Erasmus School of Economics

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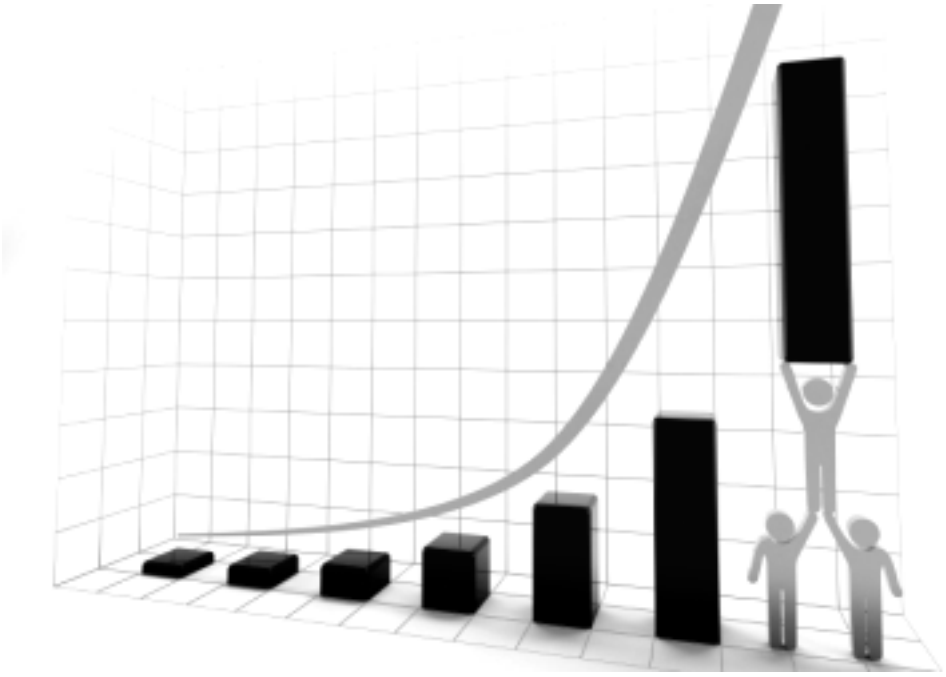
EVA vs traditional performance measures in Europe: Analyses on stock based performance and influence of IFRS



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ABSTRACT

This thesis examines the information content of financial performance measures on stock based performance of companies. Basic financial performance measures like Earnings are compared with more sophisticated performance measures like EVA in Belgium, France and The Netherlands. Overall we find information content in the range of 1%-53% for different types of stock based performance using different financial performance measures. The overall results do not suggest that one particular financial performance measure dominates on information content. Furthermore this thesis examines the impact of IFRS on the necessity of EVA accounting adjustments and the added value these adjustments have when calculating economic performance of companies. The results of this thesis suggest that the need and therefore added value of accounting adjustments for the calculation of economic performance has decreased after the implementation of IFRS when compared with previously used country specific GAAP and US-GAAP.

Keywords: Accounting adjustments Accounting performance, Economic performance, EVA, IFRS, Performance measures, Shareholder value, Stock Market Performance

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1. Introduction:

The worldwide credit crunch that started visually at the end of 2008 resulted in drastic decreases in index values of stock exchanges. This resulted in both gigantic losses for private investors and rapidly disappearing capital for companies. The credit crunch noted the importance of the stock market for the worldwide economy and the risk that comes with investing to a world wide public.

Shareholders, who are the actual owners of companies they hold shares in, want to receive rewards for investing in non risk free securities instead of risk free investments (e.g. a savings account). Increases in share prices and dividend pay-outs are what they are looking for as reward for taking risks. More specific, they are looking for increases in share prices and dividend pay-outs that are higher than the market risk free return on investments.

To be rewarded with high share prices and dividend pay-outs, shareholders demand that managers of companies are focussed on increasing these values. The well- known "agency theory" is the basis of these demands. To keep the companies in line with the goals of shareholders the performance measures used by the company should correlate highly with increases in share prices and dividend pay-outs. Performance measures used in the company for choosing investment projects and rewarding bonuses should be based on their correlation with stock based performance. This way good results based on these performance measures should be reflected in the stock prices and dividend pay-outs.

Financial performance measures like Earnings and Return on Investments (ROI) have been used for decades to manage the financial performance of companies. Newer financial performance measures like Residual Income (RI) and especially the by Stern Stewart developed and patented Economic Value Added (EVA™) should cope with the shortcomings of "old fashion" Earnings and ROI as performance measures. According to Stern Stewart Earnings, ROI and RI are based on accounting numbers and reflect the accounting performance of companies and not the economic performance, which should have a higher correlation with stock based performance.

Stern Stewarts EVA™ brings adjustments to reported accounting numbers and should therefore better reflect the economic performance of companies. "The benefits of EVA have translated into superior stock market performance for EVA™ adopters" is one of the claims of the website of Stern Stewart. But does this new and more sophisticated financial performance measure actually add new information content on stock based performance as

claimed by its creator? Or is it nothing more than a fancy word for the old fashion Residual Income?

Previous research does not give a direct answer to this question, because the results differ among samples and studies, e.g. Stewart (1991) found information content on stock based performance of 97% where Bacidore et al. (1997) only found 11%. Furthermore EVA was developed in the United States and based on US-GAAP, but do the adjustments on accounting performance as suggested by Stern Stewart also have a significant influence on EVA when the accounting performance is based on IFRS as used in the European Union, instead of US-GAAP?

In this thesis we will examine the information content of EVA and other more basic financial performance measures on stock based performance in three European markets. Furthermore we will determine whether accounting numbers reported under IFRS require less accounting adjustments to measure economic performance and therefore reduce the added value of EVA when compared with Residual Income.

1.1 Problem Statement:

Stock based performance (e.g. increases in share prices and dividend pay-outs) of companies is the most important type of performance for shareholders of these companies. Therefore it is important to measures this stock based performance of companies in the best possible way. In this study we want to examine which financial performance measure has the highest information content on stock based performance of companies in Europe. In this thesis the main research question is:

> *What is the financial performance measure with the highest information content on stock based performance in Europe, and in what way do under IFRS reported accounting numbers influence the added value of EVA™ when compared with country specific GAAP accounting numbers?*

This thesis will examine the information content of financial performance measures on stock based performance and will discuss the impact of IFRS on the necessity and added value of EVA™ accounting adjustments when compared with country specific GAAP.

1.2 Main contributions:

The main contributions of this thesis are a new field for observations i.e. Europe, where almost all previous research, e.g. Bao & Bao (1998), Grant (1996), O'Byrne (1996), Biddle et al. (1997) is based and focussed on US companies. Furthermore in this research we use accounting numbers reported under IFRS as a basis for the calculation of EVA and compare the differences for EVA™ accounting adjustments with accounting numbers reported under US-GAAP and previously used country specific GAAP.
This thesis will provide insight in the influence that different accounting standards can have on the necessity and therefore added value of EVA™ accounting adjustments and provide results for a new field of observation, i.e. the European market instead of the US market.

1.3 Summary of the research:

In this study the information content of financial performance measures on stock based performance will be examined. Furthermore we examine the impact of the new IFRS rules that are mandatory for stock listed companies in the EU. The expectation is that due to the new IFRS rules the necessity of EVA accounting adjustments decline and this might lead to less added value of this performance measure when compared with Residual Income.

1.4 Structure of the Thesis:

In the second chapter we discuss financial performance measures and stock based performance in general. Furthermore we give a brief description of previous research done on this subject. In chapter 3 we examine the introduction of IFRS and the influence of IFRS on the necessity of five important accounting adjustments for EVA™. In chapter 4 the methodology of the thesis is described and the models used explained. In chapter 5 the results and findings are reviewed and in chapter 6 limitations, possibilities for future research and the overall conclusion are given.

2. Explanatory value of financial performance measures on stock prices:

2.1 Introduction:

Financial performance measures are an often discussed subject in economic papers, furthermore in almost every study book on management accounting a big part is reserved for performance measures. The amount of available information on the subject states the importance of performance measures for the field of management accounting. The selection of the correct performance measures is often one of the most critical challenges managers and companies have to make (Knight, 1998). Performance measures that do not correctly and objectively reflect the actual performance of the company will result in a constant supply of misleading information that might result in poor decision making and control (Ferguson & Leistikow, 1998).

With the credit crunch of end 2008 the subject of bonuses rewarded to top-level managers of well-known firms is often found in the headlines of newspapers. Almost all these bonuses are rewarded upon performance measure basis. For example big companies like Coca Cola, AT&T and CSX use the EVA performance measure to evaluate the company's performance and reward their top level managers (Stewart, 1994). Most of these performance measures are based on financial information, although some companies use non-financial or a combination of financial and non-financial information. This thesis will deal with financial performance measures only. We start with discussing four leading financial performance measures in paragraph 2.2. In paragraph 2.3 the explanatory value of those financial performance measures on stock based performance will be explained. As a foundation for this theoretical background on the explanatory value of financial performance measures on stock based performance, some previous research on this subject will be discussed in paragraph 2.4. Paragraph 2.5 will contain a summary of the previously treated points.

2.2 Financial performance measures:

New financial performance measures have been introduced throughout the years, each of them bringing new or adjusted elements and factors to the calculation and monitoring of financial performance. Starting with financial performance measures based on absolute values of earnings or profit, adjustments have been introduced to calculate financial performance more accurately, resulting in new performance measures like Return on Investment (ROI) and Residual Income (RI). Traditional performance measures like earnings or profit were used in times when the decision making of the company was top-down and the responsibilities were largely focussed upon budget control and the following of orders from above (Knight, 1998). In the last decades however the focus changed from financial accounting measures to more realistic economic value creation measures, due to the changes in worldwide economics and increased emphasis on shareholder satisfaction (Stewart, 1991).

Based on Biddle et al. (1997) paper "Does EVA beat Earnings? Evidence on Association with Stock Returns and Firm Values", we can describe a general evolution of financial performance measures by highlighting four of them: Earnings, Profit (after tax), Residual Income (RI) and Economic Value Added (EVA). These four measures are used in the research by Biddle et al. on the explanatory value of financial performance measures on stock returns and firm values. The four financial performance measures mentioned above can generally be described as the basics of financial performance measures, starting with the basic earnings, expanding with multiple variables to the far more complex financial performance measure, EVA. Furthermore those four performance measures can be generally categorised as well known and popular in the field of management accounting due to the fact that they are reviewed in popular Management and Accounting study books (e.g. Zimmerman, 1996; Merchant & Van der Stede, 2007) and are often evaluated in academic research.

Earnings

Earnings can be described as the most common and basic version of financial performance measures. The financial performance is measured purely based upon earnings before adjustments, tax-expenses etc. When measuring financial performance based on Earnings, judgement can be made based on pure and non-adjusted financial information, but without adjustments to better map the costs that are needed to receive these earnings as in other more sophisticated financial performance measures like RI.

Profit (after tax)

The evolution of financial performance measures can be started by introducing a fairly straightforward but important adjustment to earnings; including operating taxes and interest expenses. The financial performance measure Profit (after tax) can be better described as *net operating profit after tax* (NOPAT). NOPAT is also used as basis for the calculation of even more sophisticated financial performance measures, including RI and EVA. NOPAT can be generally described as the net operating profit minus cash operating taxes (Bacidore et al., 1997). NOPAT includes the after tax costs of book interest expenses and can therefore be described as a financial performance measures based upon earnings but with the introduction of after tax costs for the calculation of financial performance.

In formula form: NOPAT = Earnings – cash operating taxes.

Residual Income (RI)

RI can be described as an adjusted version of NOPAT, where the cost of all debt and equity capital is taken into account (Biddle et. al, 1997). Calculating RI gives insight into the cost (or opportunity cost) of the capital investments used and therefore adds the component (opportunity) *cost of capital employed* to the performance measure NOPAT (Zimmerman, 2006).

In formula form: RI = NOPAT – K*Capital employed

Where:

K = Weighted average cost of capital

Economic Value Added (EVA)™

EVA™ can be described as a trademark version of the RI concept that is further developed and adjusted by Stern Stewart & CO. The development of EVA can be traced back to the book “The Quest for Value” written by Stewart in 1991. Since the release of that book a vast amount of literature has put emphasis on the subject (Keef & Roush, 2003).

Although EVA is based upon RI (both contain the same basis formula), both the calculation of NOPAT and of the cost of capital differ from RI. Stern Stewart & CO suggest over 164 performance measurement adjustments (Stewart, 1994), these accounting adjustments range from a large number of accounting variables and accounting capital that should be valuated

more like economic income and economic capital (Young & O'Byrne, 2001). For example the after-tax operating profit should be handled different from profit (after taxes) because of the amortization of intangible investments, such as R&D expenses and advertising cost (Merchant & van der Stede, 2007). These adjustments should lead to decision making on economic value basis instead of accounting value basis (Stewart, 1991).
Although Stern Stewart & CO suggest more than 164 accounting adjustments, companies should only implement them if they have a significant impact on the performance of EVA and are beneficial after a cost/benefit analyses. Therefore it is not common that companies make more than 15 adjustments on standard EVA™. Furthermore it is most common that companies only make 3-5 adjustments, where some companies do not even make any adjustments at all. The reasons for this are that managers are reluctant to deviate from GAAP based numbers and that test and simulation results show that there is not that much impact of additional accounting adjustments (Young & O'Byrne, 2001).

According to Young (1999) in his paper "some reflections on accounting adjustments and economic value added" there are eight accounting adjustments that are most commonly used by companies and might have the largest impact on the calculation of EVA: Non-recurring gains and losses, R&D, Deferred taxes, Provision for warranties and bad debts, LIFO reserves, Goodwill, Depreciation and Operating leases.
For his eight most important accounting adjustments Young looked beyond the four important rules stated by Stewart (1991) that accounting adjustments should only be made if: the amounts are of significant value, the outcome of the items that are being adjusted should be influence able by managers, the information needed is available and non-finance professionals can understand the adjustments. According to Young (1999) the cost of accounting adjustments can be high due to fact that: the statements are not really "true and fair" because of the accounting adjustments made, the accounting system could become more complicated and therefore more expensive, and the system might become more difficult for managers to understand. Using the previous mentioned standards by Stewart (1991) and the fact that EVA adjustments can be expensive, Young came up with his own eight adjustments that are most commonly proposed and have the largest influence on the calculation of EVA.
Anderson and Bey (2004) who based their research on the EVA accounting adjustments suggested by Young (1999) and Stewart (1991) came up with a selection based on the eight accounting adjustments suggested by Young. Anderson and Bey suggest accounting

adjustments for R&D expenses, advertising cost, LIFO inventory method, provision for bad debt and operating leases. According to their study these adjustments could have the largest influence on the calculation of EVA and are most often used by companies.

R&D expenses

According to Young and O'Byrne (2001) we can describe a general trend of a growing sense that investments in intellectual capital (R&D) have become more important than investments in physical assets. This might lead to higher emphasis on R&D and higher R&D budgets, resulting in higher costs.

Stern Stewart suggests an EVA accounting adjustment that stands for the capitalization of R&D expenses, where most companies take R&D cost as incurred. The thought behind this is that managers might under invest in R&D because of the high costs in the current period (if costs are taken when incurred), while with the EVA accounting adjustment the costs are spread over the following years. This adjustment to the calculation of EVA is made by adding back R&D costs to NOPAT and only subtracting the capitalized amount of R&D expenses.

Advertising cost

The adjustment for advertising expenses as advised by Stern Stewart & CO is based on the same concept and underlying thought as the adjustment for R&D expenses. Advertising costs occur the moment an advertising campaign is started and therefore result in direct costs. Revenues that are a result of those advertising campaigns, e.g. increased product sales, are often not directly noticeable. To better match the cost and revenues of advertising campaigns, Stern Stewart suggest capitalizing advertising costs instead of expensing them. The high costs in the starting period of the advertising campaign are then smoothed out among several years and might therefore better match the future revenue increases.

This adjustment is realised by adding up advertising expenses to NOPAT and only subtracting the capitalized amount of advertising.

LIFO

Last-in, first-out (LIFO) can be used as a system of inventory costing. The use of a LIFO inventory system can have a large impact on the income statement; it can result in important tax advantages during periods of constant inflation (Dongen, 2009). According to Young (1999) the use of a LIFO inventory system can have two major drawbacks that could bring problems for objective values of EVA: the inventory can be understated and, during periods where old LIFO layers are liquidated, the operating income and EVA can be overstated. The first problem is due to the fact that during periods of rising prices a "LIFO layer" is left behind which contains old product costs. This "LIFO layer" results in lower values of invested capital used for the EVA calculation. The second problem appears when old "LIFO layers" are liquidated, this happens when the inventory decreases, which results in overstatement of both NOPAT and EVA (O'Byrne & Young, 1999).

To cope with the two mentioned problems above an accounting adjustment should be made for the calculation of EVA by subtracting the LIFO reserve (value of the inventory – current cost) from NOPAT.

Provision for Bad Debts

Companies make provisions for costs that are expected to occur in the future due to decisions that are made in the past (Young & O'Byrne, 2001). Bad debts, a portion of receivables that is uncollectible, is one of the posts where provisions are made for. Stern Stewart philosophy on this matter is that provisions take accounting profits further away from cash flows and can be used to manipulate financial reporting behaviour. Therefore the accounting adjustment is suggested that increases in provisions are added back to the calculation of NOPAT and that decreases are subtracted. The balances in provision accounts should be added to invested capital for the calculation of EVA.

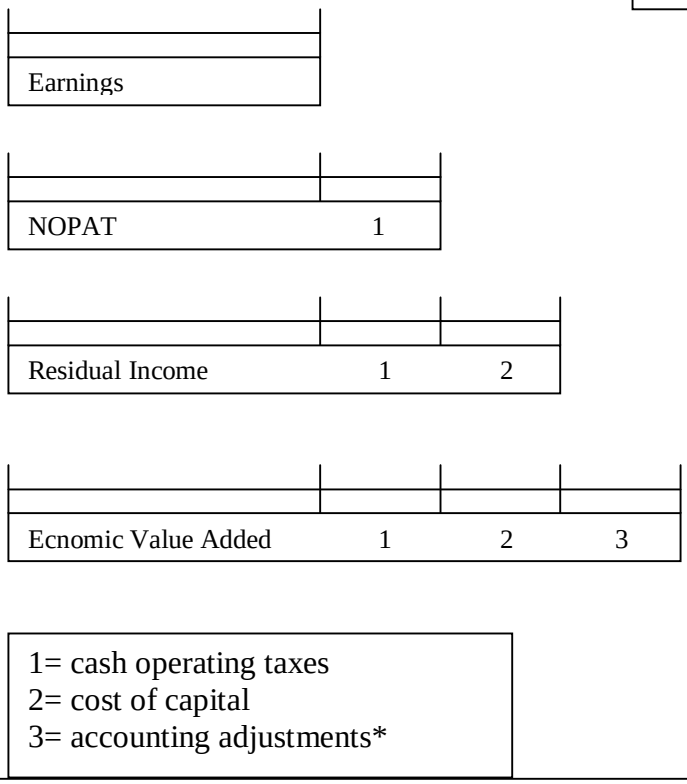
Operating leases

The problem with operating leases is that the payments are treated as a rental expense but the actual asset does not appear on the balance sheet of the company. According to Stewart (1991) this understates the invested capital of the company. Therefore he suggests an accounting adjustment whereby the present value of future lease payments (discounted for the companies borrowing rate) should be added to invested capital. The EVA adjustment for the

interest expenses are calculated by taking the capitalized value of the leases and multiplying it with the companies borrowing rate (Young & O'Byrne 2001).
Overall we can describe EVA as NOPAT including accounting adjustments minus the cost of capital including accounting adjustments.

In formula form:	EVA	=	NOPAT (accADo) – K * Capital (accADc)
Where:			
accADo		=	Accounting adjustments on the operating account
accADc		=	Accounting adjustments on (the cost) of capital

Figure 2.1



*appendix A gives mathematical insight in the calculation of EVA with the five accounting adjustments suggested by Anderson and Bey.

Figure 2.1 describes the general evolution of financial performance measures whereby every new financial performance measures adds an element to the calculation of financial performance. The major difference between the four financial performance measures should therefore be due to the introduction of: cash operating taxes, cost of capital and accounting adjustments.

2.3 Financial performance measures in relation with stock prices and shareholder value creation:

The information revolution combined with the rapid evolution in the industry due to technology improvements and the increased globalization of the world economy has resulted in major changes in the field of internal control systems of organisations (Stewart et al., 1996). Starting in the 1980s, shareholders demanded increases in company's values, which should lead to increased shareholder wealth. Furthermore they put the pressure on company managers to increase the emphasis on shareholder wealth (Bacidore et al., 1997).

"Angry investors closed out the Decade of Greed with demands that executive compensation should be tied to company performance" (Smolowe, 1996). The previous quote illustrates that shareholders wanted the company's executives to be rewarded based on company performance linked with the creation of shareholder value.

This is where modern financial performance measures gained in popularity (Stewart, 1991; Madden, 1999). For example in 1997 a survey revealed that 25% of the 153 randomly chosen companies covered in a study in the United States and Canada were using EVA (Young, 1997). The role of the manager should be pointed towards the perception that the wealth of the shareholders should be maximised by optimally allocating the resources of the company. This has resulted in an increasing emphasis on devising new measuring systems for financial performance of companies and focussed rewarding for managers (Young, 1997).

The most logical way to achieve this increased shareholder emphasis is to reward executives by basing their rewards on the stock prices and dividend pay-outs of the company. But there are some problems with stock prices as basis for rewarding because there are factors that drive stock prices that are out of control of the executives, like macro- and microeconomic news (Cutler et al. 1988). Because of the problems with the use of compensation based on stock prices most companies fell back to rewards based on financial performance measures. To get the financial performance measure to function as a "stock-price based" compensation the measure should be highly correlated with stock prices, this should satisfy the shareholders demands for executive compensation based on stock performance.

Resulting in a basic theory where a good financial performance measures should put emphasis on stock prices but is independent of non manageable side-effects that have influence on the firm's stock prices.

To determine the effectiveness of financial performance measures on their correlation with stock prices and creation of shareholder wealth we must first determine what drives stock prices in general and how shareholder value is created.

Value creation and value drivers:

Shareholder value creation, wealth creation, stock market returns and stock prices are some of the dependent variables that are discussed in empirical research on their correlation with financial performance measures. Although their names differ they are all tied to the stock based performance of companies and are highly correlated with each other. Overall they all depend on the performance of companies; therefore it is important to note what drives company performance and how companies can improve their performance.

If companies want to create value they need to earn a return on investment that is larger than the opportunity cost of capital (Copeland et al., 2000). But how do we create a return on investment that is larger than the opportunity cost of capital? According to Rappaport (1986) shareholder value can be created by improving several *value drivers* of the company. Value drivers are operating factors that have significant influence on the financial and operating results of a company, furthermore they can also be used to understand non-financial information (Knight, 1998). Within companies and organizations there are several of those value drivers that are responsible for creating value. Rappaport (1986) mentioned seven value drivers that are critical for determining the value of the company, those value drivers are spread over three different areas of the company: operating, investment and financing. The *sales growth, operating profit margin and income tax rate* determine the value of the operating area of the company. The investment area is covered by the value drivers; w*orking capital investment* and *fixed capital investment*. The financing area is covered by the *cost of capital*. Furthermore the *value growth duration* is mentioned as an external value driver. According to Rappaport the combined value of those value drivers determine the total value of the company. Financial performance measures try to take as many of the (previously mentioned) value drivers into account and put them into one single measure for determining the effectiveness of a company (Ehrbar, 1998).

Papers about the subject, EVA and other financial performance measures and their information content on stock based performance, have used multiple dependent variables for stock based performance. The most important ones used are: Stock Market Returns, Shareholder Value Creation and Market Value Added. Although these three previously mentioned dependent variables have a lot in common and can all be described as stock based performance, they do differ. The differences between the three previously mentioned measures of stock based performance will be briefly discussed below.

Stock market returns:

Stock market returns are basically the most easily measurable value of a company's stock based performance. There are two main components that drive the stock market returns; dividend pay-out and the price of the share. Furthermore there is a relation between the value of the share, an increase in financial results of the company and the dividend pay-out per share (Modigliani & Miller, 1961). According to Modigliani and Miller the value of a share can be calculated using the following formula[1]:

$$P_j(t) = \frac{1}{1+p(t)}[d_j(t)+p_j(t+1)]$$

Where:

$P_j(t)$ = Return on a share of firm *j* for period t

$p(t)$ = Price of a share (ex any dividend in $t-1$) of a firm *j* at the start of period t

$d_j(t)$ = Dividend payout per share by company *j* in period t

But there are some assumptions to be made for the model of Modigliani & Miller to hold:

- Perfect capital markets

This means that there is no buyer or seller that has so much power that he can influence the price of shares when buying or selling. Furthermore all the traders have equal and costless access to information and no other types of fees are issued.

- People tend to react rational

People prefer higher stock prices above low stock prices and high dividend pay-out above low dividend pay-out. This is the standard assumption that assumes that people are rational and try to maximize their utility by preferring high income above low income.

[1] [1] Modigliani & Miller, (1961). Dividend Policy, Growth and the Valuation of Shares

- Perfect certainty

Returns on investments in the future are guaranteed in relation with the corresponding risk, which leads to the assumption that there is no need to distinguish between stocks and bonds and other types of financials instruments. This makes it possible to analyse financial instruments as if there were only one type of financial instrument, shares of stock.

Off course there are a lot of other factors that influence stock prices and the first and third assumption can never hold in real stock exchange markets, because there are costs involved when transferring shares and there is never a guaranteed return on investments. But the model by Modigliani and Miller does give a basic insight in the components that drive the share price. A modified version of the formula by Modigliani and Miller will also be used to calculate the independent variable "Stock Market Returns".

Shareholder value creation:

Shareholder value creation is related to the value creation of companies but is not exactly the same. Shareholder value is created if the dividend payments and/or the share-price increases by an amount that exceeds the risk-adjusted rate of return in the stock market (Dalborg, 1999). The corporate value of a company equals the sum of the values of its debts and equity, whereby the equity can be called the *shareholder value* (Rappaport, 1986). Rewriting the previous formula, the *shareholder value* is the corporate value of a company minus its *debts*. The corporate value can be written as the *present value of future cash flows from operations* during the forecast period combined with the residual value, which is the present value of business attributes to the period beyond the forecast period (Rappaport, 1986). Shareholder value is the absolute economic value in the forecasted period (Net Present Value of cash flows and residual value minus debts) whereas shareholder value is created if there is a positive change in the value over the forecast period.

In his book "Creating shareholder value" (1986) Rappaport describes how shareholder value can be created by improving several value drivers of the company.

Market Value Added:

The market value added (MVA) of a company is the difference between the market value of the company and the total of invested capital in the firm (Young & O'Byrne 2001).
MVA is calculated by:

MVA = market value – invested capital

The market value is the company value e.g., all capital claims against a company at a certain date. It is the value of all debt and equity of a company. Invested capital is the amount of capital that is invested in the company by the company's capital providers (Young & O'Byrne 2001).
When the company's debt and equity is higher than the invested capital, wealth is created according to the formula of MVA. Performance measurement based on MVA pushes managers to create wealth instead of capital for the company. The goal for managers is no longer to maximize the value of the firm, but to increase the value of the firm without using more capital, or the other way around. This way value for the shareholders of the company can be created.
One of the major problems with MVA is that the formula neglects the opportunity cost of capital. The value created by a firm, based on the MVA formula, should be larger than the revenues when that capital would be invested in e.g. a risk free saving account. When an MVA of <5% is realised we might actually assume that value is destroyed because that same capital could be invested for an average return of >5% (Young & O'Byrne 2001).
Furthermore the MVA value of a company only measures value at a certain date, for example previous cash returns to shareholders are neglected in the formula. This makes the comparison of companies less objective.

2.4 Previous research on the correlation between financial performance measures and stock based performance of companies:

Financial performance measures and their correlation with stock based performance of companies has been a subject of many papers in the field of management accounting. Especially after the introduction of the EVA™ financial performance measure and the claims of Stern Stewart & CO that EVA™ is superior in explaining stock prices and creating shareholder value for companies. In their research papers Stern and Stewart (1991, 1993, and 1994) claim the superiority of EVA, but many other researchers including Biddle et al. (1997) and Bacidore et al. (1997) have reacted by doing similar research on this matter, resulting in different outcomes and results. These and other papers include some interesting facts and a theoretical basis for explaining the differences in information content of financial performance measures on stock based performance. In this paragraph some of the more important and interesting researches done in the past will be discussed.

Stewart (1991, 1994)

The Stewart papers, his book "The quest for Value" (1991) and his "hazardous" citations can be described as the starting point of the whole discussion regarding the EVA supremacy in explaining stock prices and shareholder value creation. With claims like "EVA is almost 50% better than its closest accounting-based competitor in explaining changes in shareholder wealth" Stewart (1994) set a high standard for his newly developed and patented financial performance measure.

Stewart's research (1991) started with the abandoning of the standard company rankings of the magazine *Business Week*, which were often used for academic research. According to Stewart these rankings were based upon market capitalization instead of performance. Therefore Stewart decided to come up with his own company ranking which was named Stern Stewart Performance 1000, whereby the companies were ranked based upon Market Value Added (MVA) values. Stewart then found really high values of R^2 (97%) between the values and changes in values, of EVA and MVA of companies. One important side note is that these correlations were only this high for companies with a positive value of EVA, for companies with a low, or negative EVA, the correlation was not high at all and could even be negative. According to Stewart this was due to the fact that the MVA always reflects the value of the assets of the company, even if the company has negative returns.

The results of the studies done by Stewart clearly suggest that EVA is highly correlated with MVA. Some other studies that provide evidence for the supremacy of EVA are mentioned below.

Stern (1993)

"Incentives should not be directed at maximizing total shareholder value. A concept called market value added (MVA) should be the focus" (Stern, 1993). This quote already suggests that Stern is on the same thoughts as Stewart in his book "The quest for value" in 1991. Something that is obvious because Stern and Stewart founded Stern Stewart in 1982, a firm focussing on helping other companies improve their performance and valuation[2]. Both papers focus on the MVA value of companies. The results of studies in the United States and the United Kingdom suggest that EVA is more highly correlated with share prices and changes in those prices. The R^2 of the EVA measure is 50% in comparison with other financial performance measures like Return on Equity (25%) and Earnings-per-share growth (18%), which suggests that the EVA performance measure is more highly correlated with share prices and changes in share prices. This is according to Stern due to the high correlation between EVA and MVA, because MVA equals the present value of future EVA's.

Lehn and Makhija (1996)

For their research paper "EVA and MVA as Performance Measures and signals for Strategic Change" Lehn and Makhija took a sample of 241 large firms in the United States for the period 1987-1993. Most of these companies (about 66%) were in the manufacturing industry. They compared EVA and MVA with other performance measures: Return on Assets (ROA), Return on Equity (ROE), Return on Sales and Share Returns. Their findings were that EVA and MVA are significantly positively correlated with stock price performance (59%) based upon their effectiveness as performance measures (Lehn and Makhija, 1996).
They conclude that EVA and MVA are effective performance measures and can contain information that can be used as signals for strategic decisions.

[2] http://seminars.sternstewart.com/

James. L Grant (1996)

In "Foundations of EVA™ for Investment Managers" Grant (1996) provides a basis for understanding the linkages between EVA and corporate valuation on both conceptual and empirical level. Grant took his research sample from the Stern Stewart Performance 1000 database for the years 1993 and 1994. For the fifty largest US wealth creators at the end of 1993 the R^2 was 83% on the correlation between EVA and MVA. Grant indicates that his research explains that the source of EVA-induced wealth effects is a positive residual return on capital. Furthermore Grant's findings suggest that corporate profits should be measured on a relative basis in comparison with capital used, therefore he used standardised values for EVA and MVA.

Bao and Bao (1998)

In their research paper "Usefulness of value added and abnormal economic earnings: an empirical examination" (1998) Bao and Bao investigated the explanatory value of value added and abnormal economic earnings on market returns. For their research they used observations on 166 US firms. Value added is the most significant explanatory variable on market returns and its explanatory value exceeds the value of earnings by 34%.

O'Byrne (1996)

In his study O'Byrne analysed industrial companies and studied the regression of Earnings and EVA on firms' market values. He used a two step model; he started with normal calculation of EVA and Earnings and found an R^2 of 31% for EVA where Earnings scored 33%. The second step of his analyses was by implementing some changes to the calculation of EVA, most importantly the introduction of dummy variables to stand for potential industry effects. In this second step he found an R^2 of EVA of 56% resulting in higher scores for EVA than Earnings on the correlation with firms' market values.

Uyemura et al. (1996)

100 United States bank holding companies were observed in the study "EVA for banks: value creation, risk management, and profitability measurement" by Uyemura et al. (1996). They observed these bank holding companies for the period 1986-1995 and tested the correlation between standardized MVA and standardized EVA versus traditional performance measures. The R^2 of EVA turned out to be 40%, more than two times as high as the second best

performance measure ROA 13%. Although this research is in a specific sector, the banking industry, it gives evidence for high values of correlation between EVA and MVA.

Although the previously mentioned authors claim and deliver proof for the superiority of EVA in relation with especially MVA, but also stock prices and shareholder value creation, there are authors who tend to proof the opposite. Some of the more interesting and often quoted academic papers which results suggest that EVA is not superior in correlation with stock prices and shareholder value creation are mentioned below.

Biddle et al., (1997,1998)

Biddle et al., find opposite results when compared with the previous mentioned authors in their paper "Does EVA® Beat Earnings? Evidence on association with stock returns and firm values"(1997). This paper from Biddle et al. can be seen as one of the most important papers that produce results that are not in favour of the EVA financial performance measure when tested on explanatory value on stock returns and firm values. The paper is often quoted by other researchers and mentioned in almost any other paper on this subject.

Biddle et al., conclude that although EVA can be an effective tool for internal purpose it does not dominate Earnings in explaining stock market returns for the sample they used. For their research they used the Stern Stewart Performance 1000 database which contained, after filtering, 773 firms that were observed for a 10 year period. In their research they compared EVA with Earnings, RI and operating cash flow. They also did several different regression analyses, making use of different year intervals to make sure that the results were not different for short or long time periods, or the possibility that EVA needed multiple years to explain stock prices. "To consider the possibility that equity market participants take longer to learn about and impound EVA, we extended the return interval from the one-year contemporaneous period used above to a two year period that includes both the contemporaneous and subsequent year"(Biddle et al. 1997). In their starting model they find a R^2 of 9% for Earnings which is higher than the R^2 for EVA (5,1%). Some changes to variables and year intervals changed the value of R^2 of all performance measures, but overall Earnings keeps dominating EVA in every setup.

Furthermore Biddle et al., give an explanation why the results for the O'Byrne paper (1996) are incorrect according to their thoughts. Because O'Byrne used some important adjustments for the calculation of EVA in relation with stock prices and did not use those same

adjustments for the calculation of Earnings. These adjustments resulted in favourable values for the EVA performance measure. When Biddle et al. made the same adjustments for Earnings they found a R^2 of 53% where O'Byrne only found 17% in his research.
In the year 1998 Biddle et al. released another paper "Economic Value Added: Some empirical EVAdence" where they tried to answer the question: "Why does EVA perform so poorly in comparison with accrual earnings in explaining stock returns and firm values, when after all, it appears to incorporate certain adjustments that are consistent with economic notions of income and firm valuation? "
They suggest several possible reasons why EVA performs so poorly in relation with stock returns and firm values. One of the most important reasons might be, that EVA is only equally capable with earnings in proxying for future equity cash flows. Furthermore they state that the accounting adjustments suggested by Stern Stewart may remove some of the market accruals that investors use to examine the companies future prospects. Therefore the EVA performance measure might be closer related with economic profits, but it might reduce its association with stock returns.

Bacidore et al. (1997)

In their paper "The search for the best financial performance measure" Bacidore et al. started a research on the correlation between shareholder wealth creation and EVA/REVA. REVA is an adjusted version of EVA that assesses its capital charge for period *t* on the market value of the firm at the end of period *t-1,* where EVA uses the economic book value of assets.
Their study examined 600 US companies, which were randomly selected from the Stern Stewart database 1000, for the years 1982-1992. They conclude that REVA has a higher correlation with shareholder value creation than EVA, but still the overall values of R^2 for EVA and REVA (11% and 39%) are relatively low.

Chen and Dodd (1997, 2001)

According to Chen and Dodd in their article "Economic Value Added (EVA™): An empirical Examination of A new Corporate Performance measure" (1997) the claims of Stern Stewart, that improving EVA performance is associated with higher stock returns, is rightful. Although the claims that EVA is almost two times as good as other financial performance measures is rejected. Not one of the EVA measures tested (average EVA, standardized EVA changes, return on capital and capital minus cost of capital) has a relation with stock returns that

exceeds 26%. Together the four tested EVA measures have a R^2 of 41,5% leaving a large percentage of the stock returns unexplained. Furthermore they claim that according to their study the use of accounting profit measures can still generate significant information even if EVA is already in use. They also conclude that EVA and RI are highly correlated and are almost identical in explaining stock returns.

Chen and Dodd did another study on the subject: "Operating Income, Residual Income and EVA™: Which Metric is More Value Relevant?". They used data from the Stern Stewart 1000 database for the years 1992-2001. Using those 10 year observations on the correlation between RI/EVA/Operating Income and stock returns, they found that Operating income has the highest correlation (R^2 of 9%) followed by RI (7,8%) and EVA (6,6%). They suggest that the low value of EVA is due to the fact that: "the market may see through various accounting conventions differently than Stern Stewart" (Chen and Dodd, 2001).

Pablo Fernandez (2001)

After analyzing 582 US companies in his research paper "EVA and Cash value added do NOT measure shareholder value creation" Fernandez calculated the 10-year correlation between the increases in MVA each year and each year's EVA, NOPAT and WACC. He used data provided by Stern Stewart for the period 1983-1997. For 296 of the observed companies the correlation of MVA and NOPAT was higher than the correlation between MVA and EVA. Furthermore for 210 of the companies the correlation between MVA and EVA was negative.

Kyriazis and Anastassis (2007)

One of the most recent papers on the subject is "The validity of the Economic Value Added approach: an Empirical Application" (2007). In this paper Kyraizis and Anastassis test the relative explanatory power of EVA with respect to stock returns and firms' market value and compare the results with the results of established accounting variables. Other than most other papers this article focuses on a small European stock market, the Athens stock exchange. The study covers the data form 121 non-financial publicly traded Greek firms for a period of eight years (1996-2003). Their findings do not support the Stern Stewart claim that EVA is more highly correlated with stock market returns, because net income and operating income have higher information content with respect to abnormal and raw stock returns. Although EVA scores higher in the correlation with the firm's MVA it does not significantly outperform other financial performance measures as with the studies of Stern Stewart.

There have been several large scaled and some smaller scaled researches on this matter, most of them in the United States and using the Stern Stewart Performance 1000 as a database source. In appendix B the research papers and books mentioned previously are summarised. Overall we can describe very different outcomes of R^2 values of the studies done on the subject. It is interesting to note that the papers with results in favour of EVA are almost all published in "Journal of Applied Corporate Finance" where Stern and Stewart are members of the advisory board[3]. Furthermore most of those papers that produce results in favour of EVA are done in the United States using the Stern Stewart Performance 1000. Furthermore the highest values of R^2 are found when the correlation between EVA and MVA is examined and not when the correlation between EVA and stock prices/shareholder value creation is examined.

Most academic research done on the matter by independent researchers can not find evidence for the superiority of EVA in explaining stock prices or shareholder value creation. Therefore even after examining multiple researches, focussing on the largest companies of the United States, we can not draw a general conclusion on the subject based upon previous research.

2.5 Summary and conclusion:

Starting with financial performance measures based on absolute values of earnings or profit, adjustments have been introduced to calculate financial performance more accurately, resulting in new performance measures like RI and EVA™. Claims from Stern Stewart like "EVA is almost 50% better than its closest accounting-based competitor in explaining changes in shareholder wealth" results in the question whether EVA dominate less complex performance measures like Earnings in explaining stock based performance e.g. (Stock Market Returns, Shareholder Value Creation and MVA).

Previous research done on the information content of financial performance measures on stock based performance does not provide one-sided results. Although in-home studies from Stern and Stewart provide evidence for the superiority of EVA in explaining stock based performance these results are criticised by independent researchers that do not find similar results in their studies (see Appendix B for overview).

[3] http://www.wiley.com/bw/editors

3. Introduction of IFRS and influence on EVA accounting adjustments:

3.1 Introduction:

Many countries in the Europe Union have been moving towards an increase in the protection of investors' rights in past decades (Krishna et al. 2007). To achieve this goal, entrepreneurs and stock exchanges needed to be disciplined. Financial reporting should be based on "true and fair" values, the slogan of auditors, leading to objective and non-adjusted or manipulated information for whoever needs it.

The International Accounting Standards Committee (IASC) has issued the use of International Accounting Standards (IAS) since the year 1973. These IAS state how several particular types of transactions should be reflected in the financial statements of companies. In 2001 the IASC started with the replacement of IAS with International Financial Reporting Standards (IFRS), although most of the IAS are still used in the new IFRS (Hope, et al. 2006).

In 65 countries, from which there are 28 countries in the European Union (including Belgium, France and the Netherlands), IFRS is the required framework for financial reports of publicly traded companies. Furthermore all European stock listed firms were required to adopt IFRS in the beginning of 2005 for their financial statements.

The adoption of IFRS can be described as one of the largest financial reporting changes in the last decades and is often part of debate and discussion (Armstrong et al., 2006). For Dutch publicly traded companies the implementation of IFRS is a large scale project, consuming lots of resources, in both financial and time perspective. But expectations are that both companies and investors will benefit from IFRS in the long term, because IFRS should lead to higher quality and more comparable information for both internal and external use[4].

Overall the main reason for the European Union to mandatory IFRS for publicly traded firms is a strategic one. Uniform information that is of a high standard is one of the main conditions that need to be fulfilled before a large European capital market can be established that can compete with the American capital market (Van Helleman, 2005).

[4] www.iasb.org/ifrs

3.2 Influence of the new IFRS rules on EVA accounting adjustments:

Stern Stewarts EVA™ performance measure is based upon economic performance instead of accounting performance of companies. To determine economic performance based on accounting performance Stern Stewart suggests several adjustments to accounting numbers reported by companies.

Companies report their performance in accounting values which are based on country specific accounting rules e.g. (US-GAAP, IFRS). The accounting performance from companies based on these reported accounting values can differ from economic performance as intended by Stern Stewart. The difference between accounting performance and economic performance can be partly eliminated by using the accounting adjustments as suggested by Stern Stewart.

The problem that might come up is that the accounting adjustments as suggested by Stern Stewart are based upon US-GAAP and not on IFRS accounting numbers, which is the accountings standard used by companies in this study. Therefore we need to determine whether accounting numbers based upon US-GAAP and country specific GAAP (for Belgium, France and the Netherlands) used in the pre-IFRS era are the same as when reported under IFRS. To determine the differences we compare US-GAAP and country specific GAAP with IFRS rules on the most important accounting adjustments as suggested by Anderson and Bey (2004). This way we can determine whether the difference between accounting performance and economic performance is the same for companies reporting under IFRS or country specific GAAP.

Furthermore we can determine whether the difference between accounting and economic performance has decreased using IFRS compared with country specific GAAP as basis for accounting values. A decrease in difference between accounting performance and economic performance might lead to a decrease in necessity of accounting adjustments for the calculation of EVA.

In table 3 the key differences between IFRS and country specific GAAP on Advertising, R&D, provisions for bad debt, inventory methods and operating leases are summarised.

Table 3 the key difference between IFRS and GAAP

TABLE 3	**IFRS**	**NL-Gaap**	**BE-Gaap**	**Fr-Gaap**	**US-Gaap**
Advertising	Expensed when inccured	Expensed when incurred	Expensed when incurred	Expensed when incurred or capitalized	Direct response advertising might be capitalized, other advertising costs expensed when incurred or deferred until first appearance
R&D	Research expensed, development capitalised if criteria are met	Research and development expensed	R&D might be expensed or capitalized based on the entity's accounting policy	Research must be and acquired in process development might be capitalized	Research and development expensed when incurred
Provisions for bad debt	Impairment losses, stricter rules to qualify as bad debt	an estimate is made at the end of each fiscal year of the amount of bad debt	an estimate is made at the end of each fiscal year of the amount of bad debt	an estimate is made at the end of each fiscal year of the amount of bad debt.	an estimate is made at the end of each fiscal year of the amount of bad debt.
Inventory costing methods allowed	Carried at lower of cost and net realisable value. FIFO or wtd average method. LIFO prohibited	Carried at lower cost and net realisable value. LIFO, (not recommended) FIFO or wtd average method permitted	Carried at lower cost and net realisable value. LIFO, FIFO or wtd average method permitted	Carried at lower cost and net realisable value. LIFO, FIFO or wtd average method permitted	Carried at lower cost and net realisable value. LIFO, FIFO or wtd average method permitted
Operating leases	Asset leased should be recognised as PPE by a lessor and depreciated over its useful life	Asset leased should be recognised as PPE by a lessor and depreciated over its useful life	Asset leased should be recognised as PPE by a lessor and depreciated over its useful life	Asset leased should be recognised as PPE by a lessor and depreciated over its useful life	Asset leased should be recognised as PPE by a lessor and depreciated over its useful life

When we take a look at table 3 we see that the accounting principles used in Belgium, France and the Netherlands prior to IFRS do not differ much. In France capitalization of advertising and R&D cost is allowed, while in the Netherlands and Belgium (except R&D cost in Belgium, policy choice) these costs should be expensed.
The differences between IFRS and previously used country specific GAAP are mainly found in the inventory method allowed, because while reporting under IFRS the LIFO inventory method is no longer allowed. Furthermore a difference can be found in the provision for bad debt, where no longer a provision is estimated but where bad debt should qualify for an impairment loss before it can be deducted. Differences between IFRS and US-GAAP exist in four out of five accounting adjustments except operating leases that should be treated the same way. The difference between IFRS and US-GAAP is larger than the difference between IFRS and the country specific GAAP for the three countries observed in this study.
To determine what the differences are for the calculation of the EVA performance measure while reporting under IFRS or country specific GAAP we will determine the impact per accounting adjustment. Furthermore we will examine whether the accounting adjustments, which are mainly based upon US-GAAP, are still required when reporting under IFRS.

R&D expenses (IAS38)

Stern Stewart suggests capitalizing R&D costs to gain a better view on the economic performance of the company. According to Stern Stewart the problem with R&D investments is that the expenses occur directly while only possible future benefits are generated.
Accounting rules in the United States, US-GAAP, require expensing of all R&D outlays. This means that the annual and quarterly expenses of R&D should be subtracted from the corresponding periods' revenues instead of capitalizing them.
The values of return on invested capital will decrease drastically in years with high R&D costs when R&D costs should be expensed instead of capitalized. This might distort the correlation with stock based performance for years with high R&D expenses.
When R&D costs are expensed when incurred instead of capitalized we will see more volatile EVA scores (without the accounting adjustment) over the years for companies with high amounts of R&D expenses, which is not inline with the thoughts of Stern Stewart.
The possibility of capitalizing R&D expenses is often discussed but is at this moment still prohibited, although the proposition of the possibility of capitalization of R&D expenses was often discussed before IFRS was issued (Deng et al., 2006).

IAS 38: research should always be expended, development might be capitalised if certain criteria are met (appendix C): "No intangible asset arising from research (or from the research phase of an internal project) shall be recognised. Expenditure on research (or on the research phase of an internal project) shall be recognised as an expense when it is incurred." Therefore the reported accounting numbers for R&D costs are expensed under IFRS reporting and are, just like US-GAAP, not in line with Stern Stewart's EVA thoughts where R&D expenses should be capitalized and smoothed over several years. Overall the introduction of IFRS has not resulted in a different treatment of R&D costs compared with US-GAAP, the accounting adjustment on R&D expenses is still necessary.

LIFO inventory method (IAS2)

The use of a LIFO based inventory costing system can have a large impact on the capital invested and the income statement of companies, because inventory exists of old product costs and can therefore be understated. Furthermore during periods where old LIFO layers are liquidated, the operating income can be overstated. Therefore Stern Stewart suggests an accounting adjustment to subtract the LIFO reserve i.e., (the value of the inventory minus the current cost) from NOPAT.

When reporting under IFRS it is not allowed to use the LIFO inventory method. *IAS 2 IN13:* "The standard does not permit the use of the last-in, first out (LIFO) formula to measure the cost of inventories". All companies who are mandatory to IFRS can not use the LIFO system for inventory costing; they should assign the cost of inventories based on first in, first out (FIFO) or the weighted average cost method.

The LIFO accounting adjustment suggest by Stern Stewart was approved by Young (1997), Anderson and Bey (2004) as important and significant, but influences only companies which use the LIFO inventory costing system and therefore excluding banks, investment firms, FIFO users etc. The influence of this accounting adjustment on EVA values is only valuable for companies with large inventories and volatile purchase prices which do not report under IFRS. Before 2005 in Belgium, France and the Netherlands the use of the LIFO inventory method was allowed and in the US LIFO is currently still allowed. When reporting under IFRS, where LIFO is no longer allowed, the accounting adjustment for LIFO inventory costing is no longer necessary. The IFRS for inventory methods are in line with the EVA thoughts because invested capital is no longer understated and operating income will not be periodically overstated. Therefore the accounting numbers reported by firms reporting under

IFRS do not need to be adjusted by the accounting adjustments suggested by Stern Stewart as it was while reporting under country specific GAAP.

Advertising costs (IAS39)

The adjustment for advertising costs as advised by Stern Stewart is based on the same underlying thought as the accounting adjustment for R&D expenses. Advertising expenses usually occur in the starting period of an advertising campaign, but revenue increases e.g. increased sales, will be only partially noticeable in the short term. Long term revenue increases due to advertising expenses do not match with the costs of the advertising campaign started in a previous period. To better match the revenues and costs of advertising campaigns, Stern Stewart suggest an accounting adjustment where advertising costs are capitalized during a period determined by the company instead of expensed when incurred.

According to IFRS capitalization of advertising cost is not allowed. *IAS38 IN5*: "This standard applies to, among other things, expenditure on advertising, training, start-up, research and development activities" and *IAS39 IN68*: "Expenditure on an intangible item shall be recognises as an expense when it is incurred".

While reporting under US GAAP advertising cost might be expensed as incurred or expensed when advertising takes place for the first time (policy choice). Under IFRS advertising costs should be expensed at the moment they incurred. Therefore there is no possibility for firms to better match the expenses of advertising campaigns with future revenues. Both IFRS and country specific GAAP require the expensing of advertising costs. Therefore while reporting under both IFRS and US-GAAP the accounting adjustment for advertising cost is needed for the calculation of EVA.

Provision for Bad Debts (IAS 36)

Companies make provisions for costs that are expected to occur in the future. According to Stern Stewart provisions are easily manipulated and can move accounting profits further away from real economic profits of companies. Therefore they suggest adjusting the calculation of NOPAT through adding back after tax increases in provisions and subtracting decreases. Furthermore the balance in the provisions accounts should be added back to invested capital for the calculation of EVA.

IFRS describes a provision as a liability of uncertain timing or amount. "A liability is a present obligation of the entity arising from past events, the settlement of which is expected to result in an outflow from the entity of resources embodying economic benefits" (IAS37).
Provisions for bad debt are described in *IAS 36* (Impairment of assets) because they are adjustments to the carrying amounts of assets.
Following the adoption of IFRS, strictly speaking "bad debt provisions" no longer exists, there only are "impairment reserves", but the underlying concept is similar. A company would normally expect to get a tax deduction for its bad debt provision (GAAP) or impairment reserve (IFRS) if properly calculated in relation to specific debts. The differences between IFRS and GAAP are due to stricter rules for impairment losses for companies reporting under IFRS[5]:

	IFRS	GAAP
Step1	Trigger event	Trigger event
Step2	Review past payment history	Review past payment history
Step3	estimate future cash collection	estimate future cash collection
Step4	estimate timing of cash collection	N/A
Step5	discount at EIR	N/A
Step6	provision based on discounted cash flow	Provision based on cash loss

Because of the stricter rules for impairment losses while reporting under IFRS the "provision post for bad debt" might decrease. A lower amount in the provision post will decrease the impact of the accounting adjustment suggested by Stern Stewart and therefore decrease the necessity for the calculation of EVA.

Operating leases (IAS 17)

We can distinguish operating leases and financial leases by the ownership of the risks of the lease. IFRS classifies a lease as a "financial lease if it transfers substantially all the risks and rewards incidental to ownership" (IAS 17), when the risks and rewards are not transferred to the lessee the lease is classified as an operating lease. IAS 17 has some standard guidelines to determine whether a lease is financial or operational, it depends largely on the substance of the transaction rather than the form of contract.

[5] http://www.davenham.co.uk/Group/IFRS%20Presentation%2026%20April%202007.pdf

Some standard guidelines rules for leases that qualify as a financial lease:

- the lease is transferred to the lessee by the end of the lease term,
- the lessee has the option to buy the asset for a discounted price in comparison with market value,
- the lease term is for the major part of the economic life of the asset
- the present value of the minimum lease payments amounts to at least substantially all of the fair value of the leased asset
- the leased asset is of such a specialised nature that no other company can use it without major modifications.

Leases that do not fulfil the previously mentioned guidelines are qualified as operational leases. Financial leases can be either capitalised or expensed, both IFRS and US-GAAP do have some qualitative criteria before capitalization of financial leases is allowed, operational leases should always be expensed.
Financial leases (if amortised) do not lead to inaccurate determination of economic value according to the EVA measure, because the asset appears on the balance sheet of the company. Operating leases on the other hand do result in a problem for the calculation of economic value, according to Stern Stewart. Operating leases do not appear on the balance sheet of a company although rental expenses are made for the use the lease. Therefore Stern Stewart suggests an accounting adjustment whereby the present value of future lease payments should be added back to invested capital. This adjustment changes the economic value of an operating lease to that of a financial lease with amortization of the depreciation and interest on the balance sheet. The accounting adjustment for operating leases influences three parts of the EVA calculation; Nopat, invested capital and the Wacc (increase in debt portion of distribution)
Companies are not allowed to put the book value of operating leases on the balance sheet (capitalization) because they do not own the actual asset; they only have the opportunity to use it. IFRS allows companies to “expense a operational lease on a straight line basis over the lease term, unless another systematic basis is more representative, even if this is not in line with the payment method” (IAS 17).
IFRS lets companies relatively free in their method for expensing operating leases, but it is not allowed to put the “potential” value of the operating leases on the balance sheet.

Overall IFRS has no impact on the calculation of EVA in comparison with previously used country specific GAAP, none of the accounting standards described allow capitalizing operating-leases.

3.3 Summary and conclusion:

Overall the IFRS do not differ much from previous used country specific GAAP for the countries observed in this study i.e. Belgium, France and the Netherlands. When we compare IFRS and GAAP rules on the five most important accounting adjustments as mentioned by Anderson and Bey (2004) we can conclude that the major difference is that the accounting adjustment for the LIFO inventory method is no longer needed because IFRS prohibited the use of LIFO. Furthermore due to stricter rules for impairment losses the balance of the bad debt provision account might decrease, reducing the need for the accounting adjustment for provisions for bad debt.

Overall IFRS reduces the need for two out of five accounting adjustments suggested by Anderson and Bey. Accounting numbers reported under IFRS are in theory more in line with Stern Stewarts economic performance thoughts than those reported under country specific GAAP when compared for the five most important accounting adjustments. In chapter 4 we will conduct statistical tests to determine whether this theoretical decrease in need for accounting adjustments when reporting under IFRS can be confirmed. Furthermore we will conduct statistical tests to determine whether EVA outperforms Earnings, NOPAT and RI based on information content on stock based performance.

4. Methodology:

4.1 Introduction:

The correlation between financial performance measures and stock based performance of companies has been discussed in several previously published papers e.g. (Biddle et al. 1997, Bao & Bao 1998, Bacidore et al. 1997). But in those papers multiple definitions for stock based performance are used, including Stock Market Returns, Shareholder Value Creation and MVA. The question rises whether there is a significant difference when comparing financial performance measures on Stock Market Returns, Shareholder Value Creation and MVA. Therefore we will examine the information content of Earnings, NOPAT, RI and EVA on all three previously mentioned dependent variables. Using three hypotheses focussing on three different dependent variables gives us the opportunity to examine the absolute explanatory power of all four financial performance measures and whether the correlations differ among the three dependent variables. Furthermore we examine whether EVA, based upon IFRS accounting numbers has decreased need for accounting adjustments compared with EVA based on country specific GAAP accounting numbers.
We start with describing the hypotheses used for the research in paragraph 4.2 Sample and data collection is described in paragraph 4.3. The dependent variables (paragraph 4.4) and the independent variables (paragraph 4.5) used are examined. While paragraph 4.6 describes the models used for the regression analyses and paragraph 4.7 will contain a brief summary and conclusion.

4.2 Hypotheses:

To examine whether or not the explanatory performance of Earnings, NOPAT, RI, EVA and EVA without accounting adjustments (unadjustedEVA) differs significantly from each other and if they differ more when using stock market returns, shareholder value creation or MVA, we need to test three hypotheses:

Hypothesis 1: The information content of EVA on Stock Market Returns is higher than the information content of Earnings, NOPAT, Residual Income and unadjustedEVA

This hypothesis is used to examine whether EVA has higher information content on the dependent variable Stock Market Returns than Earnings, NOPAT, RI and unadjustedEVA.

The hypothesis is based on the claims from Stern Stewart that EVA is superior in explaining stock prices in comparison with other financial performance measures. Furthermore we compare the results for EVA and unadjustedEVA to see what the influences of accounting adjustments are for EVA values in explaining Stock Market Returns.

We conduct a one-tail test whereby rejection of hypothesis 1 can be viewed as evidence that EVA does not provide higher information content on stock prices in comparison with Earnings, NOPAT or RI for our data sample.

Hypothesis 2: The information content of EVA on Shareholder Value Creation is higher than the information content of Earnings, NOPAT, Residual Income and unadjustedEVA

Using the same one-tailed test as hypothesis 1, this hypothesis is used to test whether EVA has a higher correlation with Shareholder Value Creation than Earnings, NOPAT, RI or unadjustedEVA. Rejection of this hypothesis can be viewed as evidence that EVA does not provide higher information content on Shareholder Value Creation than Earnings, NOPAT or Residual Income for our data sample.

Hypothesis 3: The information content of EVA on MVA is higher than the information content of Earnings, NOPAT, Residual Income and unadjustedEVA.

This hypothesis is to test whether EVA has higher information content on MVA than Earnings, NOPAT, RI or unadjustedEVA. Again a one-tailed test is used because of the claims and previous research (with an R^2 of 97%) from Stern Stewart on the correlation between EVA and MVA.

The three previous hypotheses are all used to determine the information content of financial performance measures on stocks based performance; they differ on the dependent variable used. This way we can examine whether EVA does provide more information on Stock Market Returns, Shareholder Value Creation or MVA than other less complicated performance measures.

After examining the information content of Earnings, NOPAT, RI, EVA and unadjustedEVA on stock based performance we arrive at the next part of the research. We also want to examine whether the difference between EVA and RI has decreased after the introduction of IFRS in the European Union. We assume that because of the stricter rules of IFRS the accounting adjustments suggested by Stern Stewart will have less impact on the calculation of EVA. This might lead to decreased differences in explanatory value between EVA and RI. The previous statement will be tested in hypothesis 4.

Hypothesis 4: The difference between EVA and unadjustedEVA (without accounting adjustments) has decreased for the period 2005-2007 compared with the period 2000-2004.

In hypothesis 4 we test whether the difference between EVA (which includes the accounting adjustments) and unadjustedEVA (which does not include accounting adjustments) has decreased for the IFRS era compared with the pre-IFRS era. If hypothesis 4 is rejected we can assume that the IFRS rules do not have a significant impact on the necessity of the five most important EVA accounting adjustments as mentioned by Anderson and Bey (2004). If this hypothesis holds, we can assume that the necessity of the five accounting adjustments has decreased for the calculation of the EVA performance measure. The decreased use of accounting adjustments brings EVA closer to RI values, because EVA and RI only differ because of a company specific cost of capital for EVA and the accounting adjustments used for calculating EVA.

4.3 Sample and data collection:

The data used for the research are from Belgium, France and Dutch companies listed on the Euronext index for the period 2000-2007. A total of 453 companies qualified for the previous mentioned criteria. Filtering for missing Thomson one banker and Compustat data reduces the amount of companies to 430. The total data was filtered per variable for outliers by resetting all data that is greater(less) than four standard deviations from the median, a method also used by Biddle et al., (1997). The final amount of companies observed was 430 with seven year data per company resulting in 3010 unfiltered overall observations.

4.4 Dependent variables:

Stock market returns

The first hypothesis will focus on the correlation between financial performance measures and Stock Market Returns. Stock Market Returns are composed by two main components; the share price and the dividend pay-out per share. We can determine the stock market returns based on the following Modigliani and Miller (1961) equation:

$$P_j(t) = \frac{1}{1+p(t)}[d_j(t)+p_j(t+1)]$$

Where:

$P_j(t)$ = Return on a share of firm *j* for period $_t$

p(t) = Price of a share (ex any dividend in $_{t-1}$) of a firm *j* at the start of period $_t$

$d_j(t)$ = Dividend payout per share by company *j* in period $_t$

The dependent variable stock market returns tells something about the performance of the company purely based on the results determined from the value of a company share. High dividend payout combined with increases in share price will result in positive values on this performance measure.

Because we want to compare companies of different size the Stock Market Return performance will be evaluated in % increase in share value, rewriting the previous mentioned Modigliani and Miller formula to:

$$StMaRe_j = \frac{p_j(t)+D_j(t)-p_j(t-1)}{p_j(t-1)} * 100\%$$

Where:

$StMaRe_j$ = Stock market returns for company *j* in % for period $_t$ in comparison with period $_{t-1}$

Shareholder value creation

Value for shareholders is created the moment a company manages shareholder returns that exceed the cost of equity (Fernandez, 2002). This is based on the concept that when a company outperforms the expectations for a given year it will generate shareholder value. Following the formula of Fernandez (2002) we can calculate shareholder value creation:

Shareholder Value Creation	=	shareholder value added – (Equity MV * Ke)

Where:

Shareholder value added	=	(Equity MV_t – Equity MV_{t-1}) + (Dividend p/s * shares)
Equity MV	=	Equity Market value (share price * outstanding shares)
Ke	=	% required return on the investments in the company's shares

The required return on investments in the company's shares can be estimated by adding a risk premium to the return on investments guaranteed by the state (risk free interest rate). Therefore we will calculate Ke using the following formula (Fernandez, 2002):

Ke	=	return on treasury bonds + company's risk premium

Where the return on treasury bonds for Belgium, France and the Netherlands is 4,3% 4,25% and 4,24% respectively for the period 2000-2007 (Morningstar data). Because there is no exact risk premium for every company available in the public databases we use the Capital Asset Pricing Model (CAPM) to determine the company specific risk.

r_e	=	$r_f + \beta [E(r_m)-r_f]$[6]

Where:

r_e	=	the expected return on a security / cost of equity
r_f	=	the expected risk free return in the market (treasury bond)
β	=	the sensitivity to market risk for the security

[6] Business analysis and valuation (Palepu et al.)

r_m	=	The historical return of the stock market
$[E(r_m)-r_{f]}$	=	the risk premium of market assets over risk free assets

The risk free rate of the market (r_f) can be determined using 10 year treasury bonds. For the period 2000-2007 these were for Belgium, France and the Netherlands 4,3% 4,25% 4,24% respectively (Morningstar data).
The average returns for the Euronext stock exchange has been 7 % for the past 10 years according to Standards and Poor's average return for the Europe 350 index.

The risk premium of stock markets has been on average 1,7% worldwide for the period 2002-2007, the values for Belgium, France and the Netherlands were 1,3% 0,9% and 1,2% respectively[7]. This was during the period that investors still had good confidence in the worldwide stock market, after the credit crunch of 2008 the risk premium went up drastically.

The value of the company specific item, β, dependents on multiple factors including management style and capital structure. To estimate the β per firm we use the values given by the Thomson one banker database per firm. The β given by the Thomson one banker database can be improved by applying Bloomberg[8] adjustment method, because high volatility of the stock returns might lead to imprecise estimates. The following Bloomberg formula will be used:

Adjusted β	=	0.66*unadjusted β + 0.34

The Bloomberg adjustment increases the values of β lower than 1 and decreases the values of β higher than 1, resulting in a smoother distribution of β among the companies used in the research.

The main differences between Shareholder value creation and the in the hypothesis 1 tested Stock Market Returns are that required return on investments are taken into account and that the total value of the company (shares * share price) is used instead of the price of one share of a company. Shareholder Value Creation is therefore a more realistic measure of stock

[7] Morningstar data
[8] www.bloomberg.com

based performance of companies rather than the performance of a company on the stock market.

Market Value Added

The MVA of a firm is the difference between the total market value of the firm and the total amount of equity capital that is contributed by the company's shareholders (Young, 1997).

MVA	=	Market value Capital – Capital invested[9]

Where:

Market value Capital	=	share price * number of shares outstanding
		+ Number of preferred Shares * share price
Capital Invested	=	Total common equity

MVA gives insight in the value that is created by a firm for its shareholders. It is the difference between the initial investments done by shareholders and the potential cash value of the company when sold.

4.5 Independent variables:

The four independent variables used for measuring financial performance, Earnings, NOPAT, RI and EVA are defined below:

Earnings

Earnings before interest and taxes (Thomson one banker database item EBIT) will be used for measuring the financial performance based on Earnings before adjustments.

NOPAT

Net operating profits after tax (NOPAT) will be defined as Earnings minus operating taxes and interest expenses.

NOPAT	=	Earnings – Taxes and interest expenses

[9] Corporate finance (Ehrhard and Brigham)

Where:

Earnings	=	Thomson one banker database item EBIT (Earnings before interest and taxes)
Taxes	=	Thomson one banker database item TotalTaxes (total income taxes)

RI

For the calculation of RI we use the previous formulated NOPAT including adjustments for the opportunity cost of capital.

RI	=	NOPAT- K*Capital employed
Where:		
K	=	Treasury bonds + risk premium[10]
Capital Employed	=	Thomson one Banker item TotalCapital

EVA

For the calculation of EVA this paper does not use the Stern Stewart 1000 database as used by most other research on the subject, e.g. (Biddle et al. 1997; Stern, 1993). This is because the Stern Stewart 1000 database contains North-American companies only and is not publicly available without charge.

Because we do not use the Stern Stewart 1000 database we do not have the by Stern Stewart calculated database item EVA to use for EVA values. Instead we have to calculate EVA using publicly available information. By using the following formula based on the RI concept plus the five mainly used accounting adjustments as suggested by Anderson and Bey (2004) and the adjustment for calculating the Wacc instead of cost of capital, we can determine EVA using publicly available information:

EVA	=	RI +/- Accounting adjustments + Wacc adjustment

[10] Morningstar data:
Treasury bonds: Belgium (4,3%) France (4,25%) and Netherlands (4,24%)
Risk premium: Belgium (1,3%) France (0,9%) and Netherlands (1,2%)

Where:

Accounting adjustments	=	Advertising cost
		R&D expense
		Provision for bad debt
		Operating leases
		LIFO inventory method
Wacc adjustment	=	company specific cost of capital (Wacc) instead of K

The Wacc reflects the cost of equity and debt, the weighted-average cost of capital. For the calculation of Wacc we need to determine the cost of equity and the cost of debt. The opportunity cost for investing in the company is the cost of equity. The cost of equity is determined by the price appreciation and dividends that shareholders could have earned investing in another company with the same risk factor. The current market yield on debt of similar risk is the cost of debt. The cost of debt and equity are weighted by their relative amounts in % and multiplied with their costs (Zimmerman, 2006).
The cost of debt is defined as the risk free-rate plus a risk premium. For most companies debt expenses are deductible, therefore for profitable firms we must discount the debt with the tax rate.

Cost of debt = (Risk free rate + market risk premium)*(1-tax rate)

The cost of equity is also based upon a risk free rate plus a risk premium, a required rate of returns for investors in equity (Zimmerman, 2006).The values for the cost of equity are the same as the company's specific rate of return already calculated using the CAPM before in paragraph 4.4.

After determining the cost of equity and debt and the total values of equity and debt the formula for the Wacc will be:

$$\text{Wacc} = \left(\frac{Teq}{(Teq+Tde)} * Ceq\right) + \left(\frac{Tde}{(Teq+Tde)} * Cde\right)$$

Where:

Teq	=	Total amount of common equity
Tde	=	Total amount of debt
Ceq	=	cost of equity (using CAPM)
Cde	=	cost of debt (Risk free rate + risk premium)*(1-tax rate)

4.6 The Model:

For the regression analysis on the information content of the four financial performance measures on stock based performance we use a model developed by Easton and Harris (1991) as a basis. This model is often used by other researchers for regression analysis on performance measures and stock based performance and used in popular papers on this subject (e.g. Biddle et al., 1997; Chen & Dodd, 1997). Although the original model by Easton and Harris only examines the information content of Earnings on Stock Market Returns, some adjustments can be made so the information content between NOPAT, RI and EVA with other stock based performance can also be examined.

The model developed by Easton and Harris (1991) links stock market returns with earnings.
The basic principle behind the formula is that the book value and the share price are both measures of the "stock" value of companies (Easton and Harris, 1991).

$$P_{jt} = BV_{jt} + \mu_{jt}$$

The price per share of the firm (P_{jt}) depends on the book value (BV_{jt}) plus a difference between market and book values (u_{jt}). The differences between market and book value (u_{jt}) can be a result of many factors including the choice of accounting practices and other information that is incorporated in the price but not reflected in the accounting values of the firm (Easton & Harris, 1991). After rewriting this formula in terms of a univariate regression on returns and earnings levels:

$$R_{jt} = \alpha_{t0} + \alpha_{t1}[A_{jt}/P_{jt-1}] + \epsilon_{jt1}$$

Where R_{jt} is the return on a share of company *j* at time *t* (containing both increase/decrease in share price and dividend pay-out) and A_{jt} is the accounting earnings in that period and P_{jt-1} is the price per share of a firm in period *t-1*.

The basic equation by Easton and Harris can be adjusted by replacing accounting earnings with Nopat, RI and EVA respectively. The dependent variable Stock Market Returns can also be substituted with Shareholder Value Creation and MVA values.
Easton and Harris (1991) expected that "earnings divided by beginning-of-period price should be an appropriate variable for explaining returns". Where the beginning-of-period share price would be a "scaling" factor, we replace the P_{jt-1} (price per share at time t-1) with the equity market value at the beginning of the period (MVE_{t-1}) of the company because scaling companies on equity is less dependent on external factors than the company's share price. The usage of equity market values will reduce heteroskedasticity (Biddle et al., 1997).

To test the first Hypothesis:

The information content of EVA on stock market returns is higher than those of Earnings, NOPAT, Residual Income and unadjustedEVA

We use a standard model based on the model developed by Easton and Harris and used by e.g. Biddle et al. (1997) that assesses the information content by examining the statistical significance of the slope coefficient b_1.

We use the following equations:

Eq 1: Stock market returns $_t$ = $b_{01}+b_{t11}(\%Earnings_{jt}]+e_t$

Eq 2: Stock market returns $_t$ = $b_{02}+b_{t12}(\%NOPAT_{jt}]+e_t$

Eq 3: Stock market returns $_t$ = $b_{03}+b_{t13}(\%RI_{jt}]+e_t$

Eq 4: Stock market returns $_t$ = $b_{04}+b_{t14}(\%EVA_{jt}]+e_t$

Eq 5: Stock market returns $_t$ = $b_{05}+b_{t15}(\%unadjustedEVA_{jt}]+e_t$

Where:

Stock market returns = the increase/decrease in share price $_t$ + dividend $_t$ compared with share price $_{t-1}$

%Earnings	=	the increase/decrease in earnings $_t$ compared with earnings $_{t-1}$
%NOPAT	=	the increase/decrease in NOPAT $_t$ compared with NOPAT $_{t-1}$
%RI	=	the increase/decrease in RI $_t$ compared with RI $_{t-1}$
%EVA	=	the increase/decrease in EVA $_t$ compared with EVA $_{t-1}$
%unadjustedEVA	=	the increase/decrease in unadjustedEVA $_t$ compared with unadjustedEVA $_{t-1}$
e_t	=	random disturbance term

To test the second Hypothesis:

The information content of EVA on Shareholder Value Added is higher than those of Earnings, NOPAT, Residual Income and unadjustedEVA

Eq 1: Shareholder value creation $_t$	=	$b_{01}+b_{t11}(Earnings_{jt}/MVE_{jt-1}]+e_t$
Eq 2: Shareholder value creation $_t$	=	$b_{02}+b_{t12}(NOPAT_{jt}/MVE_{jt-1}]+e_t$
Eq 3: Shareholder value creation $_t$	=	$b_{03}+b_{t13}(RI_{jt}/MVE_{jt-1}]+e_t$
Eq 4: Shareholder value creation $_t$	=	$b_{04}+b_{t14}(EVA_{jt}/MVE_{jt-1}]+e_t$
Eq 5: Shareholder value creation $_t$	=	$b_{05}+b_{t15}(unadjustedEVA_{jt}/MVE_{jt-1}]+e_t$

Where:

Shareholder value creation $_t$	=	the Shareholder Value Creation at time $_t$ compared with $_{t-1}$
Earnings/MVE_{jt-1}	=	earnings $_t$ / Equity value of company $_{j\,(t-1)}$
NOPAT/MVE_{jt-1}	=	NOPAT $_t$ / Equity value of company $_{j\,(t-1)}$
RI/MVE_{jt-1}	=	RI $_t$ / Equity value of company $_{j\,(t-1)}$
EVA/MVE_{jt-1}	=	EVA $_t$ / Equity value of company $_{j\,(t-1)}$
unadjustedEVA/MVE_{jt-1}	=	unadjustedEVA $_t$ / Equity value of company $_{j\,(t-1)}$
e_t	=	random disturbance term

To test the third Hypothesis:

The information content of EVA on MVA is higher than those of Earnings, NOPAT, Residual Income and unadjustedEVA

Eq 1: $MVA_t = b_{01}+b_{t11}(Earnings_{jt}]+e_t$

Eq 2: $MVA_t = b_{02}+b_{t12}(NOPAT_{jt}]+e_t$

Eq 3: $MVA_t = b_{03}+b_{t13}(RI_{jt}]+e_t$

Eq 4: $MVA_t = b_{04}+b_{t14}(EVA_{jt}]+e_t$

Eq 5: $MVA_t = b_{05}+b_{t15}(unadjustedEVA_{jt}]+e_t$

Where:

MVA	=	the Market Value Added at time $_t$
Earnings	=	the earnings at time $_t$
NOPAT	=	NOPAT at time $_t$
RI	=	RI at time $_t$
EVA	=	EVA at time $_t$
UnadjustedEVA	=	unadjustedEVA at time $_t$
e_t	=	random disturbance term

To reveal the explanatory value of the financial performance measures on stock based performance the coefficient's R^2's, F-statistics and significance levels will be examined.

To test the fourth hypothesis we need a different approach than used for the previous mentioned hypotheses. To determine the impact of the use of IFRS on EVA accounting adjustments we examine whether the difference between EVA and EVA without accounting adjustments has decreased for the period 2005-2007 when compared with the period 2000-2004.

To test the 4th hypothesis:

The difference between EVA and EVA without accounting adjustments has decreased for the period 2005-2007 compared with the period 2000 and 2004.

To find out whether the difference between EVA and EVA without accounting adjustments has decreased for the post-IFRS era we run a paired samples T-test where we compare the average difference between EVA with and without accounting adjustments per company for the period 2000-2004 with the period 2005-2007.

4.7 Summary and conclusion:

In this chapter we discussed the methods and models used for the research. We will test an overall of four hypotheses where the first three hypotheses are focussed on the information content that financial performance measures have on three different types of stock based performance. The fourth hypothesis is purely focussing on the influence of IFRS on reported accounting numbers and the need for accounting adjustments for the calculation of EVA, compared with country specific GAAP previously used in Belgium, France and the Netherlands. In the next chapter we will discuss the results from testing these four hypotheses using the models described in this chapter.

5. Empirical results:

In this thesis we wanted to determine whether the claims of Stern Stewart & CO, who claimed superiority of the EVA performance measure in determining stock based performance, could be supported by empirical results. The research sample is taken from stock listed companies from three countries in the European Union e.g. Belgium, France and the Netherlands. The regression analyses will be examined per country individually as well as for a combined data sample from the three countries.

To test our first three hypothesis, we examine the information content of Earnings, NOPAT, RI and (unadjusted)EVA on Stock Market Returns, Shareholder Value Creation and MVA. The descriptive statistics of the variables are shown in appendix D describing the median, standard deviation (SD) and number of observations of the variables. The R^2 values, F-statistics and significance levels of the regressions described in chapter 4 are used to determine the information content.

5.1 Hypothesis 1:

For the first hypothesis we compared the information content of financial performance measures on Stock Market Returns for Belgium, France and the Netherlands per country as well as a combined sample from those three countries (table 5.1 to 5.4).

The information content of EVA on stock market returns is higher than those of Earnings, NOPAT, Residual Income and unadjustedEVA

Tabel 5.1 Regression analysis Netherlands, Dependent variable: Stock Market Returns

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,030*	0,027*	0,024*	0,023*	0,017*
F	16,02*	15,50*	13,59*	13.28*	9,60*

**p<0.001*

Tabel 5.2 Regression analysis Belgium, Dependent variable: Stock Market Returns

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,015*	0,019*	0,024*	0,014*	0,023*
F	10,28*	10,80*	13,60*	8,50*	13,83*

**p<0.001*

Tabel 5.3 Regression analysis France, Dependent variable: Stock Market Returns

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,035*	0,029*	0,024*	0,025*	0,018*
F	59,75*	49,16*	41,00*	43,70*	31,00*

**p<0.001*

Tabel 5.4 Regression analysis Combined Sample,, Dependent variable: Stock Market Returns

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,030*	0,022*	0,022*	0,022*	0,019*
F	87,00*	62,00*	62,13*	65,00*	54,20*

**p<0.001*

For the Netherlands (3%), France (3%) and the total sample (3%) Earnings dominate the other four performance measures. Only in Belgium Earnings (1,5%) is dominated by RI (2,4%). In the Netherlands and France the R^2 of the performance measures actually decreases when additional information is added for the calculation of financial performance (Netherlands: Earnings 3% > NOPAT 2,7% > RI 2,4% > EVA 2,3%), (France: Earnings 3,5% > NOPAT 2,9% > EVA 2,5% > RI 2,4%).

Overall we see an overall information content on Stock Market Returns that is relatively low and does not exceed the 3% adjusted R^2. Although these results are relatively low they are in line with previous research by e.g. Biddle et al. (1997), where the information content on Stock Market Returns does not exceed the 10% barrier. Although Biddle et al. reported a 10% information content of Earnings on Stock Market Returns we can conclude that overall Stock Market Returns are largely determined by external influences and financial performance measures only have a marginal effect.

We found some volatile results between countries and the information content of the financial performance measures. For the combined sample we see highest information content for Earnings (3%) and a decreasing information content of 2,2% for NOPAT, RI and EVA. Furthermore unadjustedEVA scores even lower on information content (1,9%). Because the difference between EVA and RI only exists of a company specific cost of capital and accounting adjustments for EVA calculations, the difference between unadjustedEVA and RI is only due to the company specific cost of capital (Wacc). Therefore for our sample the Wacc does not benefit the information content of EVA on Stock Market Returns.

Because in none of the four samples EVA dominates the other financial performance measures we can reject hypothesis 1. Overall we see no evidence for the superiority of EVA

in explaining Stock Market Returns because for all three countries as well as the combined sample EVA is dominated by Earnings or RI.

5.2 Hypothesis 2:

For the second hypothesis we compared the information content of financial performance measures on Shareholder Value Creation for the Belgium, France and the Netherlands per country as well as a combined sample from those three countries (table 5.5 to 5.8).

The information content of EVA on Shareholder Value Creation is higher than those of Earnings, NOPAT, Residual Income and unadjustedEVA

Tabel 5.5 Regression analysis Netherlands, Dependent variable: Shareholder Value Creation

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,100*	0,080*	0,099*	0,090*	0,096*
F	66,28*	51,40*	63,70*	57,16*	61,37*

**p<0.001*

Tabel 5.6 Regression analysis Belgium, Dependent variable: Shareholder Value Creation

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,027*	0,039*	0,034*	0,060*	0,037*
F	17,16*	23,80*	20,98*	37,30*	22,68*

**p<0.001*

Tabel 5.7 Regression analysis France, Dependent variable: Shareholder Value Creation

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,020*	0,027*	0,017*	0,020*	0,030*
F	34,20*	45,70*	28,89*	33,00*	51,20*

**p<0.001*

Tabel 5.8 Regression analysis Combined Sample, Dependent variable: Shareholder Value Creation

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,007*	0,004*	0,007*	0,010*	0,015*
F	19,27*	10,32*	20,50*	27,70*	42,68*

**p<0.001*

For the Netherlands we see higher values of information content for all five performance measures when compared to the information content on Stock Market Returns. Earnings (10%) still dominates the other four performance measures, as it did with the Stock Market Returns. While the R^2 values of information content for Belgium and France are lower than for The Netherlands, EVA dominates in Belgium (6%) and unadjustedEVA dominates in France (3%). The results for the country specific regression analysis are very volatile and the ranking of the performance measures on information content differ per country. Overall we see that the largest difference in information content is only 3,3% for EVA (6%) compared with Earnings (2,7%) in Belgium. For the Netherlands (2%) and France (1,3%) the differences between the best and worst performing measures are even smaller.

Although EVA dominates the other performance measures in Belgium and unadjustedEVA dominates in France, the regressions run for the Netherlands does not support the claim of EVA superiority. The overall sample for all three countries shows even lower values of R^2 where overall EVA dominates (EVA 1% > RI and Earnings 0,7% > NOPAT 0,4%).

Furthermore the unadjusted version of EVA scores higher (1,5%) than the EVA version with accounting adjustments (1%). When we compare the unadjusted version of EVA with RI we see that company specific cost of capital now does contribute to higher values of R^2. This is not in line with the results from hypothesis 1 that has shown that the company specific cost of capital negatively influenced the correlation between Stock Market Returns and financial performance measures. Furthermore the accounting adjustments suggested by Stern Stewart negatively influence the information content of EVA on Shareholder Value Creation.

Overall the values of information content on Shareholder Value Creation are again not exceeding the 10% barrier for the country specific analysis.

Although EVA outperforms the other performance measures in Belgium and the combined sample we do not see similar results for the Netherlands and France. We can therefore reject hypothesis 2 for the data sample taken from Dutch and France companies. For the sample taken in Belgium and the combined sample Hypothesis 2 holds.

5.3 Hypothesis 3:

For the third hypothesis we compared the information content of financial performance measures on Market Value Added for Belgium, France and the Netherlands per country as well as a combined sample from those three countries (table 5.9 to 5.12).

The information content of EVA on MVA is higher than those of Earnings, NOPAT, Residual Income and unadjustedEVA

Tabel 5.9 Regression analysis Netherlands, Dependent variable: Market Value Added

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,525*	0,496*	0,435*	0,431*	0,426*
F	633,51*	566,00*	450,00*	439,00*	432,00*

**p<0.001*

Tabel 5.10 Regression analysis Belgium, Dependent variable: Market Value Added

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,079*	0,060*	0,090*	0,117*	0,072*
F	53,53*	37,90*	65,30*	81,37*	46,70*

**p<0.001*

Tabel 5.11 Regression analysis France, Dependent variable: Market Value Added

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,242*	0,293*	0,232*	0,275*	0,224*
F	546,00*	704,00*	516,00*	649,00*	492,00*

**p<0.001*

Tabel 5.12 Regression analysis Combined Sample, Dependent variable: Market Value Added

All years	Earnings	NOPAT	RI	EVA	unadjustedEVA
R2	0,295*	0,275*	0,283*	0,278*	0,276*
F	1220,00*	1107,00*	600,00*	1134,00*	1098,00*

**p<0.001*

For our third hypothesis we compared the information content on MVA for, Belgium, France and the Netherlands individually and as a combined sample. Overall the values of R^2 are a lot higher than in the two previously tested hypotheses. The information content of all four financial performance measures does increase in the Netherlands where Earnings (52,5%) still dominates the other performance measures. For France NOPAT dominates (29,3%) and for Belgium EVA (11%) dominates although the overall values for France and especially Belgium are far lower than those for the Netherlands. In the Netherlands we find the same decrease in information content when adding extra information to the performance measure as with hypothesis 1 (Earnings 52,5% > NOPAT 49,6% > RI 43,5% > EVA 43,1%). While in

Belgium EVA dominates the other performance measures which also was the result after testing hypothesis 2. For France NOPAT dominates the other performance measures, which is in line with hypothesis 2 where NOPAT also scored highest (although unadjustedEVA topped NOPAT).

The combined sample shows that Earnings dominates (29,5%) followed by RI (28,3%) EVA (27,8%) and NOPAT (27,5%), while the unadjusted version of EVA scores lowest (27%) which again demonstrates that the company specific cost of capital does not necessarily contribute towards higher information content on stock based performance. Overall we see far higher values of information content when we examine the relation between financial performance measures and MVA than with Stock Market Returns or Shareholder Value Added. This is in line with papers like Biddle et al. (1997) and Stern (1993) who found values of R^2 that could rise to around 50%.

Although EVA again dominates the other performance measures in Belgium, these results are not supported by the sample from the Netherlands, France and the combined sample. For the Belgian sample hypothesis 3 holds, while it is rejected for the Netherlands, France and the combined sample.

There is no evidence that EVA significantly outperforms Earnings, NOPAT or RI in relation with MVA, although Stern Stewart & CO claims that the relation between MVA and EVA could be as high as 97% (Stewart, 1993) and that EVA and MVA are more highly correlated with MVA than any other performance measure.

5.4 Hypothesis 4:

For the fourth hypothesis we test whether the EVA accounting adjustments decrease in influence on the EVA performance measure after the introduction of IFRS in 2005.

> *The difference between EVA and EVA without accounting adjustments has decreased for the period 2005-2007 compared with the period 2000 and 2004.*

Although the results from the regression analysis in the previous hypotheses suggest that EVA with accounting adjustments does not necessarily outperform EVA without accounting adjustments, EVA with accounting adjustments should result in smoother and less volatile scores for EVA and better reflect the economic performance of the company which is in line with the thoughts of Stern Stewart.

To test what the influence of IFRS is on the necessity of accounting adjustments, we compared the differences between EVA/MVE and the unadjusted version of EVA/MVE for the periods 2000-2004 and 2005-2007. We ran a paired sample T-test with average differences between EVA and unadjusted EVA for the periods 2000-2004 and 2005-2007 per company. We used the total sample of 2952 year observations to determine the mean in difference for the period 2000-2004 and for the period 2005-2007 per company. The data resulted in an output of 416 companies with average differences between EVA and unadjustedEVA for the periods 2000-2004 and 2004-2007.

The result of the paired samples T-test (Table 5.13) implies that the average difference between EVA and EVA without accounting adjustments has significantly decreased for the period after the implementation of IFRS. While the mean of the differences between EVA and unadjusted EVA was 13,99 for the period 2000-2004 it has decreased to 4,77 for the period 2005-2007 (table 5.1). Therefore we can confirm hypothesis 4 where the influence of IFRS has decreased the need for accounting adjustments for the calculation of economic performance by EVA.

Table 5.13

	Mean	N	Std deviation	Std error mean	t	Sig.
Pre-IFRS	13,987	416	84,11	4,124		
Post-IFRS	4,768	416	94,75	4,646		
Paired					3,312	0,001

5.5 Summary and conclusion:

In this chapter the hypotheses from chapter 4 were tested. Overall we can not find a particular financial performance measure that dominates for all three of the tested versions of stock based performance. Furthermore we do not find any evidence that EVA is superior in determining stock based performance of companies. The fourth hypothesis about the influence of IFRS is confirmed. Accounting numbers based upon IFRS are more in line with the economic value thought of Stern Stewart and therefore there is a decreased need for accounting adjustments when compared with accounting numbers reported under country specific GAAP.

6. Conclusion, limitations and suggestions for further research:

In this chapter the answer to the main research question will be discussed. Furthermore limitations of this study are noted in paragraph 6.2 while paragraph 6.3 gives possibilities for further research on the subject.

6.1 Answers to the problem statement:

In this thesis we tried to find the answer to the following research question:

> *What is the financial performance measure with the highest information content on stock based performance in Europe, and in what way do under IFRS reported accounting numbers influence the added value of EVA™ when compared with country specific GAAP accounting numbers?*

The first part of the question is answered by testing hypothesis 1 to 3. As discussed in chapter 5 we can not find any evidence for the superiority of the EVA performance measure compared with Earnings, NOPAT and RI. None of these performance measures dominate the others in every test or for every observed country. Therefore we can not give a direct answer to the first part of our research question, all of the performance measures perform randomly stronger or weaker then the others for different countries or dependent variables. This might be due to the fact that stock based performance is a very volatile measure that largely depends on external factors. Overall movement of the stock exchange index or rumours about a company can drastically decrease or increase stock based performance while basic earnings do not differ much from previous years.

Furthermore the results as discussed in chapter 5 show us that the differences between the best and worst performing measure per dependent variable is very low. Therefore financial performance measures do have information content on stock based performance, but adjustments to basic Earnings do only marginally influence the scores. We can assume that Earnings is the main component that has information content on stock based performance, and adding components to basic Earnings does not necessarily benefit the information content. This in combination with the higher costs of using more sophisticated performance measures

like RI and EVA lead to the conclusion that companies are better of using basic earnings as performance measure.
Furthermore we see low values of information content of performance measures on both Stock Market Returns and Shareholder Value Creation, while we see relatively high values of information content on MVA. Although Stock Market Returns and Shareholder Value Creation hold a direct correlation with the demands of shareholders the overall usefulness of improving company performance based on these performance measures for satisfying shareholder demands is far to low.
This leads to a conclusion where financial performance measures might not be the right indicator for Stock Market Returns and Shareholder Value Creation, especially in volatile and dynamic markets as the stock market is now a day, but other possibilities for measuring stock based performance fall outside of the scope of this thesis.
While Stock Market Returns and Shareholder Value Creation do only marginally benefit from increases in financial performance measure scores, MVA does have a far higher benefit from increasing those scores. This is where most of Stern Stewart EVA superiority claims are based upon. But we have shown in this research that high information content on MVA does not necessarily mean there is high information content on the direct demands of shareholders; higher stock prices and dividend pay-outs.

The second part of the research question focuses on the new IFRS accounting rules in Europe and the influence these new rules have on the necessity of the EVA accounting adjustments. In hypothesis 4 we tested this by determining whether the difference between EVA with or without accounting adjustments has decreased for the period after 2005. As discussed in chapter 5 we find that the difference between EVA with and without accounting adjustments has decreased for the period after 2005. Therefore the accounting adjustments suggested by Anderson and Bey (2004) have decreased in impact on the EVA performance measure. With the stricter IFRS rules that decrease the possibilities for managing accounting performance, EVA increases in measuring economic performance without the necessity of accounting adjustments. This will result in more economic performance values for companies reporting under IFRS. It will also imply that the EVA accounting measure looks more and more like RI and the added value of the measure (i.e. accounting adjustments for calculating economic instead of accounting performance) when compared with RI has decreased.

Because the costs of the EVA performance measure are higher than those of RI, due to sophistication and costs of implementation (Young, 1999), the choice between RI and EVA might fallout of favour of EVA when the added-value of accounting adjustments have decreased because of IFRS.
Although the choice in favour of RI over EVA seems rational after the decrease in added-value of this measure, the choice for basic Earnings over RI might be even better. This is because the results from our hypotheses show that even in this modern time of world wide markets and technology, basic, and therefore cheapest, Earnings does not lose out to more sophisticated performance measures like RI and EVA when compared on information content on stock based performance.

6.2 Limitations:

For this study the values for EVA are calculated using the standard EVA formula commonly used in schoolbooks and we used publicly available information, while Stern Stewart uses private internal information of companies for the calculation of EVA. Furthermore we only applied the five accounting adjustments as suggested by Anderson and Bey (2004) and we did not make any company specific accounting adjustments that Stern Stewart makes for their clients.
Furthermore the values for EVA are not from the Stern Stewart database and contain a self calculated cost of capital using CAPM values and self calculation of accounting adjustments, because we did not have internal company specific information for the calculation of those adjustments and cost of capital.
Also the data sample used in this research was taken from the period 2000-2007 during which a major stock crash occurred. Therefore the results from this sample might be more volatile than for periods of stable markets. But bubbles and market crashes do happen in real life and good results based on performance measures should still be reflected in some way on stock based performance.

6.3 Suggestions for further research:

In our research we only examined the five accounting adjustments suggested by Anderson and Bey (2004) while a total of over 130 accounting adjustments exist for the calculation of EVA, most of those are specifically adjusted for their clients by Stern Stewart. To measure the influence of IFRS when compared with US-GAAP on the accounting adjustments a larger scale research might give insight in the total amount of accounting adjustments possible and the amount of those adjustments that are no longer necessary when reporting under IFRS.

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Appendix A[11]:

Calculation of EVA

Adjusted Operating Profit Before Tax

	Sales
less	(COGS + Depreciation/Amortization)
less	SG&A Expense
=	Operating Income or EBIT

Stern Stewart Adjustments:

plus	R&D Expense
less	R&D Amortization
plus	Advertising Expense
less	Advertising Amortization
plus	Change in LIFO Reserves
plus	Change in Bad Debt Reserves
plus	Implied Interest on Operating Leases
=	Adjusted Operating Profit Before Tax

Cash Operating Taxes:

	Total Income Tax Expense
less	(Change in Deferred Taxes)
less	Taxes Payable
=	Unadjusted Cash Taxes Paid

Non-Operating Income Tax Expense Adjustment:

less	less (Special Items * Tax Rate)
plus	plus (Interest Expense * Tax Rate)
less	less (Nonoperating. Income/Expense * Tax Rate)
=	Unadjusted Cash Taxes Paid - Operating Income

Stern Stewart Adjustment - Tax Impact

less	(R&D Expense-R&D Amortization)*Tax Rate
less	(Advertising Expense-Advertising Amortization)*Tax Rate
plus	(Implied Interest on OP leases * Tax Rate)
=	Cash Operating Taxes - Adjusted Operating Profit

Other Calculations

Present Value of Operating Leases:
Sum of rental commitments for the next five years discounted at the cost of debt. The fifth year was considered to be a perpetuity.

Implied Interest on Operating Leases:
[(PV of Op. Leases CY + PV of Op. Leases PY)/2] * kd

NOPAT
Adj. Oper Profit Before Tax - Cash Oper Tax-Adj Op Profit

EVA
NOPAT - (WACC * IC) or
(Return on Capital – WACC)*IC

Return on Capital:
NOPAT/IC

Invested Capital:

	Common Equity
plus	Preferred Stock
plus	Minority Interest
plus	Notes Payable
plus	Debt Due in One Year
plus	Long Term Debt
plus	Other Liabilities
=	Total Book Value Capital

Adjustments for Non-Operating Income Adjustments

plus	Cumulative Unusual Losses After Tax
plus	Cumulative Goodwill Adjustment
=	Capital Adjusted for Non-Operating Income Items

SternStewart Adjustments to Invested Capital

plus	(2/3*Advertising Exp + 1/3*Last Year's Adv Exp)*(1-TR)
plus	(2/3*R&D Expense + 1/3*Last Year's R&D Exp)*(1-TR)
plus	Bad Debt Reserves
plus	LIFO Reserves
plus	PV of Op. Leases
=	Invested Capital (IC)

[11] Anderson and Bey (2004)

Appendix B:

Author	year publication	Independent variable	Database Firmsize	Country research focusses on	R2 of EVA	Best scoring other PM	R2 of other PM
Bao and Bao	1998	stock market returns	Stern Stewart 1000 166 firms	United States	0,48	abnormal earnings	0,117
Lehen and Makhija	1997	stock market returns	241 large firms	United States	0,59	ROA	0,455
Grant	1996	firm value	Stern Stewart 1000 983 firms	United States	0,56		...
Stewart	1991	MVA	Stern Stewart 1000 613 firms	United States	0,97		...
Stern	1993	MVA	Stern Stewart 1000	United States	0,5	ROE	0,25
O'Byrne	1996	Market value/IC	Stern Stewart 1000	United States	0,55*	NOPAT	0,33
Chen & Dodd	1997	shareholder value	Stern Stewart 1000 566 firms	United States	0,2	ROA	0,25
Biddle et. Al.	1997	share returns	Stern Stewart 1000 >600 firms	United STates	0,06	Earnings	0,13
Uyemura et. Al.	1996	MVA	100 bank holding companies	United States	0,4	ROA	0,13
Bacidore et. Al	1997	shareholder value	Stern stewart 1000 600 firms	United States	0,11	REVA**	0,39
Fernandez	2001	MVA	Stern Stewart 1000 582 firms	United States	0,16	Nopat	0,21
Kyriazis & Anastassis	2007	stock returns	121 non financial firms	Greece	0,06	Operating Income	0,17

*After adjustments (before adjustments 0,31)
**highly adjusted version of EVA

Appendix C:

(a) the technical feasibility of completing the intangible asset so that it will be available for use or sale.
(b) its intention to complete the intangible asset and use or sell it.
(c) its ability to use or sell the intangible asset.
(d) how the intangible asset will generate probable future economic benefits. Among other things, the entity
can demonstrate the existence of a market for the output of the intangible asset or the intangible asset itself
or, if it is to be used internally, the usefulness of the intangible asset.
(e) the availability of adequate technical, financial and other resources to complete the development and to use
or sell the intangible asset.
(f) its ability to measure reliably the expenditure attributable to the intangible asset during its development.

Appendix D:

Descriptive Statistics Netherlands

	Median	SD	Observations
A: Dependent variables			
StMaRe	0,11	0,38	595
ShVaCr/MVE	0,15	25,97	579
MVA	98,7	7496	595
B: Independent variables			
Earnings	30,4	2135	595
NOPAT	25,38	1954	586
RI	7,22	1378	586
EVA	6,5	1448	583
unadjustedEVA	6,81	1443	586
Earnings%	0,09	3,62	595
NOPAT%	0,1	6,39	579
RI%	0,07	4,71	580
EVA%	0,02	21,4	575
unadjustedEVA%	0,06	7,26	580
Earnings/MVE	0,2	1,19	595
NOPAT/MVE	0,16	1,16	586
RI/MVE	0,08	1,18	586
EVA/MVE	0,04	1,03	583
unadjustedEVA/MVE	0,05	1,18	586

Descriptive Statistics Belgium

	Median	SD	Observations
A: Dependent variables			
StMaRe	0,12	0,417	664
ShVaCr/MVE	0,03	7,99	607
MVA	26,3	3117,8	640
B: Independent variables			
Earnings	9,59	549	636
NOPAT	7,76	440	616
RI	-0,56	451	615
EVA	-0,28	337	658
unadjustedEVA	-0,25	337	658
Earnings%	0,09	479	628
NOPAT%	0,11	24	592
RI%	0,08	7,5	590
EVA%	0,07	16,8	633
unadjustedEVA%	0,07	14,8	631
Earnings/MVE	0,09	0,35	640
NOPAT/MVE	0,07	0,33	640
RI/MVE	-0,01	0,34	640
EVA/MVE	-0,1	0,33	633
unadjustedEVA/MVE	-0,1	0,33	633

Descriptive Statistics France

	Median	SD	Observations
A: Dependent variables			
StMaRe	0,09	0,58	1742
ShVaCr/MVE	0,05	9,79	1669
MVA	117,87	21303	1735
B: Independent variables			
Earnings	34,5	2120	1750
NOPAT	27,9	1651	1750
RI	17,9	1360	1750
EVA	19,09	139	1750
unadjustedEVA	18,5	1341	1750
Earnings%	0,07	8,6	1705
NOPAT%	0,07	7,5	1698
RI%	0,07	20,8	1740
EVA%	0,06	7,93	1741
unadjustedEVA%	0,06	16,92	1739
Earnings/MVE	0,32	2,94	1736
NOPAT/MVE	0,26	2,4	1736
RI/MVE	0,19	1,5	1736
EVA/MVE	0,19	1,9	1736
unadjustedEVA/MVE	0,19	1,73	1736

Descriptive Statistics Combined Sample

	Median	SD	Observations
A: Dependent variables			
StMaRe	0,1	0,52	3001
ShVaCr/MVE	0,05	10	2871
MVA	81,9	16714	2970
B: Independent variables			
Earnings	25,18	1907	2981
NOPAT	21,28	15559	2952
RI	8,85	1239	2951
EVA	8,59	1225	2991
unadjustedEVA	8,24	1225	2994
Earnings%	0,08	222	2928
NOPAT%	0,08	12,9	2869
RI%	0,07	16,59	2910
EVA%	0,06	14,64	2949
unadjustedEVA%	0,06	15	2950
Earnings/MVE	0,25	2,21	2971
NOPAT/MVE	0,2	2,03	2942
RI/MVE	0,12	1,36	2941
EVA/MVE	0,12	1,55	2952
unadjustedEVA/MVE	0,12	1,43	2955