastructure and real-time communications are common characteristics of leading American companies such as Dell Computer, Wal-Mart, Cisco and eBay. Although the investment in hardware (equipment) is capitalized, the greater part of such outlays consists of project development, training, documentation and maintenance, all of which are written off in the income statement.

However, managers are often discouraged from making such value-creating investments because their compensation is still linked to traditional accounting measures such as earnings. As with the treatment of goodwill (as discussed in Section 2.4.2), it is recommended that intangible investments in IT infrastructure, capabilities and training be capitalized in the balance sheet. This ensures that managers are not penalized in the short term and that they remain accountable for returns in the long term.

Only adjustments that have a significant impact on EVA and MVA need to be made. The adjustments most likely to be made (as is shown by the practical experience of EVA consultants) have been discussed above, along with their impact on financial statements.

3.7 EXAMPLE OF EVA ADJUSTMENTS

Below, a hypothetical company is used to illustrate how some of the most important adjustments to the financial statements are made in order to determine EVA.

Assume Company Z started doing business at the beginning of 2001 and presented the following financial statements at the end of 2002:

Balance sheet for the year ended 31 December 2002

	R million	R million	R million
Non-current assets			
Plant and equipment		160	
Motor vehicles		72	
Marketable investment		20	
Goodwill		48	300
Current assets			
Inventory		100	
Debtors		90	
Cash		5	
		195	
Current liabilities			
Trade creditors	83		
Tax payable	12	95	100
			400

Equity and liabilities

Share capital	200
Reserves	66
Deferred tax	14
Long-term loan (15% interest p.a.)	120
	400

Income statement for the year ended 31 December 2002

	R million	R million
Sales		480
Cost of sales		240
Gross profit		240
Other expenses:		
Amortisation of goodwill	6	
Depreciation on plant and vehicles	32	
Marketing costs	60	
Provision for doubtful debts	15	
Salaries and wages	53	166
Operating profit		74
Income from investments		2
		76
Interest on loan	18	
Restructuring costs	4	22
Profit before tax		54
Taxation *(Calculation 1)		18
Profit after tax		36

***Calculation 1**

Profit before tax	54
Add amortisation of goodwill	6
Taxable income before timing differences	60
Tax allowances minus depreciation on plant and vehicles	20
Taxable income after timing differences	40
Taxation – current year 30% x R40 million	12
– deferred tax 30% x R20 million	6
Tax charge in income statement	18

Further information

1. The restructuring costs originated from a loss on an investment that went bad. However, the benefits of restructuring the business are expected to continue indefinitely.
2. An initial amount of R60 million was brought into the books for goodwill when another company was taken over just after Company Z started doing business two years ago. The goodwill is to be written off over a period of ten years.
3. A provision for doubtful debts was created for the first time during 2002. The amount provided of R15 million is considered to be too high by R10 million.
4. The total amount for marketing costs was incurred to launch a new product and the benefits of the marketing effort are expected to last for four years, which include the current year (2002).
5. The company tax rate is 30% and it is assumed that the amortisation of goodwill is not tax deductible.
6. The WACC is 20%.

Based on the information given, the required adjustments to NOPAT to determine EVA are the following:

Adjustments to NOPAT

	R million	R million
Operating profit before tax		70
Less tax		18
NOPAT		52
EVA adjustments:		
Add deferred tax provision	6	
Add goodwill amortised	6	
Add marketing costs capitalised (60 x 3/4)	45	
Add excess provision	10	67
Adjusted NOPAT		119

Adjustments to net assets

	R million	R million
Net assets per balance sheet		400
Adjustments:		
Add restructuring costs now capitalised	4	
Add goodwill written off (6 x 2)	12	
Add excess provision for doubtful debts	10	
Add marketing costs now capitalized	45	
Less marketable investment	(20)	51
Adjusted invested capital		451

Calculation of EVA

EVA for 2002 = Adjusted NOPAT – (WACC x Adjusted IC)
= 119 – (20% x 451)
= R29 million (rounded to nearest R million)

The result of R29 million indicates that the company was able to generate a positive economic profit after taking into account all the cost of capital. It is expected that the market will react favourably to this result and internal measure of value creation if it is higher than the original expectations of shareholders. The impact that current EVA may have on the MVA of a company is discussed in Section 5.4 below when the link between EVA and MVA is investigated.

3.8 LINK BETWEEN EVA AND MVA

In this section, the relationship between EVA and MVA is expressed using different assumptions about the expected future growth of EVA. MVA is defined as the present value (PV) of all future EVA. Therefore it can be expressed as follows:

MVA = PV (All future EVA)

The link between EVA and MVA is determined by expectations about the future growth in EVA. It may be that the current EVA of a company does not reflect future expectations and MVA very well. A newly established company with high growth expectations may have a negative current EVA and a large positive MVA at the same time.

Other companies may have positive current profits and a positive EVA, combined with poor future prospects and expectations, and therefore have a low or negative MVA. For companies with a positive current EVA, which is reflected in a positive MVA, the relationship between EVA and MVA can be described for the following three scenarios:

- no future growth in EVA;
- constant future growth rate in EVA; and
- abnormal growth initially, then constant growth in EVA.

Each of these scenarios is discussed in turn below and it is illustrated by means of examples of what effect the different growth assumptions have on shareholder wealth, as reflected by the MVA.

3.8.1 No future growth in EVA

When no future growth in EVA is expected, the current EVA is perpetuated indefinitely. Therefore the MVA (the PV of all future EVA) is a perpetuity and is calculated as follows:

MVA = Current EVA / WACC

Using the information of the example set out in Section 3.7, the MVA calculation for 2002 is R145 million.

It must be borne in mind that the EVA is a total amount that indicates the performance of the company for a given year, while MVA is an incremental measure at the end of a given period, indicating the cumulative value added from the inception of the company up to the present time.

3.8.2 Constant future growth rate in EVA

Where the future EVA is expected to grow at a constant rate, it would be appropriate to measure MVA using a formula similar to the well-known Gordon (constant) growth model. The Gordon model uses dividends as well as the expected future growth rate and the cost of equity to determine the value of ordinary shares.

$$\text{Value of share} = D_o (1 + g) / (k_e - g)$$

where

D_o = Current dividend per share
g = Expected future growth rate
k_e = Component cost of equity

Using an adjusted version of this formula, the MVA can be determined as follows:

$$MVA = \text{Current EVA } (1 + g) / (WACC - g)$$

where

g = Constant expected future growth rate in EVA

Applying this formula to the information in Section 3.7 and adding an assumed constant future growth rate in EVA of 10%, the MVA for 2002 is R319 million.

3.8.3 Abnormal growth initially followed by constant growth

Where it is expected that future growth in EVA will be abnormally high in the first few years and then level off to a constant rate, an adjusted version of the Gordon constant growth model formula can be used to determine MVA. The formula is merely adjusted to accommodate the abnormal growth in the first few years and then adds the present value of EVA with constant growth. Assuming that the abnormal growth in EVA will be 20% per year in each of the first three years and that thereafter the growth rate will level off to a constant 10% per year, the formula is the following:

$$MVA = PV(EVA_1) + PV(EVA_2) + PV(EVA_3) + PV[EVA_3 \times (1 + g) / (WACC - g)]$$

Again using the information in Section 3.7, the MVA for 2002 is R406 million.

As stated before, the current EVAs of new, fast-growing companies may not be a good basis on which to project their future EVAs and the value of their MVA. The reason for this is that the bulk of the value of these companies is contained in their FGV.

Stern *et al*. (2001:214) gave the following alternative definition of value:

Value = Capital + PV (EVA)

= Capital + EVA / c + PV (Expected improvement in EVA)

where

c = Cost of capital

The second line of the formula above can be rewritten as follows:

(Value – Capital) = EVA / c + PV (Expected improvement in EVA)

Thus, MVA = EVA / c + FGV

If this formula is applied to the information in Section 3.7 and the scenario in Section 3.8.2 and where there is constant expected future growth in EVA, MVA can also be calculated as follows:

MVA_{2002} = R29 million / 0,2 + FGV

= R145 million + PV (EVA growth above R29 million p.a. in perpetuity)

At this point, it may be helpful to analyse the FGV. For this specific example, it can be calculated as follows:

FGV = (R2,9 million p.a. with no growth in perpetuity, plus the discounted value of R2,9 million in the first year and constant growth of 10% for each year in perpetuity)

= R29 million / 0,2 + [R2,9 million (1 + 0,1) / (0,2 – 0,1)] / 0,2

= R14,5 million + R31,9 million / 0,2

= R174 million

And MVA_{2002} = R145 million + R174 million

= R319 million

This is the same as the result in Section 3.8.2.

3.9 LINK BETWEEN EVA, MVA AND NPV

A question of vital importance is whether the use of the NPV approach in the evaluation of capital investment projects does indeed lead to a maximization of shareholder value and therefore of MVA.

The answer to this question only becomes clear when a comparison of the results of MVA and NPV is done for a specific company.

For example, Company M is considering the acquisition of an item of equipment for R12 million. The expected useful lifetime of the equipment is three years and there will be no residual value at the end of the period. The annual depreciation will be R4 million on a straight-line basis and the book value of the equipment is therefore R8 million at the beginning of the second year and R4 million at the beginning of the third year.

The equipment is expected to yield additional sales of R12 million in the first year, R16 million in the second and R20 million in the third year. The working capital required to support the sales will be 10% of the sales amount and it must be available at the beginning of the year. Increases in sales will cause increases in

the working capital required and the total amount of working capital will be a cash inflow at the end of the third year.

The working capital required at the beginning of the first year is R1,2 million (10% of the R12 million), while the increase required at the beginning of the second year will be R0,4 million [10% of (R16 million – R12 million)]. The increase in working capital will be R0,4 million [10% of (R20 million – R16 million)] at the beginning of the third year, with an inflow of R2 million at the end of the third year.

It is assumed that the operating expenses, other than the depreciation, amount to 50% of sales; the tax rate is 40% and the WACC is 20%. The NOPAT is R1,2 million in the first year, R2,4 million in the second year and R3,6 million in the third year.

PERIOD	**0**	**1**	**2**	**3**
Amounts in R millions				
INVESTMENT CASH FLOWS				
Initial outlay for equipment	(12,0)			
Working capital required	(1,2)	(0,4)	(0,4)	
Inflow of working capital				2,0
Investment cash flows (A)	(13,2)	(0,4)	(0,4)	2,0
CALCULATION OF NOPAT AND CASH FROM OPERATIONS				
Sales		12,0	16,0	20,0
Less operating expenses (50%)		(6,0)	(8,0)	(10,0)
Less depreciation		(4,0)	(4,0)	(4,0)
Profit before tax		2,0	4,0	6,0
Tax (40%)		(0,8)	(1,6)	(2,4)
NOPAT		1,2	2,4	3,6
Add depreciation		4,0	4,0	4,0
Cash flow from operations (B)		5,2	6,4	7,6

CASH FLOWS FROM INVESTMENT & OPERATIONS (A + B)	(13,2)	4,8	6,0	9,6

NPV = R522 222

The IRR is 22,23%, which exceeds the WACC of 20% and leads to a positive NPV. The same information as given in the example is now used below to calculate EVA and MVA and to show that, theoretically, NPV and MVA yield the same results.

PERIOD	**1**	**2**	**3**
Amounts in R millions			
CALCULATION OF EVA AND MVA			
NOPAT	1,20	2,40	3,60
Invested capital			
– Equipment book value beginning	12,00	8,00	4,00
– Working capital beginning	1,20	1,60	2,00
	13,20	9,60	6,00
Capital charge @ 20%	2,64	1,92	1,20
EVA (NOPAT – capital charge)	(1,44)	0,48	2,40

The MVA using a discount rate of 20% is R522 222.

The obvious conclusion from the example above is that the MVA (the PV of all future EVAs) is exactly the same as the NPV (the PV of all future cash flows).

A comparison of the cash flows using the NPVs and the EVAs in the determination of MVA shows that the EVA at the end of the first year is negative, while the cash flow is positive. There is therefore no value creation in the first year, although the investment does create a positive cash flow.

The difference between the annual cash flows using the NPV method and the annual EVAs stems from the treatment of the IC. With the NPV approach, the IC is taken as an outflow (in full) at the beginning of the first year. With the EVA/MVA approach, the cost of the initial investment is taken into account in two separate components, namely in the depreciation charge of R4 million per year and in the capital charge of R2,4 million (R12 million x 20%) for the first year, R1,6 million (R8 million x 20%) for the second year and R0,8 million (R4 million x 20%) for the third year.

The calculation below illustrates why NPV and MVA give the same results, by proving that the PV of the annual depreciation plus the capital charge (used in the EVA and MVA calculation) is equal to the initial cost of the new investment (used in the NPV calculation).

PERIOD	**1**	**2**	**3**
Amounts in R millions			
Depreciation	4,0	4,0	4,0
Capital charge	2,4	1,6	0,8
Total	6,4	5,6	4,8

The PV of the sum of the depreciation and the capital charge is equal to R12 million, which in turn, is equal to the original investment.

Drury (2000:806) confirms that NPV and MVA yield exactly the same results and states that if maximizing NPV is equivalent to maximizing shareholder value, then Stern Stewart Consulting Company's claim that the maximization of EVA also leads to the maximization of shareholder value, is justified.

The main advantage of the NPV approach is that it allows managers to take into account the cash flow impact of non-financial issues such as health and safety, as well as operations' impact on (and restoration costs of) the environment.

Managers can ignore the amount of IC at the beginning of the period and concentrate on the cash flows from the project.

The biggest advantages of MVA and EVA in comparison to NPV are that they can be determined for a project on its own or for an organization as a whole and that they are based on the principle of economic profits, as represented by EVA. Furthermore, EVA and MVA are much more suitable than the NPV approach for performance measurement and compensation because they provide an incentive for managers to act as if they were the owners of a business.

3.10 CONCLUSION

The concepts of EVA and MVA have been widely embraced by academics, investors and business managers alike. EVA and MVA represent new benchmarks that enable financial managers to align and deploy their efforts in such a way that shareholder value is maximized. These concepts have been popularized and marketed effectively by Stern Stewart & Co. and have been implemented by high-profile companies world-wide, including Coca Cola Company, Siemens, AT & T, DuPont, Eli Lilly and Quaker Oats.

Wood (2000:9) found that, by 2000, more than 400 South African organizations had already implemented EVA and "that it seems likely that it will gain increasing prominence in South Africa in the years ahead." In further support of EVA, Fatemi *et al*. (2003:175) found that EVA and MVA were better predictors of top management pay than other performance measures. Abdeen and Haight (2002:35) emphasized the use of average EVA over three to five years as a target, rather than the EVA of one year, because of business cycles and seasonal fluctuations.

Although EVA and MVA cannot be regarded as the final answer to the challenge posed by the quest to evaluate and manage company performance objectively, it is acknowledged that no better alternative measures exist at the moment. Proponents of EVA advocate its superiority to other financial performance

measures and point out the following outstanding features (Ehrbar and Stewart, 1999:20):

- EVA is the performance measure that is tied most directly (theoretically and empirically) to the creation of shareholder wealth;

- EVA is the only measure that always gives the "right" answer, in that more EVA is always better for shareholders (this is not always the case with profits and earnings);

- EVA provides a framework for a comprehensive new system of corporate financial management, encompassing operational budgets, capital budgets, strategic planning and acquisitions and divestitures;

- EVA is a simple but effective method for teaching business literacy to less sophisticated workers;

- EVA is the key variable in a unique incentive compensation system that causes managers to think like owners;

- EVA provides a framework that companies can use to communicate their goals and achievements to investors; and

- EVA is part of an internal system of corporate governance that motivates all managers and employees to work cooperatively and enthusiastically to achieve the very best performance possible.

Several studies, most of which has been conducted by Stern Stewart Consulting Company, support the view that EVA is superior to other earnings-based measures in explaining changes in MVA. By contrast, other researchers have questioned the validity of Stern Stewart Consulting Company's initial claims. Some have even provided evidence that earnings, and specifically NOPAT, are superior

to EVA in explaining changes in MVA (Kramer and Pushner, 1997:41; Biddle *et al*., 1999:69).

Some authors, such as De Villiers (1997:285), Makelainen (1998:21) and Brealy and Myers (2000:329) have criticized EVA directly, mostly on the grounds of wrong periodization and being inaccurate under conditions of inflation. The initial "hype" about EVA and MVA has died down somewhat. As more research evidence regarding EVA becomes available, the alleged advantages of EVA appear to be less clear-cut than was initially reported. The balanced current view is that the evidence supporting EVA is not conclusive and that more research is required to clarify this issue.

It can, however, not be denied that EVA does take into account the full cost of capital of all sources of finance used by the company and therefore makes economic sense. EVA is based on accounting earnings and the adjustments required cause some ambiguity. The ambiguity is caused by the fact that a large number of possible adjustments can be made to the financial statements in order to determine reliable values for EVA and MVA.

There is subjectivity involved in the process of making these adjustments because different analysts could make different adjustments to the same financial statements and also do specific adjustments differently. However, to date, EVA is still the best internal performance measure available to management to enhance shareholder value.

The financial statements of a company, particularly the income statement and the balance sheet, provide the basis for the determination of EVA and MVA. It must be recognized that the financial statements are drawn up according to GAAP, in order to conform to accounting constraints such as prudence (conservatism), consistency and the principles of realization and accrual.

The users of the financial statements of a company are a diverse group, which includes current and potential shareholders, lenders (banks and creditors), the Receiver of Revenue and others. As a result of the way in which the financial

statements are set up, the figures contained in them are not presented primarily from an investor's point of view.

In order to determine the IC and operating profit as seen from an investor's point of view, the financial statements, which normally have a conservative accounting bias regarding capital and profits, must be adjusted appropriately. In this chapter the major adjustment items that have the most significant impact were discussed. These items typically include R&D costs, marketing costs, goodwill, strategic investments and deferred taxation.

For each of the adjustment items discussed, the adjustment required regarding the income statement (and specifically operating profits) and the balance sheet (and specifically the invested capital) was indicated. An example was given of how the most prevalent adjustments are done for a hypothetical company and of how the adjusted NOPAT and adjusted IC and EVA are calculated.

This was followed by a discussion of the link between EVA and MVA, showing that the value of MVA is equal to the PV of all expected future EVA the company will generate. In order to make the calculation for a given situation, an assumption about the expected future growth in EVA was made.

The discussion included the calculation of MVA under three different scenarios: no growth in EVA; constant expected growth in EVA; and initial abnormal growth, followed by constant growth. It was shown how MVA could be determined by using a different formula that calculates the expected future growth in EVA (FGV) separately. This formula, which incorporates the FGV, was shown to yield the same result as the normal formula.

The chapter concluded with a discussion of the link between MVA and NPV, showing that MVA and NPV give exactly the same answer. Both indicate the increase in shareholder wealth expected from investment in a certain project, or from investment in a company as a whole. NPV may be more appropriate for investment decision-making, while MVA (and EVA) is better suited to performance measurement and reward that leads to the maximization of shareholder wealth.

After the discussion of the concepts EVA and MVA, as well as the adjustments required to calculate their value, it is now appropriate to investigate further where EVA fits into the process of internal value management and how it relates to other financial management concepts. In the next chapter, the link between EVA, MVA and leverage is discussed.