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Performance Measurement: An Empirical Study of Cash Flow Return on Investment and its application on Smith & Nephew

Master Thesis

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Niclas Kristensen, 270487-XXXX

Supervisor: Thomas Einfeldt

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Executive Summary

In this paper, we investigated the use of value-based metrics, which serves as an alternative to accounting ratios. Corporate operators have increasingly been under pressure to deliver shareholder value and as a tool to cope with this demand, - managers and executive's turns to value based metrics such as CFROI and EVA to help them understand their firms underlying economics. Both measures provide their own advantages and disadvantages over traditional accounting metrics such as P/E and ROE. While accounting measures do provide some information on the current state of the firm, - it can be biased by accounting differences or by simple misclassification of reported expenses that explain little about true profitability. In particular, the handling of leases, and R&D can skew operating income while depreciation schemes can lower book value and increase returns.

The main research question asked in this thesis were "How do CFROI compare to EVA as a financial management tool?" and consequently this thesis examined the pros and cons of both measures through a literature review and a case study. The thesis found EVA is superior as a corporate value based management tool. This is partly because it is easier to comprehend and calculate but also because EVA as an absolute measure provides managers with a clearer understanding of the magnitude of wealth that has been made. As a relative measure, CFROI on the other hand allows for benchmarking across firms as it is not distorted by differences in size. Another key advantage in the CFROI model is the fact that its inflation adjusted and not restricted to different accounting standards as it´s based on compressive accounting conversions – these attributes further enables benchmarking across time and national borders.

Principle users of these metrics are corporate operators and investment managers, the latter will find CFROI more useful as it can work as a stock screening tool and provide an edge when looking for alpha. Firms however, will do well in understanding both metrics and serve the needs of both sides. The thesis provides the same recommendation to Smith and Nephew, which is to focus on EVA and ROIC for internal value based management and keep CFROI in the strategic department to assist executive management in their dialogue with investors and analysts who do look for CFROI when evaluating firms.

1.0 INTRODUCTION

The past decades have witnessed a considerable shift in managerial accounting practices as corporate operators are being held under increasing pressure to deliver shareholder value. Corporate finance and valuation has moved towards an emphasis on "excess return", rather than traditional valuation models focusing on the link between growth and value. Higher growth firms are not necessarily assigned corresponding values, as it is recognized that growth without excess returns creates zero value (Damodaran, 2002: 841). In addition, financial decision-making has grown from an emphasis on budget controls and accounting oriented goals to embrace an approach that emphasizes identification, measurement, and management of the key financial and operational drivers of shareholder value (International Federation of Accountants, 1998; Institute of Management Accountants, 1999).

A number of reasons can explain this renewed emphasis on managing and measuring shareholder value. Indeed, market exuberance of recent financial crises has renewed the interest in shareholder value concepts, but also shareholder activists demanding a voice in business decisions or executives concerned about hostile takeovers and potential loss of control has encouraged managers and executives to better understand the importance of managing and measuring the expectations of its shareholders. Further, increasingly competitive capital markets, where the flow of investment money goes beyond international borders when seeking the best risk adjusted return, must also have forced a growing interest in shareholder value concepts as well as a pressure on corporate operators and money managers to focus more on value based metrics (Fabozzi, 1991; 12). Whatever the reason may be, the focus on shareholder maximization has created a market for consultants and investments bankers to offer their insights into value enhancement.

A number of management approaches for improving firm performance has been proposed, for example, Kaizen, Total Quality Management, flat organizations, etc. Koller et al, (1994) said that while many of these approaches have been successful, - many have also failed as these approaches are not properly aligned with the ultimate goal of creating shareholder value. Instead, what has widely become known as the number one tool to cope with the demands of the shareholders, - is Value Based Management (Hereafter, VBM). The reasoning behind VBM is straightforward. It is based on a notion that is deeply integrated in finance. The valuation of an organization is measured by its free cash flow streams discounted at the cost of capital. Value is made just when organizations make returns on capital that exceed the cost of that capital. VBM use this principle and extends it further to

strategic and operating activities (Koller et al, 1994) and argues that this concept can be used in everyday decision-making.

As such, VBM advocates performance metrics that measures real shareholder value in contrast to traditional accounting measures that does not take economic cost of capital into account. Although accounting information is necessary, itself does not explain market valuations nor provide comparability between peers. Understanding the link between performance and the stock markets valuation puts managers in a favorable position, as this is a key factor in attracting and maintaining current capital providers. As this notion may both be intuitive and widely accepted, the measuring of excess return has proven to be a difficult task. For this reason, a number of value based performance measures have been developed by consultants and investment bankers in an attempt to guide management towards activities that yields positive net present values, - each claiming to be the best and most "correct" measure however, this paper will focus on one particular metric and its framework: Cash Flow Return on Investment (hereafter, CFROI) conceptualized by HOLT Planning Associates/Boston Consulting Group.

The paper is first intended as an examination of CFROI and its economic reasoning. Based on this examination, the paper provides an objective recommendation to Med-Tech device company, Smith & Nephew PLC, - as to whether or not they should apply the CFROI framework within their organization and if so, - to what extent. In the pursuit of this question, the paper first lays out what such measures are trying to measure, why it matters and its advantages and disadvantages. It also provides a theoretical introduction to other concepts such as Return on Invested Capital (ROIC) and Economic Value Added (EVA) which are more popular concepts and Smith & Nephew´s current value Key Performance Indicators (Henceforth, KPI). In the second part of the paper, I will turn our attention to a Smith & Nephew case study. The purpose of the case study is to investigate CFROI and all of its accounting adjustments in order to fully understand it. The results from the case study are analyzed and interpreted. This provides a solid understanding of the numbers and serves as key point in the recommendation given to Smith & Nephew. In this thesis, EVA and EP are used interchangeably. This is because the difference between the two concepts comes from the accounting adjustments made to EVA. The adjustments are unlike CFROI, highly customized one firm to another. In other words, no clear definition of EVA exists. The thesis will instead consider EVA on the groundwork of Economic Profit - well aware that EVA considers many of the adjustments also made in the CFROI methodology. Comparing standardized EP/EVA with CFROI will help

understand which accounting adjustments are important. The goal of this thesis is CFROI and subsequently most effort is put into the understanding of the CFROI framework.

1.1 MOTIVATION

In mission statements, most firms recognize the maximization of shareholder value over time as their main objective (McTaggart, Kontes, & Mankins, 1994: 34). In order to achieve this goal, firms are engaged in a number of activities in which their processes can be improved. To maximize the shareholder value through process, organizations adopt VBM as a holistic approach. Such framework requires an objective measure of internal operating performance that can identify current and new investments and serve as a link between the firm and the stock market.

In a time where companies and investors are holding onto their cash and pulling back on investments in response to mounting fears of an extended global economic slowdown, one could also argue that the need for reliable valuation models has never been greater. Consequently, behind every major resource allocation decision, lies a precise calculation of what that move will be worth. Whether the decision involves a new strategic partnership, product or production plant, understanding valuation is a prerequisite for meaningful participation in a company's resource allocation decisions. Ultimately, this is a key driver on a company's overall performance. Managers facing limited knowledge of valuation methods or using incomplete valuation methods are subject to costly mistakes such as misallocation of resources, investment losses and underperforming business units. Additionally, failing to understand how investors perceive valuation can result in devaluation in the investment community. A good valuation model can be an objective measure of internal operating performance, generate new investment ideas, evaluate current investments and work as a profitability benchmark when making corporate decisions. The bottom line of course, is the understanding of the importance of valuation metrics and that it requires as much skeptical examination as you would give any other "make it or break it" analysis and decisions.

Finally, in academic literature and among finance professionals, - very limited information and practical experience exists on the concept of CFROI. Most academic literature on value based metrics focuses on EP/EVA and thus information on these metrics are easily available. The inputs needed in these calculations can be obtained directly through financial statements and the economic reasoning behind are easily obtainable. On the

other hand, the CFROI is only available to buy side investors through the HOLT data and proprietary software and very little information is available to the public. This is partly because Credit Suisse Holt has made a business out of the concept and partly because it is quite complex. Finance professional buy their access into a CFROI "database" which provides numbers and insights from Holt Analysts. Subsequently this thesis is one of its first (to this authors knowledge, - the first) to investigate further into the concept and explore its economic reasoning using a case study.

1.2 PROBLEM STATEMENT

This thesis is written in collaboration with Smith and Nephew PLC. Smith and Nephew is a global leader in the med-tech industry and is listed on both the London Stock Exchange (LSE) and on the New York Stock Exchange (NYSE). Throughout the thesis period, I have held a close dialogue with the Senior Director of Business Insights and Strategic Planning of Smith and Nephew PLC, - Nick Fridberg. On behalf of the strategic department which includes the group CFO, - Julie Brown, Nick has expressed a strong desire of learning about the CFROI methodology and its merits. Smith and Nephew are currently relying on ROIC and Economic Value Added (EVA) as their main indicators for value creation and value based management.

Through his position, Nick has observed a growing popularity of CFROI among his peers and among Smith and Nephew ´s equity analysts. The problem statement below is an outcome of these observations as well as my discussions with him. As such, the research questions reflect what I see as being of main interest for corporate operators.

The ultimate goal of this thesis is to deliver a recommendation to Smith and Nephew on to whether they should implement the CFROI framework. Consequently, the thesis critically compares the CFROI metric with S&N´s current value KPI´s and more popular counterparts; ROIC and EVA in order to put the recommendation in perspective. Thus, the main research question in this thesis is:

“How does CFROI Compare with EVA/EP as a strategic management accounting tool?“

Subsequently, the objective of this dissertation becomes to examine the merits and economic reasoning behind CFROI in order to deliver a recommendation to Smith and Nephew on to whether they should implement the CFROI framework as a management tool and corporate objective. The second research question is thus a consequence of the first research question:

“Should CFROI be applied as a portfolio and performance management tool within and across the Smith and Nephew Group?”

In order to arrive at this conclusion, several sub-questions are asked throughout the thesis. First, the dissertation conducts a literature review by considering the link between corporate finance, - the theory of the firm, and the role of corporate strategy in creating value. In particular, the literature review is the conceptual framework for value based metrics and the section aims to answer the following sub-research questions:

I. How has performance management developed and what are the pros/cons of implementing such systems?
II. Why should firms manage for value? On what financial logic is VBM based upon?
III. What are the factors that affect corporate performance in a VBM Framework?
IV. What are the empirical evidence on VBM tools such as CFROI and EVA/EP (Pros/Cons)?

The second part of this thesis deals with a case study of CFROI and its frameworks, using Smith and Nephew´s historical financial data. It also provides a short analysis of the findings. In particular, it investigates the application of the CFROI framework in practice, its accounting adjustments and its implications for management. The sub questions in this section are:

I. Description of the CFROI framework
    a. How is CFROI calculated the conventional way?
    b. What is the economic reasoning behind the accounting adjustments?

II. Analysis and results
    a. How has Smith and Nephew performed historical? What are the causes?
    b. What are the managerial consequences to be considered when adopting CFROI?

1.3 METHODOLOGY

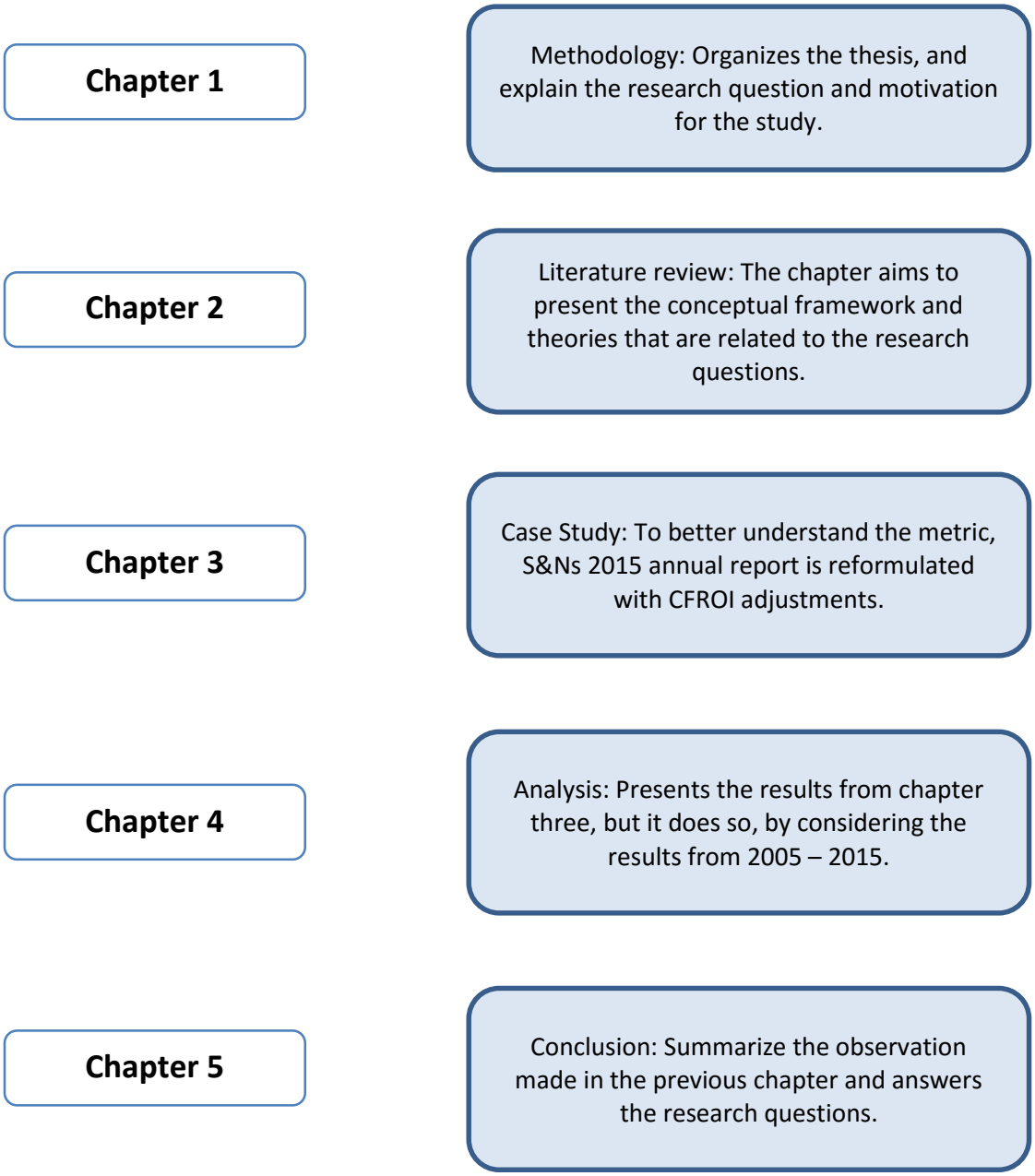
The thesis main objective is to Evaluate the merits of CFROI, and apply it on a single case study to gain "a rich understanding of the context of the research and the processes being enacted" (Morris & Wood, 1991, 23). Yin (2003: 13) argued that case studies as a method, is the correct way of answering research questions that involves "why" and "how" when real life examples exists. Likewise, Yin also mentions that case studies are useful when the boundaries between phenomenon and context are not clearly evident. Further, Eisenhardt and Graebner, (2007: 23) said that a single case study can provide rich information on the existence of the phenomenon or practice that is subject for the study.

The qualitative research approach used in this thesis has been a literature review and a case study in order to go into depth with this single case study, I have chosen to use mainly qualitative data in which I do not make any quantitative surveys, but are focusing the public available information from financial statements. This was done with the intent of gaining a useful understanding of the CFROI case within a real life setting. The explanatory design is used to assess the use of CFROI mainly with a corporate perspective. Therefore, data is collected describing the characteristics of the CFROI methodology. Such case studies are described as descriptive and highlight the aspects of the case using explicit theories or pre-existing conceptual categories (Yin, 2009: 19). Yin´s descriptive case study is accounted for by gathering information not only on the features of CFROI, but also connecting it to real life situations. Yin (2009: 50) also mentions that it's important that researchers does not focus solely on the subunit level and thereby fails to return to the larger unit of analysis. Therefore, a wide ranging literature review will be made in chapter two In order to clarify which specific theories and literature has already been researched on and which research and theory are relevant to further pursue for this paper's single case study. The definition of sources of data in this thesis, comes from Yin (2009: 102) who labeled six data collection methods in empirical social research in relation to case studies. Documentation is the primary source of data for this paper while archival records and direct observations are used as secondary data collecting methods.

Documentation have provided quantitative, repeatedly data for this thesis (Yin, 2009: 102) – mainly from annual reports, journals and internal material obtained through S&N. These methods have several advantages and disadvantages. However, in combination these are to hedge each other's strengths and weaknesses. For example, one advantage of documentation is that it is exact and not created as a result of the case study. On the other hand, it can be biased selectively or reflect bias of author. In this case the direct observations from the

case study serves as a reality check when applying and selecting documentation. Further, Eisenhardt and Graebner (2007: 25) said that a helpful way of ensuring consistency and quality in the information collected, is by using multiple sources of data. In this thesis, excising literature will be reviewed in order to form a foundation of knowledge and guide the intervention approach to the research questions. One drawback of this study, is the limited literature on CFROI. In particular, only one book is fully dedicated to the CFROI framework. This is the original book from Bartley J. Madden (1991) CFROI Valuation - A Total System Approach to Valuing the Firm. To compensate for this, sources for different elements are collected through different authors and sources in order to create a full picture.

1.4 Thesis Structure



2.0 Literature Review & Conceptual Framework

2.1 Evolvement of performance frameworks

2.1.1 Performance management vs. performance measurement

Clarifying the concepts between performance management and performance measurement is useful, as overlapping definitions of the two exists both in the academic literature and in this thesis. Since the terminology and labeling is often different, this section aims to clarify this and from the definitions, create a relationship between the concepts.

Performance management is closely related to Frederick Taylor´s scientific methods and B.F. Skinners behavioral principles. These theories were the starting point for using science in the workplace to improve performance of both employees and the firm as a whole (J.E. Daniels, 2004: 125). Generally, performance measurement is the process of evaluating the progress of achieving predetermined goals, while performance management is the process of adding the relevant communication and actions against on progress against these predetermined goals (Mitchell, 2007: 3).

Otley (2001: 14) defined performance management with two dimension: the process of delivering effective outputs and efficiency by using as few inputs in that process as possible. Other characterizes it as being less about past accomplishments, and more about the future capacity assessed (Neely, 2001: 130). This thesis however, will define performance management in line with Kyle (2005) as "The strategic use of performance standards, measures, progress reports, and on-going quality improvement efforts to ensure an agency archives desired results.

Performance measurement is the quantifying effort and efficiency of actions. Likewise, performance metrics are used to Evaluate the productivity and/or adequacy of an activity (Gregory & Platts, 1995: 81). This definition proposes that performance measurement is carried out by the help of individual performance metrics. Examples of such measures could be assembling lead-time, sales, consumer loyalty or delivering time. Such measures have different names and are sometimes called result indicators, performance metrics and key performance metrics (KPI´s) (Kerzner, 2011: 125). Neely also defined performance measurement as "*system can be defined as the set*

of metrics used to quantify both the efficiency and effectiveness of actions". This definition is short and precise and represent what is now being labelled in the literature and in practice as 'performance measurement.

From the above, it is clear that performance management and performance measurement should be seen as combined, as these two are used interchangeably. The definitions make the relationship between the concepts clear. Performance metrics delivers quantified measures to performance measurement and by linking these measures to firm objective and managing thereafter, creates a groundwork and reasoning for a performance management system.

2.1.2 Development of performance measurement and frameworks

To understand performance management within today's business environment, it is important to briefly investigate the history and see the advancement from the first developments to the most recent patterns in the field. In terms of performance measurements, we generally and also in this thesis, distinguish between traditional indicators and modern indicators.

Some of the first recorded use of performance metrics can be tracked back to the renaissance and Medici accounts (Johnson, 1981). The accounting methods in those days were used to track transactions in accounts such as, prices of goods sold and cost of production. The more sophisticated use of performance metrics however, occurred during and after the industrial revolution. During this period, accounting techniques became more refined as the complexity of transactions increased. According to Johnson (1981), techniques such as return on investment, standard variance analysis and standard costing was developed and used by industrial corporations. In this period and forward, traditional earnings based ratios were developed to measure financial performance. These ratios are based on historical data and are still used today. Example of such is return on equity (ROE), return on assets (ROA) and as before mentioned, ROI. Also ratios such as net profit margin, debt ratio, current ratio and gross profit margin belongs to traditional ratios (Johnson ,1981).

The beginning for modern indicators was followed by Irving Fisher´s (1930) introduction of the discounted cash flow model (DCF), which led into the free cash model (FCF). Miller and Modigliani later introduced the capital structure theorem and Gordon incorporated the constant growth factor in the FCF model. This work was followed by Lintner (1965) who introduced the cost of capital theory. The abovementioned theories created the groundwork for value based metrics by taking not only invested capital into consideration, but also the cost of

capital. During the late 50`s and throughout to the 90´s these kind of indicators were developed. Examples of modern indicators includes Shareholder value added (SVA), Economic Profit (EP), Economic value added (EP), Cash flow return on investment (CFROI) and Earnings per share (EPS).

These methods however, were heavily criticized as it was difficult to adapt them under the changing business environment. The business situation in the 1950s and 1960s was moderately steady, and firms focused on growth through vertical integration, mass marketing, diversification, productivity through scale and long-term investments (Rogers, 2013: 17). As result, these firms grew in size and complexity, and management control issues grew into a popular debate. Accounting measures and budgeting do provide some answers for these questions however; long-term investments required more advanced planning than annual budgets. This led to various management concepts in the 70´s, which became popular frameworks for strategy and asset allocation decisions (Rogers, 2013: 18). For example, BCG´s growth matrix which were launched as a portfolio planning model and classifies a firm's business units into four categories based on market growth and market share.

Further, Rogers (2013: 20) argued that, events such as, the interest rate hike, the oil shock and cross border competition during the 1970´s finished the post-war time of relative stability and created an environment where diversification and planning were no longer an accurate supplier of expected return. Thus, firms moved towards more flexible management approaches that relied on competitiveness being the main strategic objective. The emphasis on such are illustrated in Michael Porters five forces analysis, which takes macro-economic factors into account when assessing a firm's position in the market.

Throughout the 1980´s and 1990´s, we have seen capital markets expanding as mentioned before, as well as an emergence of corporate raiders and leveraged buyouts (LBO´s). As a result, the focus has switched to the stock markets valuation and the importance of these changes, has strengthened and reinforced the need for efficient Performance management framework, and related Performance measurement frameworks to support, and encourage business to stay profitable and competitive (Zeng and Zhao, 2005).

To sum up, - A Performance measurement focus can help overseeing human capital, gain a competitive advantage as it influences present and future performance of a firm, and offers helps and learnings to assess and screen how a business performs. Further, it gives dependable and strong guiding measures at both the top level

and the at lower orders. The performance measures can provide a snapshot of a company's advancement towards the accomplishment of its main goals and objectives.

2.1.3 Advantages and Disadvantages

2.1.3.1 Traditional indicators

Advantages:

Traditional indicators are widely used as it creates a numerical and quantitative connection between figures of a firm's financial statement. This allows for an assessment of a firms current and historical financial performance. Since they are based on historical number, they are very simple to calculate and are easily implemented within an organization. Within an organization they can be used in forecasting and planning process when forecasting future business activity and therefore also in the budgeting stage. Further they are easy to communicate and easily captured throughout the organization.

Disadvantages:

These traditional accounting measures do not take the cost of capital into account and they reflect historical performance which can be misleading, as companies make use of highly subjective accounting methods that includes depreciation and off balance sheet items which distort the true profitability of the firm and make traditional accounting ratios suspect (Knight, J. 1998: 102).

As a result, these measures are often criticized for being short-term oriented. They also fail to highlight other factors such as the quality of management, human capital and other important factors.

2.1.3.2 Modern indicators

Advantages:

Modern indicators provide a return figure that takes into account the invested capital with respect to the cost of capital. As a result, these ratios are a useful tool for shareholders. Modern indicators also introduce the concept of future value creation with a prediction of growth.

Disadvantages:

Some would argue that that value based metrics are less relevant for parties other than shareholder. It is true that for those involved in the daily operating process, value metrics can be irrelevant t as these metrics, just like traditional metrics does not take into consideration the quality of management or characteristics of production directly. Some of these factors also affect the performance. Finally, the estimated growth rate is the most important step in calculating these figures and this can be highly subjective which questions the quality of such. Indicators, both traditional and modern are also not adaptable for changes in the business environment.

2.1.3.3 Performance management frameworks

Advantages:

Performance management frameworks are developed for solving the abovementioned problems with traditional and modern metrics. In essence, performance frameworks aim to merge non-financial data and financial data. An efficient framework can equip managers at all levels with the necessary information to make value enhancing decisions.

Disadvantages:

Although these frameworks are meant to solve the problems of traditional and modern metrics, they do come with some drawbacks. It can become a very staff captured exercise to implement such a framework throughout the organization, not to mention extremely costly. This is also why such an exercise would not work on all companies. Some frameworks use a large amount of internal data, not available to outsiders that can be difficult understanding. At the same time, it can have no effect on front line mangers and their decisions if not implemented correctly.

2.5 Managing for Value

As learned from the previous section, companies have for many years measured their performances in terms of profit or earnings per share. However, growing dissatisfaction with these measures has led to a whole new array of metrics being developed and promoted under the banner of shareholder value. Shareholder value measures have diverted the focus away from profits and towards cash flows. These measures also recognize that capital invested in an organization is not free, and they make a charge for the use of the capital employed by an organization in its operations. Shareholder value is created by generating future returns for equity investors

which exceed the returns that those investors could expect to earn elsewhere. The belief is that these excess returns will be reflected within the share price of the company. The returns are measured in terms of cash flow, and the cost of capital is used to charge for the use of the capital invested. In essence, the idea is that if you manage your business to add to your shareholder value, then you also improve the value of your shareholder´s investment, and this is consistent with the organizational objective of maximizing shareholders' wealth. Companies create value by investing capital to generate future cash flows at rates of return that exceed their cost of capital.

2.5.1 Accounting ratios and its drawbacks – The need for value based metrics

The development of value-based metrics is often based on the widespread criticism on traditional accounting measure's, such as earnings per share (EPS), return on equity (ROE), return on assets (ROA), and price/earnings ratio (P/E).

ROE measures the profitability from the owner's point of view, and the relationship with ROA and ROE are found in the operating and financial gearing and risk. In theory, firms can increase ROE by gearing its financial risk, as long as the loan rates are lower than the profit made on the investments. EPS measures income per share and is also included in the calculation of P/E. The ratio P/E, is one of the most used ratios when Evaluate stocks. It tells you how much you, as an investor will have to pay to get a share of the profits made by the firm. In other words, the ratio is related to both the annual report and the current price level of the stock all of which enables comparability between stocks.

The problem with these ratios is that they are based on accounting income and fails to take risk into consideration. The combined risk is based on two components, - operational risk and financial risk (Elling, 2001: 107). Consider two firms that have identical expectations to its future growth; in the assessment of these two firms, there may be a difference in the outcome of deviations in terms of the overall growth (Bigger spread in the average expected growth rate). Investors would prefer companies with low operational risk. Financial risk is increased by additional gearing, as such, the debt increases and becomes a larger part of the capital structure. An increase in operational and financial risk requires a premium for the investors for taking this risk. Such premium in not included in the annual reports of the firms.

These ratios are still used as key performance measures and as key strategic target goals by many companies. Maybe because they are easy to understand and interpret. However, as mentioned, they do not reflect true

profitability and do not create a transparent picture of to which, companies are creating value for its shareholder. Further they are poor at comparing one firm to another, and especially comparing firms with different geographic's.

This is partly because firms have different accounting standards which allows companies to use subjective numbers, - but also because these numbers fails to take capital structure into consideration. A company that is financed through debt, will because of the interest expenses all else equal obtain a smaller profit than a company that is all equity financed. Even though, the company financed with debt can still obtain a better result and thus create more value for the shareholders than the equity financed company. Lastly, these ratios to do take account of different risk profiles. A company with a high risk profile must all generate a higher return on invested capital compared to those with lower risk profiles. If you just look at the numbers isolated, difference in risk profiles are not accounted for. If a firm generates higher profits as a result of taking on more risk, it is not given that value is created in the long run.

It should therefore, come to no surprise that accounting ratios have very little correlation with the creation of long term value. Consequently, value based metrics aims to convert balance sheet and income statement information into a return measure that are more appropriate when estimating firms underlying performance and in particular, take account of the impact of inflation, risk notion and to some degree opportunity costs, which is not considered in traditional accounting based performance measures.

These "re-calculated" returns can be used to assess historical ability to create or destroy wealth over time. Copeland et al. (2000: 3) stated that value is the only performance measure that uses complete information and manager must use a long-term perspective, manage all cash on the income statement and adjustments on the balance sheet as well discounting periods on a risk adjusted basis. Finally, the end goal of all value-based metrics is to remove these distortions and enable comparability between business units, between peers/industries and over time, which in turn will allow for corporate performance measurement and valuation.

2.5.2 Determinants of value

Deeply integrated in finance, is the notion that firm value is a function of its expected future free cash flow. In particular, the value of investments is a function of its future cash flow, the life of the investment, the growth rate of the cash flows as well as the associated risk (Damodaran, 2010:20). One of the most fundamental

principles in corporate finance, is that the value of an asset or investment, is the net present value (NPV) of its expected cash flow.

$$\text{Asset value} = \sum_{t=1}^{t=N} \frac{E(\text{Cash Flow}_t)}{(1+r)^t}$$

Source: (Damodaran, 2010:20)

The equations show that the asset has a life of N, and a discount rate of r, which is represent the risk and finance mix used to acquire it (Damodaran, 2010:21). This approach can be extended to firm valuation where the cash flows over its life is discounted at a rate that reflects the risk on the firm's assets. The tricky part in valuation is the fact that while some asset is already in place, a substantial component of firm value comes from the estimated value of future investments. Therefore, to estimate a firm's value one would need to estimate the expected value of future investments. In the following I will review some of the basic principles in valuation. This is important for answering the research question as we are comparing two valuation methods.

2.5.2.1 Free Cash Flow to the Firm

Free cash flow to the firm (FCF) is the cash flow that are left after the firm has paid all of its expenses. The FCF should be after tax and after net capital expenditures (CAPEX). The CAPEX represents expenditures that needs to be bought in order to acquire or upgrade physical assets (Machinery, Buildings etc.) to stay operating.

In theory there's two ways of estimating cash flow to the firm. First, one could simply add up all the cash flow available to different stakeholders in the firm, and – thus, the cash flows equity investors are added to the cash flow of debt holders to arrive at the free cash flow. The other way and more used approach, is to estimate the cash flows prior to debt payments but after re-investments. The two calculations should yield the same result (Damodaran, 2010:41)

EBIT (1 - tax rate)
– (Capital Expenditures - Depreciation)
– Change in Non-cash Working Capital
= Free Cash Flow to the Firm[1]

[1] Notation from (Damodaran, 2010:41).

The same equation can be stated as a percentage of the after tax income. The free cash flow to the firm is then**:** Free Cash Flow to the Firm = EBIT (1-t) (1 – Reinvestment Rate) (Damodaran, 2010:41).

2.5.2.2 GROWTH

In the previous section it was stated the it is the future expected cash flows that determines value. While this is still true, it is the forecast of revenues, expenditures and working capital that will yield the cash flows. As a consequence, the forecast of variables is a crucial element in any valuation model. The fundamental drivers of growth will be disused more thoroughly in 2.7, - however, the basic estimation of future income is a function of a reinvestment rate (The amount of after-tax income that is invested in capital expenditures and changes in non-cash working capital).

$$Expexted\ Growth\ EBIT = Reinvestmnet\ Rate * Return\ on\ Capital$$

where,

$$Expexted\ Rate = \frac{Capital\ Expenditure - Depreciation + Non.Cash\ WC}{EBIT\ (1 - tax)}$$

$$Return\ on\ Capital = \frac{EBIT\ (1 - t)}{Capital\ Invested}$$

Source: (Damodaran, 2010: 49).

These measures are forward looking and represent ROI on future investments. Relying on the above measures, we also implicitly assume that the current return on capital is a good measure of the true returns earned on assets in place, and that this return is a good proxy for returns that will be made on future investments.

2.5.2.3 DISCOUNT RATE

The discount rate refers to the rate of interest used in valuation of cash flow (I.e. Discounted cash flow analysis (DCF)). The interest rate is used to determine the present value of future cash flows which should mirror the financing cost of these assets. The discount rate in the DCF model, consists of financing costs that represents

both equity and debt holders and their respective weight in capital structure. The concept of discount rates is disused in more detail under section 2.6.2.1.

2.5.2.4 Asset Life

Since cash flows cannot be estimated in infinite, we generally impose a terminal value in valuation models. The terminal value represents all cash flow beyond this point. There various ways of estimating terminal value, including using multiples. According to Damodaran (2010: 192), the most consistent way of estimating terminal value in the DCF model is to assume that the terminal cash flow will grow at a fixed rate forever. The terminal value can then be calculated as:

$$Terminal\ Value = \frac{FCFF}{Cost\ of\ Capital - g}$$

It is further assumed that the cost of capital and growth are constant forever as well. Therefore, it is also reasonable to assume for example, that these rates cannot grow at a rate higher than the overall economy. In the CFROI methodology, the concept of mean reversion is built into the valuation model, meaning that no firm can beat fade and growth will eventually fall to the average economic level. The concept of fading return will be discussed along with CFROI.

2.5.2.5 Summary

In order to value any firm, one must estimate the length of growth, the magnitude of the growth during that period and the cash flows during the period. We then estimate a terminal value and discount all of the cash flows, including the terminal value, back to the present to estimate the value of the firm. The discounted cash flow model is explained further in Section 2.6.2 as it serves as a cornerstone in VBM and value based metrics principles.

2.6 Value Based Management

As before mentioned, increased competition on global markets has forced a pressure on managers to deliver shareholder value and as always, managers turn to management practices to assist then in their new challenges. In the fight for shareholder value, a number of management approaches for increasing shareholder value and organizational performance has been developed and proposed by various consultants and academics. However, a widely used approach has become known as Value Based Management (hereafter, VBM).

What makes managing for value any different from other objectives? At a fundamental level, value is definable for the market economy. When investors make investments, they do so, by expecting that when they sell again, the value has increased by an amount that is higher than the risk they undertook. In fact, in a business environment, an organization's ability to make value for its shareholders and the degree of value it makes, are the key factors by which it is judged upon. As a performance measure, value is also ideal because it takes all stakeholders interests into account, unlike accounting earnings that only consider current and short term performance in the view of the shareholders (Copeland et al., 2000: 3)

The reasoning behind VBM is straightforward. The valuation of an organization is measured by its free cash flow streams discounted at the cost of capital. Value is made just when organizations make returns on capital that exceed the cost of that capital. VBM use this principle and extends it further to strategic and operating activities and argues that this concept can be used in everyday decision-making (Koller, "McKinsey & Company").

The following sections will provide a brief literature overview of the development of VBM, the reasons why companies implement such framework and review the fundamental financial principles that it is based upon. Understanding VBM is important for this thesis because, value based metrics such as EP/EVA and CFROI are rooted in this concept.

2.6.1 Definitions and Development of VBM

The concept of VBM is not new and dates back to the late 19th century however, the philosophy wasn't recognized by the corporate world until American economists Alfred Rappaport published his book "Creating Shareholder Value" in 1986.

Value based management as a framework first appeared in the U.S. in the 1980´s, while European companies has adopted the concept in the 1990´s (Wang, Zhang & Man, 2006: 36). According to Brandenburg (2013: 14),

increased competition in the managerial labor and capital markets were the main reason why, however other factors such as fear of hostile takeover, large equity positions among institutional investors and active boards of directors also contributed. Likewise, Martin & Petty (2000: 10) explained the development with the dramatic rise of ownership concentration of common shares in the hands of institutional investors (Martin, Petty, 2000: 10)

Morrin and Jarrel (2001: 21) framed the evolution of VBM into three phrases: 1) The Number Crunching phase 2) the Strategizing phase and 3) the Integrating phase. VBM emerged as a discipline for corporate raiders who´s focus was on financial considerations when buying and selling companies. This involved valuing business on spreadsheet models where stock prices was a function of cash flows and ROE adjusted for risk (Morin & Jarrel, 2001: 22). With this emphasis's, business units not meeting the expectations were divested and profitable business prospects were acquired. Indeed, this type of restructuring can generate short term profit however, at some point a company must focus on generating value of all of its business units. In the second phase, VBM extended to management and business strategy. In other words, VBM evolved as a technique to access business strategies and an alliance of finance and strategy was beginning to emerge (Morin & Jarrel, 2001: 22). Finally, in the integrating phase, VBM was becoming an integrated approach to all aspects of a firm's decision making including, asset allocation, strategy, compensation, and performance measurement (Morin & Jarrel, 2001: 23)

In recent years, VBM systems have generated significant impact. A study of the awareness of VBM by Ryan and Trahan (2007) indicated that 87% of 86 CFO´s surveyed in their study were familiar with the concept and that most of these also used one or more VBM systems. The CFO´s further indicated their desire of knowing more about the impact of financial decisions on stock prices, the impact of institutional and managerial ownership on stock prices and the impact of shortsighted management (Ryan and Trahan, 2007)

Ottoson and Weissenrieder (1996) observed the need for such a system while Browhich (1998) called for the need of a measurement systems, that can be used for internal and external communication. Stern Stewart (1991) recognized the change in management objectives and called this "The switch from managing for earnings, to managing for value" while Ehrar (1998) said that the use of accounting figures should be abandoned when VBM principles are adopted.

Arnold & Davis (2000: 14) mention three key elements that differs VBM from other management approaches:

- The long-term wealth of shareholders is set as the paramount objective. This view pervades the organization.
- The amount of shareholder's money devoted to capital investments, product lines, strategic business units and the entire corporation should be quantified. Value can only be created if a return greater than the opportunity cost of these funds is achieved.
- Internal metrics used for ex ante appraisal and ex post performance measurement of capital investments, product lines, SBU strategy and corporate strategy should inform and motivate managers in the pursuance of long term shareholder wealth maximization. External metrics should permit transparent and accurate evaluation of past achievement, and reflect the potential for future value creation.

Mckinsey describes VBM as an "approach to management that aligns a company's overall aspirations, analytical techniques and management processes to focus management decision making on the key drivers of value" (Copeland et al., 2000: 7)

Martin & Petty (2000: 12) said that The fundamental premise which the VBM approach is built upon is that in order sustain the wealth creating process, managerial performance must be measured and rewarded using appropriate metrics that are able to link directly to the creation of shareholder value. Research supporting this definition comes from Keuleneer & Verhoog (2003: 99) who studied the reasons for implementing VBM frameworks among New Zealand companies. The study suggested that the main reason for implementing such practices was to align managerial and shareholder interests (Keuleneer, Verhoog, 2003, p. 99)

Further, the change in management objectives is also related to that fact that managers realizes that accounting measures does not reflect value creation. These measure does not take risk into account as well as the impact of inflation and opportunity costs, Stern Stewart & Co called this "the switch from managing for earnings to managing for value" (Stern Stewart, 1999).

Moskalev and Park (2010: 49) suggested that firms must build its operations on the core concept of value, which includes its strategy, communication, processes and organization and further argues that for VBM to be successful, corporate culture should encourage governance mechanisms consistent with value creation at all divisional levels (Moskalev Park, 2010: 54). It has also been found in academic research that the link between

corporate governance models and firm valuation are strongly correlated i.e. a strong governance model can improve performance (Dahya, Dimitrov, Mcconnell)

2.6.2 Discounted Free Cash Flow valuation (DCF) – The foundation of Value Based Management

To gain insight into the framework of VBM, it is important to understand the concept of value creation since VBM is a framework that focuses on creating shareholder value for its capital providers. When accessing value, the primary interest is in its future financial performance (Martin & Petty 2000: 10). All VBM performance metrics are rooted in the free cash flow valuation. Free cash flow valuation has served as the benchmark for valuation since the 1980`s (Martin & Petty 2000: 12) because conventional accounting numbers have been viewed as incomplete as mentioned earlier. Therefore, the idea of free cash flow serves as principle within the VBM framework, regardless of which VBM methodology is used and plays a key role in organizations efforts to increase shareholder value. In order to generate cash flows companies has to raise capital and reinvested in its assets. This does not come without a cost, in reality; value is only created when cash flows exceed the cost of raising capital from debt and equity providers. Thus, firm value can be seen as a function of the excess return it creates from new and existing investments. While this principle is in-built in the mind of both academics and practitioners and easily understood, the measuring of excess return has proved to be a topic of debate and difficult to do.

Firm value is driven by its cash generating abilities in the long run. Likewise, the ability to generate cash flows are driven by a firm's growth and the return eared on its invested capital in the long run relative to a cost of capital.

When companies invest in projects, assets or make acquisitions, investors contribute with cash. Even in situations where projects, assets etc. has been attained with shares or with other non-cash assets, it is still a cash transaction as these assets have value that could have been used elsewhere and been converted into cash. Promising cash today is a function of the expectation of receiving more in the distant future. Otherwise, investors would have no rationale in investing in anything. While this is straightforward, the key question to ask is how much the right to future cash flows are worth in today´s money. This amount is a function of three things: 1) the cash flow development 2) the size of the investment and 3) the uncertainty of the cash flows (Copeland et al., 2000: 101). The size of the investment does not say much about the value today unless the timing is known. A well know mantra is "Money today is worth more than money tomorrow" thus, the earlier we receive the cash flow the better and the more valuable it is today. Even so, the timing of the investment together with its size

does not capture the full story. Cash flow is question of future expected cash flow and there is a risk that it will not work out as planned. Consequently, there is a risk element which together with income's size and timing decides the amount it is worth to us today. These elements are captured in the discounted cash flow model. This method, projects future cash flows and discount then to present value at a rate which reflects the risk involved. The discount rate reflects the time value of money and the additional risk investors expects to be compensated for.

The estimation of a firm's value consists of two pillars of financing capital. The value of debt in the firm plus the value of its equity. The DCF model values the equity of a company, i.e. the cash flow that is available to all of its investors, and subtracts the value of its debt. The DCF model requires a four-step process (Copeland, 2000: 103):

1) Value the firms operation by discounting the free cash flow at the average cost of capital (WACC)
2) Value non-operating assets and summing these with the value of operation to get the enterprise value
3) Identify and value of debt and other claims against the firms
4) Subtract the value of non-equity claims from enterprise value to determine the value of common equity.

At some point in time, forecasting free cash flows become questionable because no one can project that far in the future. At this point, a terminal value is calculated when estimating the future cash flows. There is many different continuing-value formulas. One method is to use Gordon's growth model to value the remaining value of the steady state cash flows in perpetuity such that:

$$\text{Enterprise Value}_0 = \sum_{t=1}^{n} \frac{\text{FCFF}_t}{(1+\text{WACC})^t} + \frac{\text{FCFF}_{n+1}}{(\text{WACC}-g)} * \frac{1}{(1+\text{WACC})^n}$$

Source: (Copeland, 2000: 103)

Where FCFF= Free cash flow to the firm, WACC= Weighted average cost of capital, g=terminal growth rate.

2.6.2.1 Cost of Capital

As mentioned in the beginning, the free cash flow represents cash flow available to all investors. In proportion to this notion, free cash flow is discounted using the WACC (Weighted average cost of capital) as this represents the required rate of return by the firm's debt and equity holders blended together (Copeland, 2000: 103).

The discount rate used in the discounted cash flow model needs to consider two things. One, the time value of money and two, the level of risk (Berk & Demarzo, 2013: 213). This discount rate can be seen at the cost of investing in a project compared to other projects, i.e. the firms opportunity cost of capital. Therefore, investors needs to be compensated for the time value of money by taking on the investment cost today, and by being exposed to the risk throughout the investment horizon. For example, consider an organization overall. The discount rate used for valuing the whole firm should equal the expected return on a portfolio containing all the assets that belongs to the firm. By this, the firm should value individual projects as if they were small firms, and the firm should use the discount rate that investors would expect when making a separate investment in this project (Brealey, Myers, Allen, 2006: 84)

The discount rate in the discounted cash flow model only compensates for the downside risk, i.e. the risk of loosing money and does not account for upsides that increase value (Kodukula & Papudesu, 2006: 231). Therefore, for every added level of risk, this implies a higher discount rate which in turn lowers the PV of the firms cash flows. The standard discount rate in the DCF model, is calculated by the average cost of capital (Hereafter WACC) which is explained below.

2.6.3.1 WEIGHTED AVERAGE COST OF CAPITAL

The weighted average cost of capital is the standard model used in the discounted cash flow analysis explained earlier (Berk and Demarzo : 340). As mentioned, the free cash flow is the cash available to all investors. Consistent with this definition, free cash flow must be discounted using WACC since this model represents rates of return required by both debt and equity holders blended, and as such is the company's opportunity cost of funds. The cost of capital measures the required rate of return of the investors in the company, and is affected by how the risk associated with the business. A company's WACC increase with beta and as the required return on equity increases. Thus, a higher WACC implies higher risk and hence the investors require a higher return for accepting this risk, which leads to a decrease in valuation. The WACC includes all sources of capital including, bonds, preferred stock and other long-term debt. The formula for calculating WACC in the standard case is:

$$\mathrm{WACC} = \frac{\mathrm{D}}{(\mathrm{D}+\mathrm{E})} * \mathrm{r_d} * (1-\mathrm{t}) + \frac{\mathrm{E}}{(\mathrm{D}+\mathrm{E})} * \mathrm{r_e}$$

Source: (Copeland, 2000: 720)

In order to calculate WACC, you multiply the cost of each component by its proportional assigned weight and sum the results. As the equation clarifies, the return on equity and cost of debt are weighted relative to their values of equity (E) and level of debt (D). In addition, the WACC integrates the effect of the tax shield that arises due to the interest payments on a firm debt. The interpretation is that since interest payments are tax deductible, the government pays part of the overall cost of debt (Copeland, 2000: 720) This tax advantage is therefore included in the WACC approach through a lower discount rate and not as larger cash flows.

The capital structure in the WACC, I.e. the debt equity ratio is best estimated using market values ((Copeland, 2000: 299). Thus the cost of capital in capital budgeting should reflect the current required return and not historical values. In other words, WACC represent the current opportunity cost of capital based on current market values (Copeland, 2000: 298). With this assumption however, the risk of the firm is assumed to remain constant. This means that if changes to debt levels or changes to business risk occurs, then the WACC should be recalculated to reflect these new changes or opportunities. This is also known as "proposition 2" which states that investors required rate of return increase proportional with the increase in a firm's debt-equity ratio (Modigliani & Miller, 1958). In order to understand WACC it the following sections will estimate the theory behind the inputs of the WACC starting with cost of debt.

2.6.3.2 Cost of debt

The required return on a company´s debt is the rate of return required by its suppliers of debt. Most academic literature suggest that the cost of debt is best estimated by looking at corporate bonds issued by the company itself. Alternatively, when no bonds are issued credit ratings from agencies such as Moody's and S&P can be used as an estimate. The ratings of Moody and S&P ranges from AAA which is perceived as low risk of default to D which is default (Moody's, 2015). In general, for an established company with a low D/E ratio, the risk of debt will generally be perceived as low because debt in such companies are not expected to rise significantly. In addition, stable cash flows will make the probability of default relatively low. The ratings of Moody and S&P ranges from "AAA" which is perceived as low risk of default to "D" which is defaulting (Moody's, 2015).

Mckinsey (2010: XX) point out that bond yields is a reasonable estimate of the cost of financing debt when the risk of default is so low that the promised cash flow from bonds, are also a realistic estimate of the expected cash flow to the bond holders. Rating agencies identification of high and low rated bonds are good estimate as described above. In conclusion, when one have information about the current coupon rate, schedule of principal payments and information on the current price of a traded bond, the cost of debt can be estimated by solving for the YTM. In the equation below, P_0 is the price of the bond, C_t is the coupon payments at times, F is the principle payment at time N and Y is the yield to maturity:

$$P_0 = \sum_{t=1}^{n} \frac{C_t}{(1+Y)^t} + \frac{F}{(1+Y)^n}$$

Source: (Copeland, 2000: 325)

2.6.4.3 Required return on equity

The idea that all risk-return models is based upon is the rate at which investors can make risk-free investments and the risk premium they should be compensated for taking riskier investments. I.e. the equity risk premium is the excess return investors require to compensate for the risk they take when investing in equities over risk-free securities such as government bonds. It is also one of the most important concept in mainstream finance as it is serves as a decision making tool in asset allocation when weighting between bonds and equities. In addition, it plays a key role in cost of capital calculations such as the Capital Asset Pricing method (CAPM) and the three-factor model proposed by Fama and French (Fama and French, 1993). The equity premium is not a fixed number and has changed throughout history to reflect the price investors demand to take on risk, which is influenced by the economic risk the world is facing. All things equal, a low risk free rate of return will also yield a low equity premium (Damodaran, 2013: 4-8).

The equity premium or the market portfolio risk premium is widely debated in contemporary portfolio theory and there are many different estimations of the market premium (Damodaran 2013: 15). Therefore, some controversy exists about which methodology will yield a more accurate result, and uncertainty about the true level of the risk premium (Petersen et al., 2012: 264). In the WACC calculation, the cost of equity is probably the most difficult input to calculate. One reason is that unlike in the calculation of the cost of debt, return on equity

is the return that investors require on their invested capital and not actual ongoing payments as with the required return on debt by the suppliers.

2.6.3.4 CAPM

In CAPM, investors need to be compensated for the time value of money and risk. Time value of money is represented by the risk free rate (r_f) and will compensate investors for placing their money in equities over safer bonds. Second, risk is measured by beta (β_a) which compares the market return to those of the asset. Each variable will be describe below and the general formula can be described as:

$$R_A = r_f + \beta_a(r_m - r_f)$$

Source: (Damodaran, 2002: 173)

As the equation indicates, the CAPM states a linier relationship on return an asset, beta, the expected market return and the risk-free rate. Consequently, the only firm specific factor in the CAPM is the beta. All other inputs assumes the same for all firms. Thus, the risk-free rate and the market return should be the same for all investments. Beta is the estimation of an assets risk relative to the market portfolio and is consequently expressed as the portion of market risk exposure$(r_m - r_f)$. Thus, the required return on equity depends on the risk relative to the market and not from the sources of capital. This was investigated by Markowitz (1952) and implies that investors can diversify everything but systematic risk. As such, in the CAPM, systematic risk is the only risk investors should be compensated for.

RISK-FREE RATE

The risk free rate expresses how much an investor can earn without incurring any risk. This is important, because it serves as the foundation for the premium gained by obtaining risk in the portfolio (Damodaran, 2008: 4-5). Thus, when measuring the risk free rate, we want to find a rate equal to a zero beta portfolio, which is a portfolio that does not move with the market and will provide certain retain. Because such analysis is usually infeasible government bonds is usually serves as best practice (Copeland, 2000: 270). This is based on the assumption that government bonds are risk-free because we assume that there can be no default risk, which is not always the case. Ideally, bonds for each of the years in the cash flow should be obtained (Copeland, 2000: 241). However, the implications on the yield curve for each year is modest, and does not influence the implied interest rate

significantly, which is why we ideally use a 10 or 30-year zero-coupon bond. A 10-year bond has a more liquid yield curve, whereas a 30-year bond might be a better match to the cash flow of the valuation (Petersen et al., 2012: 251)

BETA

Beta is defined by the movement of the asset with that of the global market. It is defined as:

$$\beta = \frac{\mathrm{Cov}(\mathrm{rcpr_f}, \mathrm{r_m})}{\mathrm{Var}(\mathrm{r_m})}$$

Source: (Copeland, 2000: 301).

Where $\mathrm{Cov}(r_F, r_m)$ is the covariance between the returns of the market and the firm. $\mathrm{Var}(r_m)$ is the variance of the market portfolio. Beta is not static as it changes over time according to the underlying risks of the firm vs that of the market. Since we do not have data on the future, historical data is often used to explain the future, thus assuming that the risk of a company remains stable over time. In practice however, firms are exposed to various risks that such as acquisitions which exposes them to different risk determinants than earlier (Petersen et al., 2012: 253). Also, the historical data is often quite volatile and a long sample size might help reduce variations in the beta. However, too long a sample size and the fundamental risk exposures may have changed. There is no consensus between the real beta and it often varies significantly between financial institutions. One method of estimating Beta is by performing a regression analysis of past equity returns with the returns of the market portfolio as the explanatory variable (Berk & DeMarzo, 2006: 433). This of course will only work for listed companies.

MARKET PREMIUM

As mentioned previously, CAPM divides risk into systematic risk, which is non-diversifiable and stems from macroeconomics factors and company specific risk that is diversifiable. The non-diversifiable risk is different companies in between and is depend on firm's volatility in the market or to their specific projects (Berk & Demarzo, 2006: 303). Thus, some projects are risker than other and investors must be compensated for this non-diversifiable risk. As a result, investments that are highly correlated with the market risk should be discounted at a higher rate. Company specific risk on the other hand, is diversifiable and should not be compensated. The

rationale behind this categorization, is that one can think of holding a diversified portfolio can diversify all firm specific risk.

From the CAPM equation, the market premium is represented by $(r_m - r_f)$. This spread can be calculated I various ways. One method is to estimate forward premiums on the basis of market rates or prices today (Copeland, 2000: 323). In practice, these are based on regression or option pricing models with the market index as the underlying asset. Another approach is to use historical data on past return relative to risk free investments such as government bonds and use the historical premium as a prediction of the future (Dimson et al., 2013: 12). The use of historical data is a widely debated topic. Mainly because past returns vary over time which leads to estimation errors. A market index that has thrived in the past may have been estimated too high and vice versa a market that has underperformed may be valued too low. There are many models that claims to overcome this problem but leaping into the fundamental discussion of the many theories and their shortcomings and benefits is beyond the scope of this assignment. Instead, it will build on the research of Madden (1999: 82) and the CFROI methodology in particular which uses a forward looking model, much similar to an implied cost of capital model (hereafter, ICOC).

2.7 VALUE DRIVERS

A key factor of VBM system is the understanding of the performance variables that will generate value within a business. It´s important because you cannot react directly on value itself. Businesses act on variables that influence value such as capital expenditures, investment projects and product enhancements (Copeland, 2000: 421). It is these drivers that form the basis of understanding the entire organization, and establish a dialogue on performance expectations. McKinsey argues that value drivers must be defined with a level of detail that is consistent with the decision variables that are under control of line management. Such value drivers as sales growth and operating margins can be applied to most business units but lack specificity and cannot be used at lower levels of management. It is clear however, that drivers need to be organized in a way such that managers are able to identify the level of impact and thus being able to assign responsibility to the right people in order to reach the organizations targets.

The value driver three below presented by McKinsey shows how one can gain insight into the company´s health by identifying short, medium and long term growth drivers. The concept resembles the work of Kaplan´s and

Norton´s and their "balanced scoreboard". McKinsey advocates that companies choose their own metrics based on industry and strategy however, the eight generic driver presented in table 1, should be used as a starting point ensuring that firms systematically explore the important ones (Copeland, 2000: 423).

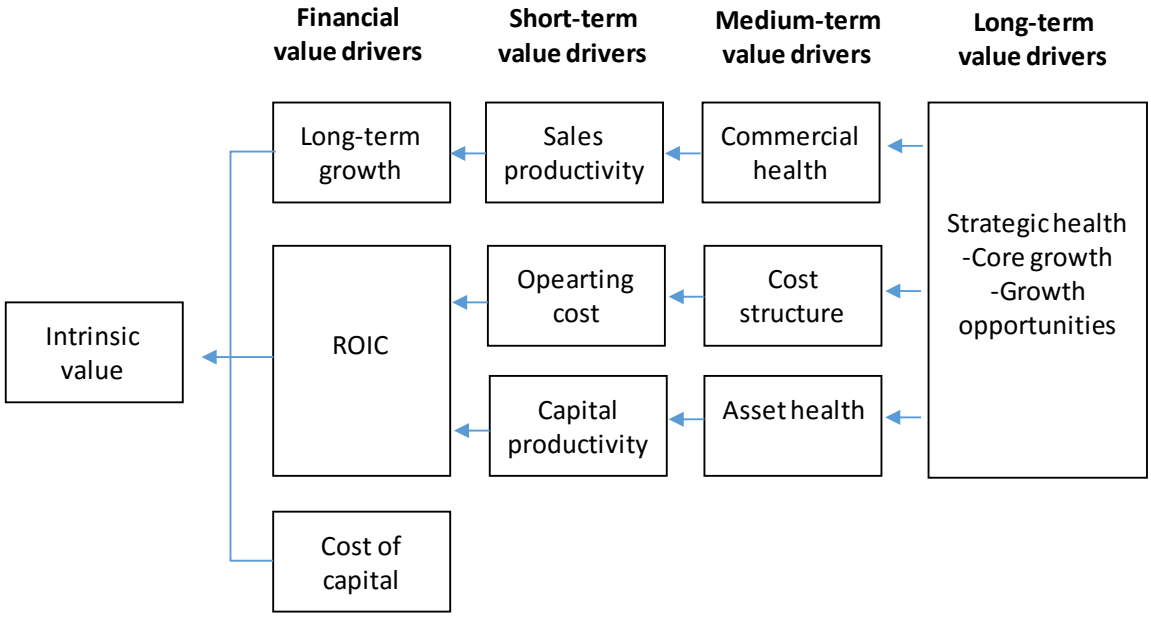


Figure 2. Source: Own Creation based on the assumptions of McKinsey (Copeland, 2000: 421-425).

Short-term value driver is the easiest to monitor and quantify. Mckinsey suggests these should be monitored monthly or quarterly. The short-term drivers indicates whether or not the current growth and ROIC and be sustained, will decline or improve. The sales productivity metrics includes the drivers of the recent sales growth. These are such things as price and quantity sold, market share, and sales efficiency whereas the operating costs are typically unit costs (Copeland, 2000: 425). Finally, capital productivity measures the efficiency of a company's working capital and property plant and equipment (Copeland, 2000: 425). When assessing short term performance, McKinsey advocates that mangers are being held responsible on things they can directly influence such as sales and not on prices shift market prices and other variables that are out of the hands of managers.

Medium-term value drivers should be looked at in a timeframe of one to five years however, for companies with longer product cycles such as pharmaceutical companies; it might be longer (Copeland, 2000: 425). The medium term metrics are harder to identify, as they are measured over a year or longer. According to table one, these drivers' falls under three categories. Commercial health deals with the company's current revenue growth and

includes product pipeline process, brand strengths and customer satisfaction. Cost structure measures the ability to manage costs and the use of assessments programs such as Six Sigma to identify the current state of the company. Finally, asset health measures the company´s ability to maintain and develop its assets (Copeland, 2000: 426).

Long-term strategic value drives are metrics for measuring the ability to sustain current operations and to identify new growth areas (Copeland, 2000: 421). McKinsey said that companies must periodically assess and measure the new threats such as technology enhancement and customer preferences – things that can make the current business less profitable. Such measures however, are hard to identify and Mckinsey advices the use of qualitative methods.

2.8 TOOLS UNDER VBM

This sections examines Smith and Nephews current value indicators ROIC and EP and gives a short introduction to CFROI before turning to the CFROI accounting adjustments in chapter three.

2.8.1 ROIC

A way of determining if growth is profitable is by examining the Return on Invested Capital. ROIC measures the cash earnings before financing costs. There are two components to this, first - the Net Operating Profits after Tax (NOPAT) is calculated and second, the invest capital (IC). The textbook definition of ROIC is:

$$\text{Return on Invested Captial} = \frac{\text{EBIT (1}-\text{tax rate)}}{\text{Book Value of equity+Net debt}}, \quad \rightarrow \quad \text{ROIC} = \frac{\text{NOPAT}}{\text{Invested Capital}}$$

Source: (Berk & Demarzo, 2013: 43)

The difficulty in arriving at ROIC is the fact that it's not readable straight out of financial statements. The adjustments to arrive at ROIC are:

2.8.1.1 NOPAT

The numerator NOPAT, measures the cash earnings before financing costs and thus NOPAT assumes no financial leverage (Berk & Demarzo, 2013: 43). This means that NOPAT is not influenced by leverage and is the same whether a firm have leverage or is free of debt which is important for comparability. NOPAT is also the first step in calculating EP which is presented in the next chapter. NOPAT is calculated as:

Revenues
Less: Cost of goods sold (COGS)
Less: Selling, general and adm. Cost (SG&A)
Less: Depreciation
Plus: Other operating income
= EBIT (Earnings before interest and taxes)
* (1-Tax rate)
= NOPAT

Source: (Berk & Demarzo, 2013: 43).

2.8.1.2 Invested Capital

In the denominator we find Invested Capital. Invested capital can be viewed as the amount of assets a company needs to keep the business going. Alternatively, it can be view as the amount of financing satisfy shareholders and creditors needs to supply to fund the asset (Berk & Demarzo, 2013: 45) - both approaches yield the same results as dual entry accounting requires assets and liabilities on the balance sheet to be equal. However, for performance indications, one should calculate IC using the asset side as this approach tells you how efficient a firm is at using its capital whereas the right hand side just shows how´s the firm as chosen to finance itself.
Invested capital can be calculated as:

Fixed assets
Plus: Current Assets
Less. Current Liabilities
= Invested Capital

Source: (Berk & Demarzo, 2013: 45).

2.8.2 Economic Value Added (EVA)

The concept of M. Stern and G. Stewart builds on the underlying principle that companies should maximize its value by evaluating projects according to the Economic Value Added framework. This framework is a refined model of the original concept of Economic Profit (EP) that can be traced back to the work of economist Alfred Marshall (1890). The difference between the original concept and the concept of Stern & Stewart can be found in the accounting adjustments suggested by Stewart. EVA is a measure of the dollar surplus earned by an investment and is calculated as the excess return less the cost of financing it. Stern et. al. (1996) describes EVA as a "Financial Management System" which insures that management will allocate capital to projects, divisions or investments that generates economic value. I.e. securing returns on invested capital that are above the cost of capital. From a shareholder point of view, the return must compensate the risk taken, i.e. their investment has to generate the same return as a similar investment in the stock market as a minimum. If this is not the case, no real profits have been made and the firm operates at a loss from the shareholder perspective.

2.8.2.1 Residual Income

According to Biddle (1999), Stern & Stewart´s EVA is a result of the assumptions of Residual Income theory (henceforth, RI). RI can be defined as the profit after tax less equity capital and cost of equity. In this way, RI is calculated by estimating net operating profits after tax (I.e. NOPAT explained above) and subtracting the cost of capital (Explained in section 2.6.2) multiplied by the invested capital. Such as:

(1) RI = NOPAT – (Invested capital – WACC)

Alternatively, NOPAT can be expressed as the return on investment (ROI) multiplied by the invested capital where invested capital is the return on assets (ROA)

(2) RI = NOPAT – (Invested capital * ROA) – (Invested Capital * WACC)

The reason why we rearrange (2) is that doing so, we separate the total return on the invested capital from the capital charges. By reformulating the right side of the equation, invested capital is put outside of the parentheses

and thereby ROA and WACC is inside, making it possible to access positive or negative Residual income in equation (3):

(3) RI = (ROA - WACC) * Invested Capital

ROA less WACC shows the percentage difference, which ultimately decides, that for a company to have a positive RI, the return on invested capital has to be greater than the cost of capital.

As it can be seen from this equation, there´s three possibilities to increase the left hand side. All else equal, RI will increase if NOPAT is increased and ROA is reduced. On the other hand, reducing WACC is more difficult and often hard to influence as it depends largely on market factors as described in earlier sections.
In sum, value can be created when all expenses are deducted, including the cost of capital that equity holders have provided for the firm. To complement the traditional RI, one can calculate EP, which shows the added economic value for a company. This will be described in the next section.

2.8.2.2 EVA CALCULATION

As mentioned in the introduction, EVA is a development from the original concept of RI. Stewart (1991) argues in his book "A Quest for Value" that EVA is more accurate than RI because its adjusts Invested capital and NOPAT. In particular, these accounting adjustments are trying to exclude figures from the financial statement that has no effect to the company valuation.

As the reader will notice, equation (4) and (5) includes the same components as those in (1) and (3). The Invested capital and the WACC has the exact same definition, however, ROA is replaced by Return on invested capital (ROIC).

(1) EVA = Invested Capital * (ROIC – WACC)

The difference between ROIC and WACC – in percentage is called EP%. An increase in EP% is positive for the firm value and vice versa. If ROIC and WACC where the same, just enough would have been earned for a company to satisfy its owners.

Alternatively, EP can be expressed as the difference in NOPAT and Invested capital. As before mentioned, NOPAT indicates how much is left after taxes when adjusted for a company's capital structure. The invested capital can also be defined as above and expresses the amount of assets needed for a firm to generate its income. Thus the absolute EVA or $EVA can be expressed as:

(2) EVA = NOPAT * (Invested Capital – WACC)

Figure 3 below illustrates the process of estimating EP starting from the results on the balance and income statements.

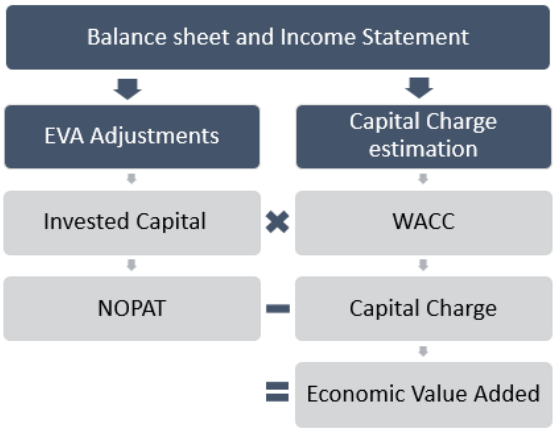


Figure 3. Source: Own creation based on assumptions of Stewart (1991)

In his book "A Quest for Value" - Stewart (1991: 23) addresses as many as 160 possible adjustments to EP and specifically to NOPAT. According to Young and O'Byrne (2000: 227) however, these adjustments should only apply in cases where 1) the required information is available 2) amounts are substantial 3) corporate operators are able to influence the outcome and 4) it can be understood throughout the organization. Young (1999: 12) said that organizations should ask themselves four fundamental things before it opts for an accounting adjustment:

- Is the unexpected result caused by the accounting practice being used?
- Will the adjustment cause an improvement to the managerial behavior and thus stimulate actions that leads to the creation of value?
- Are the benefits from the improved managerial performance greater than the costs related to the change in accounting practices?

- Are the accounting adjustments more effective than alternative mechanism?

In other words, accounting adjustments are not a "one fits it all" type of change. This is partly due to the fact that firms have different assumptions and desires in terms of the adjustments needed to deliver the desired results, but also because the judgments and practicality of mangers when such changes are being made I.e. there's a managerial accounting factors to consider.

Although Stewart (1991: 23) mentions 160 possible adjustments, Young and O'Byrne (2000: 12) recognized and summarized the most important ones as:

1) Non-recurring gains or losses (successful-efforts accounting)
2) Research and development
3) Deferred taxes
4) Provision for warranties and bad debts
5) LIFO reserves
6) Depreciation
7) Goodwill
8) Operating Lease

2.8.2.3 EVA AND VALUATION

The concept of EVA can be extended to a cumulative measure of intrinsic value, i.e. a multi period value measure - Stewart introduces the concept of Market Value Added (Henceforth MVA). MVA is the difference between the company´s market value and its capital (Stewart, 1991). As mentioned, MVA is a cumulative measure of intrinsic value and thus not a measure of return, which reflects a single period. When the total market value of a firm is more than the capital invested (MVA is positive), shareholder value are created. Otherwise, shareholder value has been destroyed (MVA is negative). Stewart (2013) defined MVA in his book as:

MVA = Market Value-Capital → MVA=PV of all future EP´s[2]

Where market value added is the present sum of future EP`s and thus by increasing EVA, market value is added. This measure is identical to another know measure – Market-to-book ratio, which is in turn a relative measure (%) whereas MVA is in absolute terms. Steward (2013) stated: "In fact, increasing MVA should be every company's most important financial goal. An increase in MVA reveals, as no other measure can, how successful

[2] This is the notation used in "The Quest for Value: A Guide for Senior Managers" by Stewart, G. Bennett p.156

management had been at allocating, managing, and redeploying scarce resources of all kinds so as to maximize the wealth of the owners by maximizing the net present value of the enterprise.". MVA represents investors (stock markets) valuation at a particular time of the NPV´s generated in the past and projected capital projects. Thus, the present value of the EP corresponds to the MVA. I.e. MVA = PV (EVA). Theoretically, EVA will give the same result in valuations as recognized concepts such as discounted cash flow analysis (DCF) and net present value (NPV) (Stewart 1990, p.3) which both include the time value of money and the opportunity cost of equity i.e. the return on similar investments. Stewart presents this in a total valuation formula which is based upon the concept on discounted cash flow and NPV´s where EVA´s are discounted at the rate of return. Figure 2 explains the relationship between EVA and MVA. Weighted average cost of capital is used to discount future EP´s into present values. Hereafter the total value of the firm can be found using a standard DCF approach

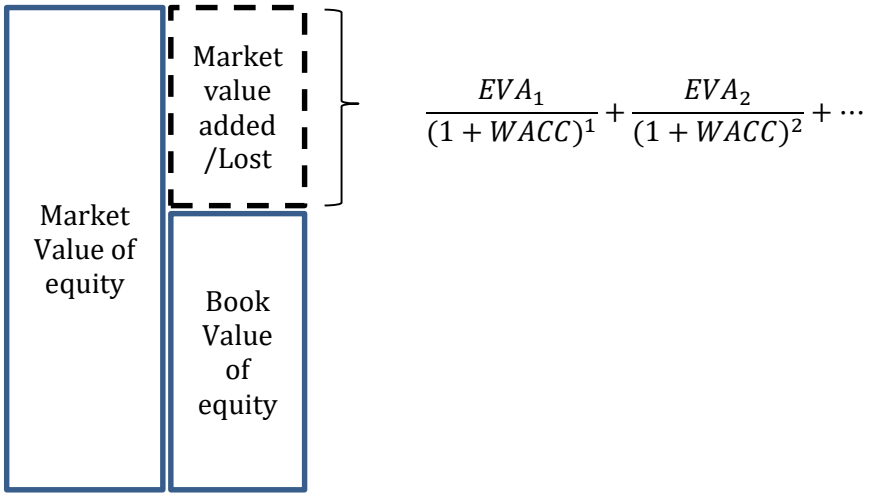


Figure 4. Source: Own creation based on the assumptions of Stewart (2013)

2.8.3 Cash Flow Return on Investment

The underlying research of CFROI originates from the 1970´s when Bart Madden worked with Bob Hendricks on the preliminary CFROI structure. In 1985, Bob Hendricks, Eric Olsen, Marvin Lipson and Rawley Thomas, shaped HOLT Planning Associates. HOLT began as an acronym from the first letters of each of the originators last names and in 1991, Bob Hendricks shaped HOLT Value Associates (Credit Suisse/Holt: 2016). Boston Consulting Group (BCG) procured the corporate arranging fragment of HOLT Planning Associates and organizers Olsen, Lipson and Thomas joined BCG (Credit Suisse/Holt: 2016). In 2002, HOLT was procured by CSFB, making CSFB HOLT. By 2006, CSFB gets to be Credit Suisse through the "One Bank" activity and HOLT is currently a gathering inside of the Equities division of the bank (Credit Suisse/Holt: 2016).

2.8.3.1 CFROI Calculation

The most fundamental premise, the CFROI is built upon is the notion that firm value reflects its ability to create economic wealth. At this level, CFROI has evolved as a framework for measuring corporate performance and explaining levels and changes in stock prices for listed firms (Madden, 1999: 3). In particular, the Holt methodology emphasize on companies' cash generating abilities by taking accounting information and converting it into cash. Accounting measures can be highly subjective which makes it difficult to compare performance across peers, industry and national borders. The latter is often a result of different accounting standards that can differ widely one country to another. Holt´s premise is precisely that financial statements can be misleading and that accounting ratios can be subjective and distort the true profitability of the company. Thus Holt converts income statement and balance sheet information into CFROI´s, which according to Madden (1999: 3) are a more accurate indication of firms underlying economics. The verdicts can then be used to analyze firm's ability to generate returns on capital, understand the market's expectations or to see whether the market is fairly pricing in a company's prospects for value creation.

A key element to the CFROI calculation is that it rests on a total system approach, which treats components as a whole instead of individual parts. This approach supports Madden´s criticism of the WACC/CAPM that are estimates treated separately in the sense that they offer no direct link to cash flows. Instead, CFROI uses a market-derived discount rate, which is a product of the CFROI valuation model itself and can be directly tied to the firm's cash flows. This approach differs the model significantly from any other performance metric and from

mainstream finance in general. Also implemented in the Holt framework, is a specific life-cycle framework, which forecasts long-term patterns of economic returns and growth, using empirical research on how thousands of companies with similar characteristics have performed in the past (Madden, 1999: 56)

In his book, CFROI Valuation: "A Total System Approach to Valuing the Firm", Madden refers to various authors who claims that security analysts and corporate administrators progressively utilize CFROI as a key tool for measuring corporate performance and shareholder returns (Madden, 1999: 4). Other Practitioners perceive CFROI as an investor minded tool (Keuleneer, Luc, and Willem Verhoogm, 2003: 101). A critique often associated to this model, is that it´s perceived as a complex financial measure device. (Fera, 1997; Young and O.Byrne, 2001).

An understanding of Holt´s performance metric is complex and is best explained using an example. When an organization takes on a project, such as, an acquisition, merger or expansion, a financial profile is prepared which considers the timing of forecasted cash inflows and cash outflows over the estimated life of the project. From this, an internal rate of return can be estimated and contrasted with the company's hurdle rate or cost of capital to decide whether to proceed with the project or not. CFROI applies this to not only a project, but rather to a whole organization. Thus, CFROI can be seen as an internal rate of return (IRR) calculation, which essentially assumes that cash flows are reinvested at the IRR. By recognizing, the finite economic life of assets that depreciates such as building and the value of assets that do not necessarily depreciate, such as land and cash, the CFROI is the ratio between investments and cash flows and a proxy for economic return. As mentioned, the CFROI is practically comparable to an IRR calculation, except that CFROI is a far more complex measure. This is because it uses real numbers it takes asset life and asset release into consideration. Based on the calculation of inflation adjusted gross investments, CFROI can be calculate by considering two additional parts: asset life and the separation of gross investments into non-depreciating and depreciating assets. Figure 5 illustrates the basic structure of the CFROI calculation and its four components necessary for calculating a CFROI value for a firm.

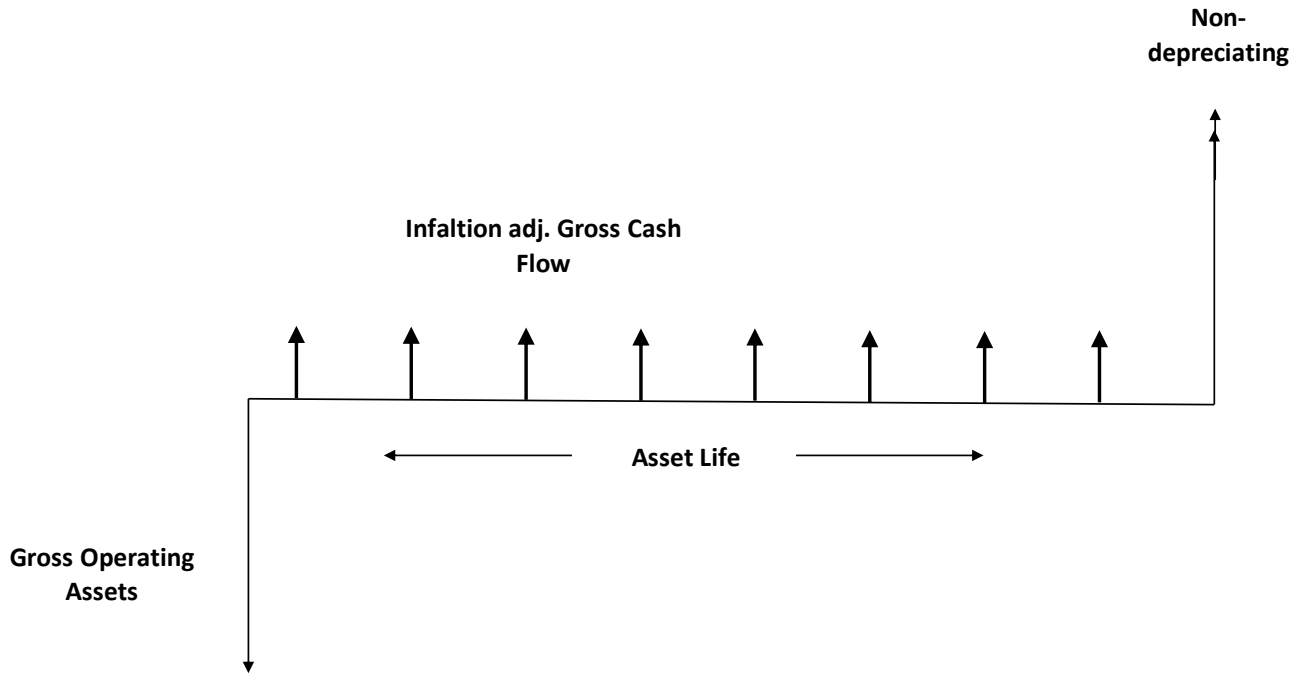


Figure 5. Source: Own Creation based on assumptions of Madden (1999: 10)

Considering these inputs, the company's CFROI can be calculated as the rate that would guarantee that the present estimation of all the future cash flow streams (the annual inflation adjusted gross cash flows and the terminal non-depreciating assets) is equal the initial outlay (Total non-depreciating + Depreciating assets).
Therefore, the CFROI can both be seen as a return on investment (ROI) metric when estimating individual projects and as a measure of total firm value when calculated for the whole of the firm. The four basic inputs and the accounting adjustments made in the Holt Framework will be discussed below. The warranted value is the present value of the cash flow stream generated from operating assets and non-operating assets.

2.8.3.2 CFROI IN A VALUATION FRAMEWORK

The central valuation building pieces are the explanation of a company´s anticipated cash flow stream (net cash receipt) and the discount rate used to derive at a warranted value. At this fundamental level: the CFROI is rooted in the basic DCF principle where i) more cash is preferred to less, ii) time has value and iii) less uncertainty is better. Valuation based on discounted cash flow (DCF) where explained earlier and is straightforward. The DCF

model has three steps; 1) forecast future free cash flows, 2) calculate a discount rate and 3) derive at a warranted value (Madden, 1999: 11)

HOLT estimates an organization's worth by forecasting CFROI´s and real growth rates over an extended period. CFROI and growth rates are the determinants of the free cash flows (FCFF), which are discounted back to present value. The CFROI uses the concept of mean reverting such that no economic profits are generated in the forecasted years. The concept of mean reversion is explained below. The near term inputs needed to calculated likely CFROI´s are derived from consensus estimates and faded over four years to reach outcomes for firms with similar starting CFROI and growth (Credit-Suisse/Holt: 2016). Cash flow streams can be generated for periods 1 to 5 and from that point, the cash flows are generated as CFROI fades toward the cost of capital and the growth toward its long haul mean of 2.5% (Credit-Suisse/Holt: 2016).

If the same adjustments and forecasts where made using EP/EVA or the DCF model – cash flow streams would be the same while a CFROI valuation will most likely result in a different value. This difference can be found in the calculation of excess return in the residual period and the asset base Vieberg & Varmaz (2008: 155). Figure 6 shows the key components in the CFROI valuation model. The different concepts will be discussed in the next sections.

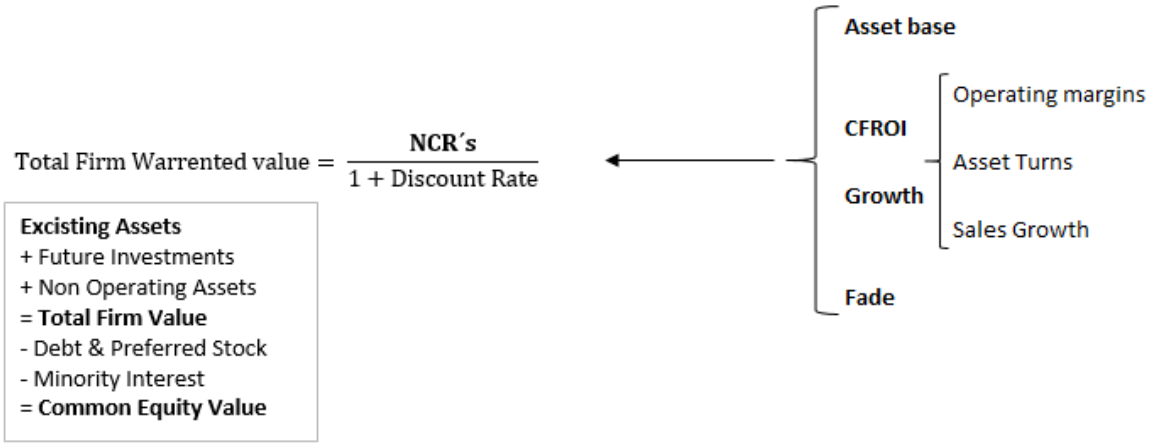


Figure 6. Source: Own creation based on assumptions of Madden (1999: 65)

2.8.3.2.1 CFROI´s Discount rate

CFROI/CS-Holt Value utilize a firm-specific discount rate when assessing CFROI. Thereby rejecting the traditional and mainstream use of the CAPM. As the reader will notice, the calculation of a cost of capital is done much similar to an implied equity premium approach where we look to the market instead of using past data as CAPM and Beta does. Credit-Suisse-HOLT calls this a market-implied discount rate and uses this to value individual equities. In addition, the CFROI discount rate is adjusted for regional and sector risk, as well as company size and leverage (Credit-Suisse Holt, 2016). In his book, CFROI Valuation: "A Total System Approach to Valuing the Firm", Madden (1999) claims his method of evaluating discount rates has two major benefits over CAPM. First, the market-derived discount rate considers expected future cash flows, while the traditional DCF valuation method uses CAPM /Beta, which is a backward looking statement based on historical data as mentioned. In other words, CFROI uses forward-looking statements which are affected by inflation, nominal tax rates, interest and dividends. Second, Madden (1999: 4) emphasize the fact that the CFROI market-derived discount rate is a product of the CFROI valuation model itself, whereas CAPM and Beta are estimates treated separately in the sense that they offer no direct link to cash flows (Madden, 1999;83). This does indeed emphasize and support the total system approach practiced by HOLT Value Associates. The CFROI discount rate is determined by three variables: Market rate, company size and leverage.

The market-derived discount rate is derived from a pool of representative sample firms. First, the aggregate market value of the firms at one point in time is computed. Second, expected cash flows are estimated. These cash flows are obtained by considering consensus estimates from analysts and the market derived discount can then be estimated by solving the following equation for a single return period (Young & O'Byrne, 2001).

$$\text{Aggregate Market value (equity + debt)} = \frac{\text{Expected Aggregate NCF}}{1 + \text{K}_{\text{Market}}}$$

Source: (Young & O'Byrne, 2001: 67)

Firm-specific discount rates are obtained in a similar way. By comparing the firm specific rate with the market rate a risk differential can be calculated (Madden, 1999: 4). The approach applied by HOLT Value Associates assumes that a firm's risk is a function of its size and financial leverage, and that this risk cannot be eliminated by means of diversification (Young & O'Byrne, 2001: 425). The risk differential can consequently be applied to

Evaluate the risk associated with a specific firm. In those cases where the CFROI value exceeds the firm-specific discount rate, the firm's NPV is positive (Fabozzi & Grant, 2000: 25). Consequently, shareholder value is created, while it is destroyed by CFROI levels below the discount rate (Young & O'Byrne, 2001: 383). It is also possible to compare CFROI to a real rate calculated for an industry (Martin & Petty, 2000: 117). This enables analysts to identify the greatest shareholder value creators in an industry.

2.8.3.2.2 Net Cash Receipts (NCR´s)

The NCR stream in the CFROI model is the expected cash flows of the future operating assets. The NCR streams are separated into two parts: i) NCR`s from existing assets and ii) NCR´s from future investments as shown in equation X (Madden, 1999: 190). Each of these parts are separately discounted giving a separate NPV for existing assets and for future investments.

$$Warranted\ value = \sum_{t=1}^{L} \frac{NCR_t}{(1+DR)^t} + \sum_{t=1}^{H} \frac{NCR_t}{(1+DR)^t}$$

Source: (Madden, 1999: 189)

The NCR´s from existing assets are winded down over the economic life (L) over of the asset and the NCR´s from future investments cover the horizon (H years) representing the life of the firm (Madden, 1999: 189). This is calculated by considering the amount of operating assets employed in the firm, growth rate of the assets, CFROI level and the fade rate which is a function of mean reversion discussed below.

2.8.3.3.3 Competitive life-cycle and Mean Reversion concept

Holt´s build a concept of fade or "mean reversion" into its valuation model. This fade influences future CFROI´s and growth levels. This is really the concept of competition. Credit-Suisse-Holt, argues that while most companies experience rapid growth and low returns in their early stages, with returns improving as the company matures; competition ultimately drives the profitability of all firms towards the cost of capital (Madden, 1999: 17). Holt´s own empirical research shows that the long-term average CFROI for global service and industrial firms is around 6% and companies tend to revert to this mean rate of return of capital (Credit-Suisse/Holt, 2016). Build into the Holt valuation framework is that returns on capital work their way into this lifecycle, eventually fading into this observed average. In essence, fade is then the decay in excess return in capital or CFROI´s and this affects the

CFROI and growth levels in the future at varying rates for different companies. I.e. High CFROI´s coupled with high growth opportunities would attract substantial competition. In addition, high growth itself increases the difficulty of managing a business forcing the return towards the average of 6% (Madden, 1999: 20).

In order to forecast the rate of fade, the Holt methodology considers three main factors: i) the present CFROI level, ii) the CFROI volatility and iii) the asset growth rate (Credit-Suisse/Holt, 2016). As mentioned, high CFROI tends to draw a crowd forcing future CFROI´s downwards. I.e. the more a firms CFROI level deviates from the global average of 6% - the faster the return falls to this average. Volatility is another factor mentioned by Holt. Large differences in yearly CFROI´s indicates that profitability is likely to fall more rapidly than more stable firms (Maden, 1999: 25). Finally, asset growth rate is inversely related to fade (Credit-Suisse/Holt, 2016). In the Holt framework, high growth companies are forecasted to fade more rapidly than slow growth rate companies do. In addition, Holt´s empirical research shows that asset growth rate also fade over time, and by the same factors (Credit-Suisse/Holt, 2016). This makes sense since cash is needed to invest in assets and firms cannot grow at rapid pace forever.

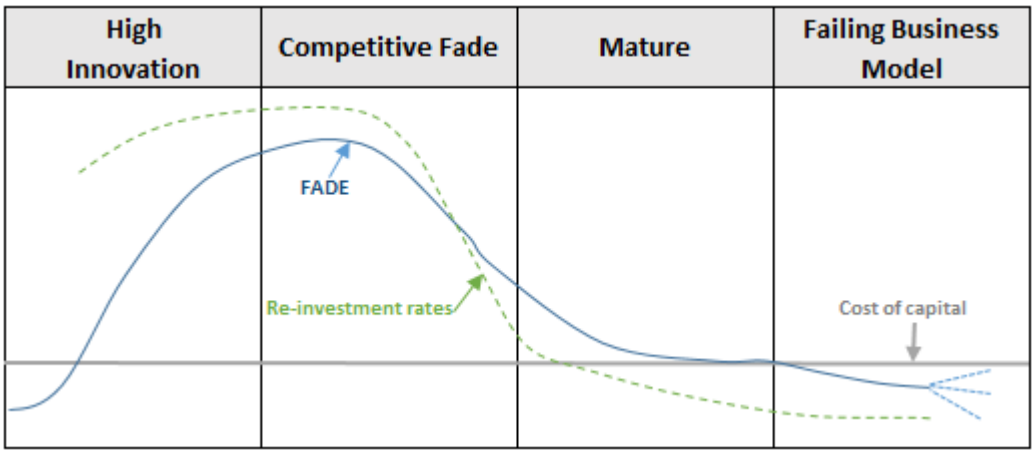


Figure 7. Source: Own Creation based on assumptions of Madden (1999: 13)

Figure 7 displays the stages of the Corporate Life Cycle as proposed by Holt. New firms tend to invest heavily in their business establishing a foundation of future success while posting returns on capital that is usually below their cost of capital. Mid-cycle companies enjoy these early investments and earns CFROI´s excess their cost of capital. These profits however attract competition, increasing the likelihood that CFROI will fade in the future. Late stage firms exhibit symptoms of over investments, thin margins and higher leverage and CFROI´s levels are

barely above its cost of capital (Credit-Suisse/Holt, 2016). When CFROI level falls below the cost of capital, firms will often try to improve them by assets sales, consolidation and reorganization. Occasionally, this succeeds and firms and industry experience a new wave of innovation and growth and the lifecycle start all over (Credit-Suisse/Holt, 2016). The speed at which CFROI´s drops are according to Holt, a direct result of the CFROI deviation of the long-term average. High return will attract a crowd fast and thus speed up the process. In addition, Holt mentions volatility as a fade factor. The more volatility in historical CFROI´s the faster the firm tend to revert to the global average of 6% (Credit-Suisse/Holt, 2016).

In order to maintain above average returns and re-investments rates over time, organizations should persistently reEvaluate themselves to beat contenders. In this sense, the path of the company and the rate of decay can be attributed to the level of management expertise (Madden, 1999: 45). This can be done by expanding into new business segments or develop new products.

In the mature stage, managers often suffer from a “bigger is better” mindset, which grounds in past success and breeds business as usual contentment. Instead, large companies in this stage should direct their actions towards activities that can stop the decline in CFROI´s such as, return wealth to shareholder from share-backs or dividends or divesting unprofitable business units. In the stage of failing business models, stakeholder pay a substantial cost for the disappointment of top management ability to effectively change business conditions. Organizations in this stage must usually always scale back or go bankrupt (Madden, 2007: 45).

However, Madden (2007:62) points out that in a free market environment, fade will always catch up no matter how skillful and innovative a company’s management team is. Attracted by the high sales and margins, competitors will try to get a piece of the pie by either copying the business or by innovating it by providing additional benefits to the customers. In a market place, this is forced up and down as investing in projects below the cost of capital both destroys value and prevents reaching higher values. This fact produces long term ambitions that outweighs short term disruptions.

2.9 SUMMARY

2.9.1 ADVANTAGES/DISADVANTAGES EVA/EP

Advantages:

- As it can be seen from equation (4) and (5) in chapter two, EP is conceptually very easy to calculate as It involves only three variables. This of course, is without the possible 160 adjustments mentioned by Stewart. However, in practice, far from all adjustments are needed. In fact, Young and O'Byrne (2000: 12) notes that only 8 adjustments are needed in reality, and even after these adjustments – EP is still easy to calculate and interpret.

- In this context, EP becomes a very operational management tool. Also as mentioned earlier, EP is calculated over a specific time period which gives management indications of weather business units are destroying or creating wealth. This is an advantage for line managers as performance is easy to measure unprofitable business units can be divested.

- EP is also a good indicator when it comes to new investment projects. Managers should only invest if the expected profit is higher than the firms cost of capital. This is easy to interpret and communicate throughout the organization which makes it possible to form an internal reporting system that focuses on value creation for the company as a whole but also throughout the organization.

- Finally, EP is not limited to listed companies as it measures the productivity of the capital. For this reason, many non-listed companies can use EP as their main measure for value and as a management framework.

Disadvantages:

- The fact that EP calculated for a specific time period, makes its subject to faults when valuing longer oriented investments. For example, medical companies might have development projects with difference phases that are expected to run for years before becoming profitable. In many of those years, EP might be negative although the overall investment carries a positive NPV. This is a clear disadvantage

with EP; investments often carry negative values in the introduction phase as it requires down payments. For firms, projects or other investments, which makes substantial infrastructure investments with long gestation periods, EP might not be a good indicator of the overall investment.

- Since the calculation of EP is calculated on the basic of historical numbers, it will according to Brewer (1999: 23) suffer from the same limitation as accounting ratios as discussed in in chapter 2.5.2 and further, EP does not measure cash flow, but only the periodic accounting results from the books.

- Another problem with EP is the fact that there's no standardized method of calculating it. Stern Stewart (1991) have their own definition, but recognize that there's no standardized model and that firms should make the adjustments necessary for their own company.

- Obrycki and Resendes (2000) mentioned that EP is distorted by the old plant trap since EP, like traditional measures of return, tends to be overstate the effect of at the remaining book value of assets. As such, EP increases as assets are depreciated and gets older. Since this is not a matter of change in economics, but rather a result of plants depreciating scheme, which lowers the capital each year. This issue has implications for mangers incentive mechanism as managers will tend to resist growth as each project will incrementally decrease EP. Again, the effect of inflation will further increase such problem as new investments are communicated in real prices. Obrycki and Resendes (2000) mentions that this problem can overcomes by replacing accounting depreciation with annuity depreciation as shown in chapter three with CFROI.

2.9.2 ADVANTAGES/DISADVANTAGES CFROI

Advantages:

- CFROI takes inflation into consideration when estimating total cash flows (Martin & Petty, 2000: 116). This feature of the CFROI can make life easier for managers who is comparing their firm across a peer group, national borders and time. Under an inflationary environment EP can be distorted and be inadequate when estimating profitability.

- As a relative measure, CFROI provides a holistic approach that can be used for valuation regardless of size and across a portfolio, market or between peer groups. This element of CFROI have made it very popular in the investment community (Fabozzi & Grant, 2000: 165)

- In addition, CFROI can be an excellent measure of long-term performance trends. CFROI incorporates the concept of mean reversion. If firms fail to recognize declining CFROI value drivers, this will force the market value under the firms cost of capital.

- Accumulated depreciation is added back to the book values employed to generate cash flows. This removes the heavily depreciated assets (Martin & Petty, 2000: 131) and different depreciation policies.

Disadvantages:

- The main complaints regarding CFROI is the complexity of its calculations (Young & O'Byrne, 2001: 407). Unlike EP, - these adjustments needs to be completed. This is also recognized by the founder of CFROI.

- It is also mentioned by madden (1991), that CFROI may not be an ideal measure for start-up firms which usually have negative cash flows in its beginning. (Madden, 1999: 80).

- It is future argued that CFROI will provide mix signals for firms with a large portfolio of different projects (Madden, 1999: 80). The CFROI is an average for the portfolio and thus it can be hard to identify individual projects.

- The CFROI also suffers from the "hurdle rate problem". It happens epically when firms set a suitable required rate of return i.e. cost of capital, and compares performance based on the rate archived. Hence, organizations are discouraged from putting resources into activities that would accomplish a lower return, contrasted with the currently employed assets, even if that exceeds the cost of capital (Venanzi, 2012: 65). Taking on such a project would generate positive cash flows for the firm but lower the overall rate of the portfolio which is what the performance evaluation criterion is based upon. Thus, managers could be reject positive NPV projects even though it would benefit the firm as a whole.

- Corporates needs to remember that NPV and not IRR, is the correct way to increase value. This needs to be a consideration for mangers.

- Inflation adjustments are estimates. Therefore, the quality of such, greatly impact the estimates. In addition, also the discount rate used in the CFROI model needs to be adjusted for inflation. This adds to the complexity. Peterson and Peterson (1996: 29). Further, in a low inflation environment as we see today among European industrial countries - these adjustments are not significant.

- It is argued that CFROI mixes operating and financing decisions and as a result, makes it difficult to determine if changes in the CFROI levels come from one or another (Fabozzi and Grant, 2000: 166)

2.9.3 CORPORATE OPERATORS VS. INVESTMENT MANAGERS

As the previous sections proved, all VBM metrics have the same objective, but if that's the case then why do so many different ones exists? A skeptic may answer that it gives every one of the consultants something to contend about. In spite of the fact that this speculation without a doubt has merit, different metrics serves different needs.

The primary users of value based metrics such as CFROI and EP/ROIC/EVA are investment managers and corporate operators. Each side has their own need for accessing valuation information when carrying out their job responsibilities. It is equally important for both corporate operators and investment managers to understanding what a stock is worth and why changes happen over time.

For example, investment managers will base their analysis by looking at historic and forecasted information relative to peers when determining whether a firm is undervalued or not. Using a value metric, this will allow them to evaluate and quickly assess companies on the basic of publicly available information. This will result in a buy/hold/sell decision and the market will eventually tell them if their assumption were right or wrong.

Although, manager's focus are primarily internal, it is certainly useful to understand the markets valuation of their stock. This allows them to make adjustments and strategic decisions that creates shareholder value for their owners. For MNE´s, these firms consist of several different units, projects and employees spread across geographic. This calls for an integrated management principle that maintains and ensures that the firm does not stray away from the designated path of creating value. This principle must be clear and easy to communicate and administer throughout the organization down to the lowest levels.

In brief, Investment manager's wants a metric that allows them compare companies across industries and geographic and a valuation system that is objective. Corporate operators want the same however, is more interested in a metric that allows them to compare performance across different business units - a performance measure that is easy to communicate and implement throughout the organization and identifies investment opportunities as well as motivates leaders to make value enhancing business decisions.

3.0 Smith & Nephew Case Study

3.1 S&N – Company profile

Smith and Nephew is a British global producer of med-tech devices which supports and helps health professionals all over the world by improving lives of patients. S&N are a leading manufacture in the following business segments[3]:

- Orthopaedics Reconstruction - joint replacement systems for knees, hips and shoulders
- Advanced Wound Management - wound care treatment and prevention products used to treat hard-to-heal wounds
- Sports Medicine - minimally invasive surgery of the joint
- Trauma & Extremities - products that help repair broken bones

Smith and Nephew consist of almost 14.000 employees that are spread out across 90 countries. In 2015, $4,634m was reported in revenues while operating profits came in at $628m (S&N Annual report, 2015). Further, S&N is a company with a long track record of acquiring firms and successfully integrating them. In S&N´s annual report 2015 it is further mentioned that acquiring firms are part of the overall strategy – "We invest in acquisitions that provide opportunities to supplement our organic growth, strengthening our technology and product portfolios" (S&N Annual Report, 2015)

Key Excecutives

Name	Title
Julie Brown	Chief Financial Officer
Olivier Bohuon	Chief Executive Officer
Roberta Quarta	Chairman
Ian E. Barlow	Director
Virginia Bottomley	Director

Key Financials ($)

Smith and Nephew PLC	2015A
Revenues	4,634M
Operating Profit	628M
MarketCap	15B

Share price history 2005 - 2015

[3] Source: S&N website and annual reports

3.2 CFROI Accounting Adjustments

To understand the concept of CFROI, S&Ns 2015 annual report is used for illustration purposes. This method has systematically been applied to the years 2005 - 2015 and a short quantitative growth analysis of the results will be presented in chapter 4.0. As mentioned in chapter 2.8.3.1, - CFROI requires four calculations steps. Figure 5 summarized these inputs as asset life, amount of total assets (depreciating and non-depreciating) and the periodic cash flow stream.

3.2.1 Asset Life

The asset life in the CFROI calculation is used as the analysis horizon. This is an approximation and is equivalent to the weighted average life on a company´s projects. Estimating life of the asset helps measure the economic return earned today, by forecasting how much cash flow will be received over a realistic time period. In CFROI, asset lifetime estimates the average economic life of the tangible depreciating non-current assets and calculating asset life in the CFROI methodology requires three major inputs: Adjusted gross plant capitalized lease project life and capitalized R&D expenditures life (Madden, 1999: 113):

$$\text{Gross Plant Asset life} = \frac{\text{Adj. Gross Plant}}{\text{Depreciation}}$$

Source: (Madden, 1999: 67)

Depreciation in the denominator signifies a mix of gross plant purchased to support operations and acquired gross plant and as such, adjusted gross plant and gross plant recaptured is included in the numerator. As indicated by Madden, this figure gives an evidence of the remaining period over which the income will be created. Goodwill and amortization are excluded in the calculation of depreciation and therefore represent current period depreciation.

The adjusted gross plant comprises of all tangible non-current assets. In the CFROI methodology however, Land is excluded since it is a non-depreciating asset meaning is has an unlimited useful life. Likewise, construction in process is also excluded because it is considered fixed property and does not have an associated depreciation charge attached (Viebig,2008: 134). In practice, companies can choose different ways of reporting land and CIP.

This can be as a result accounting standards however, companies may also to artificially boost its numbers which is why CFROI makes this adjustment. For example, General Accepted Accounting Principles (GAAP) allows for both straight-line methods[4] and accelerated methods[5]. For companies relying on accelerated methods to calculate useful life, this will result in an artificially low life and therefore an underestimated CFROI. S&N uses a straight-line approach when estimating depreciation (SNN Annual report, 2014: 128 Note 7).

When calculating asset life in the CFROI methodology, the estimated overall project life for a firm is in fact a mean of different asset classes used such as gross plant, R&D, intangibles and lease. This is because depreciation may mirror a specific year (Credit Suisse, 2016). Thus a three-year median is used when calculating lease while a fixed asset life of five years is used to mirror R&D asset life and intangibles. Viebig (2008: 135) mentions however, that if capitalized lease and R&D have known life's, - this should be used as the approximation. This is not the case with S&N why these approximations are used. In addition, the CFROI calculation also makes inflation adjustments to gross plant. This is because; gross plant represents historical cash on financial statements. Except in situation where inflation rates are zero over the life of the asset of course, - then this will lead to an incorrect estimation of the CFROI. In the stylized example below for example, no inflation is made because numbers already represent current dollars. In earlier years this is accounted for. In other words, these adjustments make cash inflows and cash outflows represent the same purchasing power. Table 1 shows the calculated gross plant life for S&N and the expected asset life.

[4] Straight line depreciation method charges a firms cost evenly throughout the life of a fixed asset.

[5] Allows firms to write off their assets faster in earlier years and to write off a smaller amount in the later years.

Gross Plant life		Total	Source
Gross Plant		2413	B/S
Less: Land		19	I/S
Less: CIP		156	I/S
Adjusted Gross Plant for Asset Life		2238	Calculated
Depreciation		226	B/S
Inflation adjusted land		9.9	Calculated
Asset Classes			
Intangibles (Presumed 5 years)		5	C/F, Note 2
R&D (Presumed 5 years)		5	B/S
Lease (3 year average)			
	2013	11	
	2014	10	
	2015	9.9	
Average		10	
Gross Plant Life		**6.7**	

Table 1. Asset Life. Source: Own creation

As it can be seen from table 1, S&N´s CFROI project life in 2015 is 9.9 years. The asset life used in the further calculation of CFROI is 6.7 years. It means that the average life of S&N´s assets are 6.7 years. In Appendix B a full overview for the years 2005 – 2015 is displayed.

3.2.2 Total Gross Assets

The amount of total assets is inflation adjusted and is the sum of the depreciating and non-depreciating assets.

Inflation Adjusted Assets

= Inflation Adjusted Depreciating Assets + Inflation Adjusted Non Depreciating Assets

The next two sections will discuss the calculation of the depreciating and non-depreciating assets components as well as their individual accounting adjustments using Smith & Nephew´s 2015 annual statements.

3.2.3 Depreciating Assets

Alongside non-depreciating assets, gross depreciating assets contains the measure of gross operating assets applied in the periodic cash flow inflow. The full calculation how gross depreciating assets is listed in below:

Depreciating Assets:
Gross Plant Less Land & CIP
Plus: Gross Plant Inflation Adjustments
Plus: Construction in Progress
Plus: Capitalized Operating Lease
Plus: Capitalized Research and Development
Less: Pension Intangibles
= Depreciating Assets

Source: (Madden, 1991; 112)

3.2.3.1 Gross Plant Inflation Adjustment

The CFROI calculation makes inflation adjustments to gross plant. This is because gross plant represents historical cash on financial statements. Expect in situation where inflation rates are zero over the life of the asset, this will lead to an incorrect estimation of the CFROI. In other words, these adjustments make cash inflows and cash outflows represent the same purchasing power. In order to make these adjustments however, one would need exact data on when the items are purchased. Since this is rarely available in financial statements or can be a too complex of a calculation, Viebig, Varmaz & Poddig (2008: 129) suggest an alternative way of estimating gross land that involves (a) gross plant life, (b) real asset growth rate and (c) GDP deflators.

The estimation requires delayering of the gross asset base into an initial CAPEX. In 2015, S&N earned total gross assets of 2258$M[6]. In order to estimate the current dollar amount (purchasing power) of each year after 2005, each layer must be inflation adjusted. Since 2005, S&N has been able to grown its gross assets by approx. 10%. An average growth rate is used since this number for most companies are volatile

Mathematical, the first layer is found by dividing the gross assets by the growth rate, which is the initial outlay in historical costs. Knowing this, the remaining years are simply assumed to grow at a rate of 10% and inflation

[6] Total gross investment is summarized in section 3.3.3.5

adjusted respectively. If this markup procedure is followed for each year, the sum is the gross plant amount stated in 2015 dollars and the mark up multiplier or ratio is then found by dividing the current dollar amount by the historical dollar amount. Because of takeovers and divestments, it is more appropriate to use this delayered method when trying to estimate changes in the reported figures on the balance sheet, predominantly because acquisitions of non-publicly traded firms are done with no disclosure of the assets acquired (Viebig, Varmaz & Poddig, 2008: 129).

3.2.3.2 OPERATING LEASE

Holt capitalizes operating leases to remove accounting distortions in firms operating leases so it represents a fair amount on the balance sheet. This is because accounting treating of lease expense depends on whether it is view as an operating or capital lease (Viebig, Varmaz, Poddig, 2008: 128). When a firm buys an asset or enters into a capital lease, these are recorded as assets and liabilities. However, when a company signs an operating lease agreement most accounting measures charge it as a rent expense over the term of the lease with no related asset or liability added on the balance sheet. The Holt framework view this as a discrepancy that reflects a financing choice rather than a difference in economics (Madden, 1999: 140). Consequently, it is difficult to make a true comparison when firms have different lease capitalization policies and different debt and asset levels. In addition, it can affect not only valuation model inputs, but also profitability and valuation multiples. In general, whether a firm looks a lease as an operating or financing lease, - lease is primarily a financing decision. If the asset wasn't needed, it wouldn't be leased or acquired in the first place.

In the CFROI methodology, this discrepancy is removed by capitalizing operating leases. Rental expense is capitalized at the prEPiling real debt rate based on the average yield for AAA rated corporate bonds, leased asset life and the lease expense. Finally, the debt rate is deflated by the expected inflation rate to arrive at the real debt rate[7] (Viebig, Varmaz, Poddig, 2008: 128).

Table 3 present S&N´s 2015 capitalized lease obligation given an asset life of 10 years, a lease expense of 57$M and a real debt rate of 4%.

[7] For instance, in cases where the nominal bond yield was 2% and expected inflation was 1% the real debt rate would equal 1.02/1.01= 1.0009

	Total	Source
Asset life (NPER)	10.17	Section 3.3.1
Lease Expense	57.00	B/S
Inflation factor	0.00	External
Inflation Adj. Lease expense	57.11	Calculated
Corporate Bond Yield	0.04	External
PV	**475.86**	

Table 2. Source: Own creation

3.2.3.3 Research and Development

As mentioned, a shortcoming of traditional accounting statements is the way they are treated one firm to another. For Research and Development costs, these are often classified and quantified in different ways. For this reason, Holt capitalize research and development costs to fairly compare companies that account differently for their R&D costs. In the US GAAP jurisdiction, R&D costs are required to be marked as an expense, while the IFRS capitalizes them as assets if it can be proved that these costs will generate future earnings (Credit-Suisse/Holt, 2016). Marking R&D as an expense has the consequence of value created by R&D not showing up on the balance sheet as part of the total assets to the firm (Damodaran, 2006: 82). This is the rationale of CFROI which therefore adds back R&D expense to net income when calculating the gross cash flow and capitalizing the historical off balance sheet expense in the CFROI asset base.

The main issue for capitalizing R&D expenditures, are to decide how many years to capitalize. In the Holt methodology, R&D have different life spans depending on its industry. In certain industries, such as pharmaceutical, R&D have a much longer term impact on future sales. Such companies with long investments or long patent protection periods should therefore be capitalized using more periods. In contrast, Tech companies should have a shorter lifespan since technological innovation leads to accelerated obsolescence (Viebig, Varmaz, Poddig, 2008: 129).

Once the amortizable life of R&D expenses has been estimated, the calculation proceeds by taking the R&D expense for each period that are to be capitalized and multiplying it by the inflation factor for that period. The sum of the inflation adjusted R&D expenses are the capitalized R&D expense used in the CFROI calculation (Viebig, Varmaz, Poddig, 2008: 129).

Credit-Suisse/Holt (2016) assumes that amortization is uniform over time and that R&D have a standardized life of five years, this leads to the following estimate of the residual value of research asset today:

	2011	2012	2013	2014	2015	Source
R&D Expense	167	171	231	235	222	B/S
Inflation Facor	0.02	0.02	0.02	0.02	0.02	Exrernal
Infaltion Adj. R&D expense	170	174	236	240	226	Calculated
CFROI Capitalized R&D					1,047	

Table 3. Source: Own creation

3.2.3.4 INTANGIBLES/GOODWILL

The key issue concerning intangibles in the CFROI calculation is the treatment of goodwill. When an acquisition is made - goodwill; the excess premium paid on the company´s assets, is recorded on the balance sheet. Holt´s considers this misleading because it distorts the true operating profit of the company. Instead, the CFROI excludes goodwill from the balance sheet and rely on the historical cost of the operating assets.

Additionally, it should be mentioned that Construction in progress is not adjusted for inflation. This is because most of these items are shown at current replacement values in the balance sheet. CIP numbers are not at this time subject to depreciation and are also included with other depreciating assets because they will be depreciated in the future (Madden, 1999: 118).

3.2.3.5 TOTAL DEPRECIATING ASSETS

After completing all of these modifications to leases, R&D, gross plant and construction in progress, they are added back to arrive at the inflation adjusted depreciating assets. Table 4 shows the inputs need to calculate the figure for S&N in 2015.

	Total	Source
Inflation adjusted gross plant	2474	Calcualted
CIP	156	B/S
Gross Leased property	475	Note 7, Ann. Report
R&D expense	1269	I/S
Adjusted intangibles	2388	Note9, Ann. Report
Inflation adjusted depreciating assets	**6,761**	

Table 4. Source: Own creation

3.2.4 Non-Depreciating Assets

Conceptually non-depreciating assets consist of working capital and other non-depreciating assets such as land and inventory. In the CFROI methodology it includes:

Non-depreciating assets
Current Assets other than inventory
Less: Current non-debt liabilities
Plus: Inflation adjusted land
Plus: Inflation adjusted inventories
Plus: Other tangible assets
Plus: Non-depreciating assets

Source: (Viebig, Varmaz, Poddig, 2008: 129)

The CFROI procedure for non-depreciating assets are to organize these into monetary assets and all other non-operating assets. Monetary Assets are considered cash and other short-term investments that are subject for changes in value due to loss of purchasing power; it is the accumulation of Cash & Short-term investment, Receivables, and other Current Assets (Madden, 1999: 129). Net Monetary Assets are then calculated by subtracting Current Liabilities, including Account Payable, Income Taxes and Other Current Liabilities (Madden, 1999; 129). Land and improvements are marked up to represent current dollars. This is done by using the same inflation adjust factors as used in calculating Gross Plant. Table 5 shows the total non-depreciating assets for S&N 2015A.

	Total	Source
Current Assets other than inventory	2475	B/S
Less: Current non-debt liabilities	1298	B/S
NWC Adjusted	1177	
Plus: Land & Improvements	19	B/S
Plus: Inflation Adj.	1	Calculated
Inflation adjusted land	20	
Plus: Long Term Investments	0	C/F, Note 2
Plus: Other Assets Excluding Deferred Charges	118	B/S
Total non-depreciating assets	$ 1,315	

Table 5. Source: Own creation

3.2.5 Inflation Adjusted Gross Cash Flow

The sum of gross cash flows should give an impression of the aggregate income created by the company's operations and overlook the strategy for financing. This is calculated on an annual basic and it is assumed that the same sum will be produced for each of the years included in the beneficial lifetime. The gross cash flow is calculated as:

Net Income after tax
Plus: Depreciation and amortization
Plus: Adjusted Interest Expense
Plus: Rental expense
Plus/less: Monetary holding gain / (loss) - Cost of sales adjustment for replacement value of inventories
Plus: LIFO charge to FIFO Inventories
Plus: Net pension expense
Plus: Minority interest
Plus: Special item after tax
= Inflation-Adjusted Gross Cash Flow

Source: (Madden, 1999: 133)

3.2.5.1 Net income after tax

CFROI recognize the tax advantage of debt in the gross cash flow calculation and uses an average cost of capital that rises with increasing debt levels (Viebig, Varmaz, Poddig, 2008: 129). Thus, the tax advantages from debt are considered in the gross cash flow´s numerator and the risk is recognized through the rising cost of capital in the denominator in a DCF valuation approach. This is different from EP/EP and other measures that recalculates tax in a cost of debt setting that are part of the firms cost of capital or discount rate.

3.2.5.2 Depreciation & Amortization

Depreciation & Amortization is added back to net income because they are non-cash operating expenses and have been subtracted from the net profit after tax (Madden, 1999: 131).

3.2.5.3 Interest Expense

Interest Expense is viewed as a financing cost in the CFROI model, which makes it consistent with treatment of the related debt in the capital structure, where it is deducted from the aggregate estimation of the organization when determining total warranted value. Financial subsidiaries are also undertaken a special treatment in the CFROI calculation. This is done to ensure that interest expense represents only core business activity. When adjusting cash flows for financial subsidiaries, gross reported interest expense is reduced by the estimated portion attributable to the finance subsidiary´s debt (Madden, 1999: 131). Thus, in situations where a subsidiary is present, the firm's receivables, interest spread, less the interest goes to net income.

3.2.5.4 Rental Expense

Rental Expense is added to net income since a firm holds the future obligation of operating leases (capitalized in the depreciating asset calculation) and is thus used to derive cash flows in the CFROI model (Madden, 1999: 134). In a valuation setting, capitalized leases is added to debt and equivalents which is subtracted from enterprise value in order to arrive at the equity value, which is also indicated by figure 6.

3.2.5.5 Monetary Holdings

The gain (loss) from monetary holdings is adjusted in the CFROI calculation in order to make it comparable through time and geography. It does so by taking inflation into consideration and is calculated as net monetary assets times the percent change in the GDP deflator (Madden, 1991: 135). The CFROI model makes changes to

monetary assets and current liabilities. These two figures are subtracted in order to find the net monetary asset number, which is then multiplied by the GDP deflators to make it represent current dollars (Madden, 1999: 135).

3.2.5.6 LIFO CHARGE

When assessing inventory, the CFROI methodology favors the FIFO method when estimating balance sheet figures. However, when the income statement is considered, the LIFO method is used as it is thought to more accurately estimate net income. Since FIFO deals with the last goods purchased, this method are preferred because in an inflationary environment, these goods more accurately represent current dollars. Contrary, it´s argued that under the FIFO method, these goods would be understated (Madden, 1991). The inventory charge is calculated as the proportion of a firm inventory on FIFO, multiplied by the percentage change in Producer Price Index (PPI) for that year (Madden, 1999: 135). This indicates an approximate amount by which net income would change if the firm were on LIFO.

3.2.5.7 NET PENSION

CFROI incorporates Net Pension to the amount of Net Income. By doing this, the CFROI model incorporates the measurement of managerial performance in terms of resources used independent to how those are financed Pension expense is calculated as the “Service cost” of promised pension benefits incurred over the accounting period plus interest cost less expected return (Madden, 1999: 136).

3.2.5.8 MINORITY INTEREST

Minority interest is added back to net income because the minority owner is treated as a supplier of capital in Holt framework (Madden, 1999: 136)

3.2.5.9 GROSS CASH FLOW CALCULATION

The final input for calculating the CFROI are summed in table 5. A total overview of the years 2005 – 2015 are displayed in appendix C.

	Total	Source
Net income	410	I/S
Less: Special Items (after tax)	-264	I/S
Plus: Depreciation and Amortization	134	B/S
Plus: Amoritzation	219	B/S
Plus: Adusted Interest Expense	49	Note 2
Financial Subsidiary Interest Expense	0	Note 4
Plus: Rental expense	57	I/S
Plus: R&D	222	I/S
Plus: Minority Interest	0	I/S
Plus: Pension Adjustments to Cash Flow	11	Calculated
Plus: Monetary Holdings (Loss)	1	I/S
Plus: Share-based Compensation	22	B/S
Less: LIFO Charge	-29	Calculated
Total Gross CF	**1452**	

Table 6. Source: Own creation

3.2.6 CFROI

With Gross Cash Flow in section 3.4.9, we have all the inputs needed in the CFROI computation which resembles an IRR method. The CFROI for 2015 EOY is 8.13%. Figure 8 summarizes the inputs used in the calculation for S&N. The inputs needed in the IRR calculation are Gross investment (PV), Non-Depreciating Assets, Gross Cash Flows (PMT) and Asset Life (N). This method has been systematically applied through the years 2005 – 2015. The historical performance is commented on in section 4.1 and appendix A provides a historical table summary.

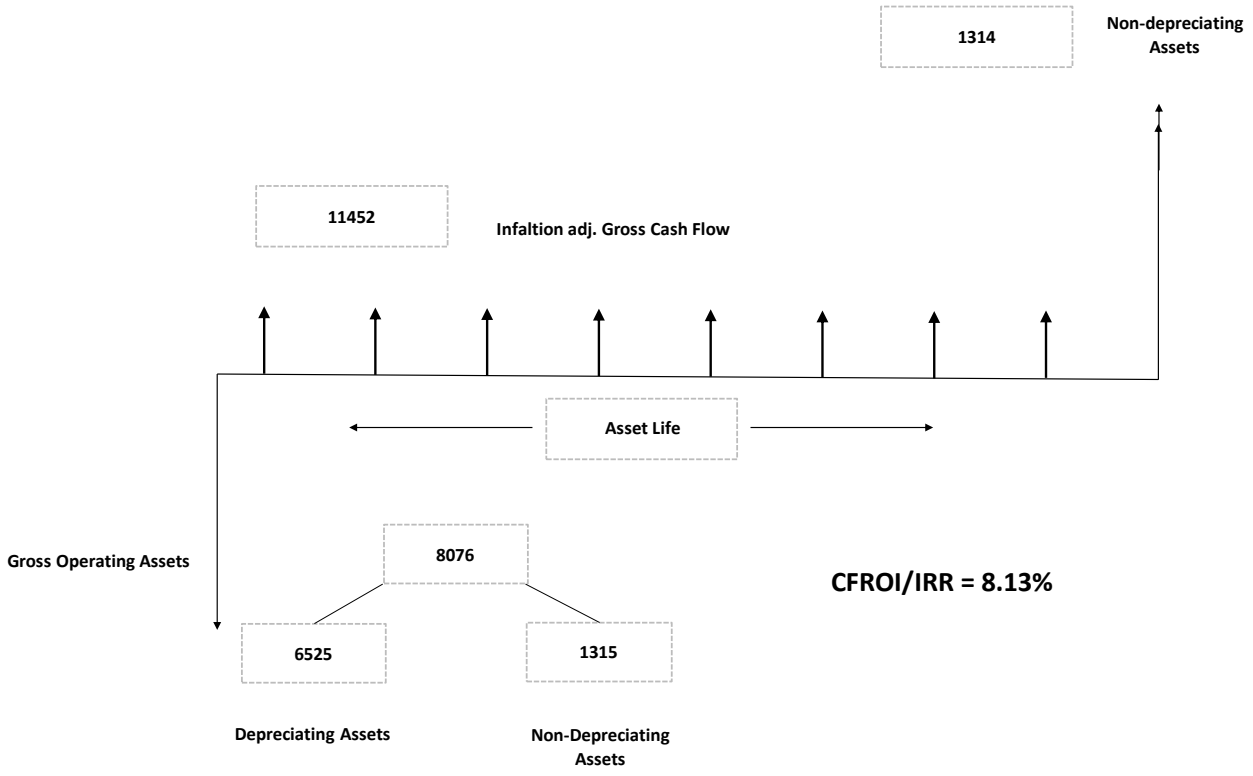


Figure 8 - S&N 2015, CFROI Illustration

4.0 RESULTS AND ANALYSIS

4.1 KEY ADJUSTMENTS

Some of the most significant adjustments in the case study where those made to Research and Development costs, goodwill, and asset lives. Under Generally Accepted Accounting Principles (Henceforth, GAAP), Research and Development are required to be expensed in the same year they occur. In CFROI however, Research & Development costs are treated as an investment in the future profitability of the firm. Thus, Research and Development are considered a capital investment and we capitalized this on the balance sheet in the case study – modified for inflation and asset age. This was done by adding back R&D to net income in the calculation of gross cash flows. The estimation of asset age is in this authors opinion the most subjective input in this calculation. Madden (1999) mentioned that the standard assigned lives of individual asset classes are based on academic research. However, one could argue that these are hard to generalize and varies overall. In general, however, asset lives enhance comparability of companies.

Goodwill is another major adjustment not considered in the EVA/EP model. We defined goodwill as an intangible created when one company is acquired by another. The intangible consists of things such as patents, brand name and other intangibles that are hard to value. In the CFROI methodology, goodwill is excluded from the asset base and thus CFROI clearly emphasize on a firms operating return and the underlying economics. The adjustment has the advantage of highlighting the management's ability to integrate acquired firms and it also enables the comparability of firms regardless of their acquisition history.

Taking asset lives into account, CFROI addresses one common problem among other cash flow measures that can be too static when removing depreciation This have the effect of not addressing the sustainability of cash flows. CFROI considers this issue by calculating asset lives on assets from the balance sheet.

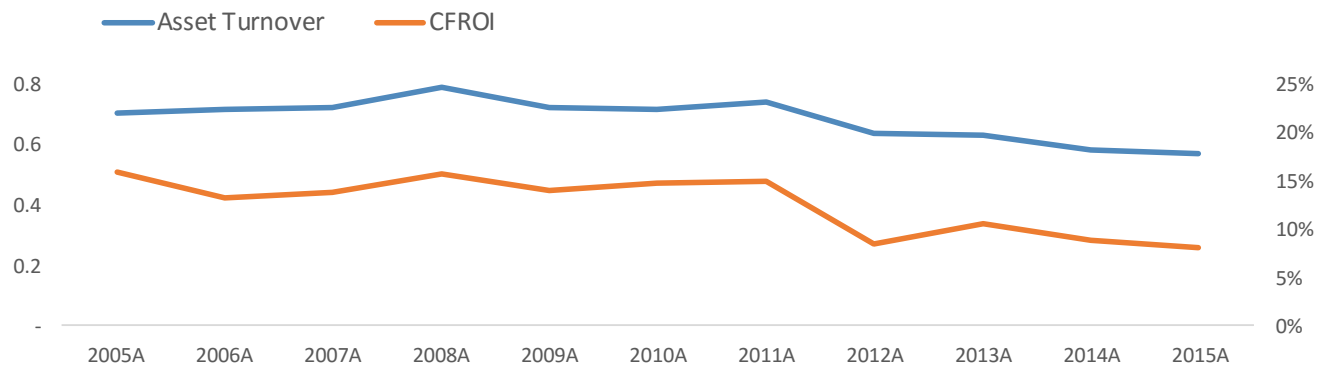
Further the inflation adjustments are a unique feature of the CFROI calculation. In the case study we considered inflation when calculating the current value of a company's assets in real terms. Although a 2% inflation rate were assumed for simplicity, - the firms home country GDP deflator should be used. What it did was to consider the asset base at its replacement value and not as fully depreciated. If this was the case, firms with older asset

would look more profitable as their assets would have suffered more depreciation than firms with more recent investments.

4.2 Smith & Nephew: Historical CFROI Performance[8]

S&N has created stable value for its shareholders by delivering CFROI´s above the average cost of capital for industrial firms by securing CFROI´s for the past decade of over 10%. Its CFROI´s however has been on a decreasing trend as it has dropped from 15.93% to 8.13% - a decrease of almost 50%. What causes the CFROI to drop significantly over these years?

On a more metric specific level, - CFROI´s key drivers as described in section 2.9, Sales, Margins and Turns reveals some interesting facts[9]. Asset turnover has been declined over the years, implying that S&N have not been able to generate consistent revenues on its assets. Since ROA is a function of the profit margin and asset turns, it is clear that CFROI can be improved by generating more sales per unit of assets or by improving its profit margin. Recall that CFROI uses Gross investment instead of Gross Assets that has been inflation adjusted. Similar, CFROI adjust net income to gross cash flows. Thus, CFROI can be improved by changing margins and asset turns. Figure 7 also confirms this. Asset utilization have averaged approx. 7% from 2005 - 2015 ($1 of sales is generated from every $1 of inflation-adjusted gross assets). As a consequence, S&N have seen declining CFROI levels from approx. 16% in 2005 to approx. 9% in 2015.



[8] For full overview see appendix A.
[9] Turn of appendix G for CFROI drivers

Figure 9. Source: Own creation based on assumptions in appendix and calculation of CFROI.

In the company profile, it was mentioned that S&N has a long track record of accruing firms. For this reason, it is interesting to look at the performance relative to M&A activity. Mergers and Acquisitions are very capital intensive and declining CFROI´s could be a result of companies failing to reach the expected synergies. There are many reasons acquiring firms underperform the market after an acquisition. One important reason is acquisition timing. M&A activity is driven by the market cycle, peaking at market highs. Allocating significant capital and paying a control premium at a market peak can compound the pressure on the stock price as a market cools off. Decline in CFROI level in the years after a transaction is common. How can investors assess the past acquisition skill of a management team? With this information, investors can quickly and effectively assess management's acquisition skill and make hold or sell decisions when a company they own announces a deal.

As mentioned, goodwill is the excess premium paid on a company´s asset when an acquisition is made. This premium represent brand value or a competitive advantage and while goodwill certainly represents expenditures of shareholder capital, it is not an operating asset. Managers can influence margins positively by improving ROA, cutting costs and increasing sales. Goodwill on the other hand, cannot be influenced since it represents excess over the book value. Thus, goodwill in the Holt framework is excluded from the original CFROI calculation. In order to access manager's ability to acquire profitable businesses, Holt uses a modification of the original CFROI. Since only senior management makes acquisition or merger decisions, the modification allows investors to gauge and hold management accountable for the attained goodwill from acquisitions. Holt calls this "transaction CFROI" and the calculation requires two steps (Madden, 1999: 101):

i) transaction CFROI ratio = Gross Investment / (Gross Investment+ Goodwill),
ii) then Transaction CFROI = Transaction CFROI ratio x Operating CFROI.

Figure 10 shows the transaction CFROI vs. the original CFROI since 2005. Note that since transaction CFROI represents lost operating return due to acquisition costs, this number is less than CFROI. Comparing S&N´s real CFROI vs. Transaction CFROI can provide useful insights. For example, the 2012 and 2104 dip can be credited to the acquisitions of Healthpoint and ArthroCare respectively. Mainly looking at the graphs, it could seem that both acquisitions were low return business as reflected in the CFROI. The difference between the CFROI and Transaction CFROI represents the value transferred to S&N shareholders.

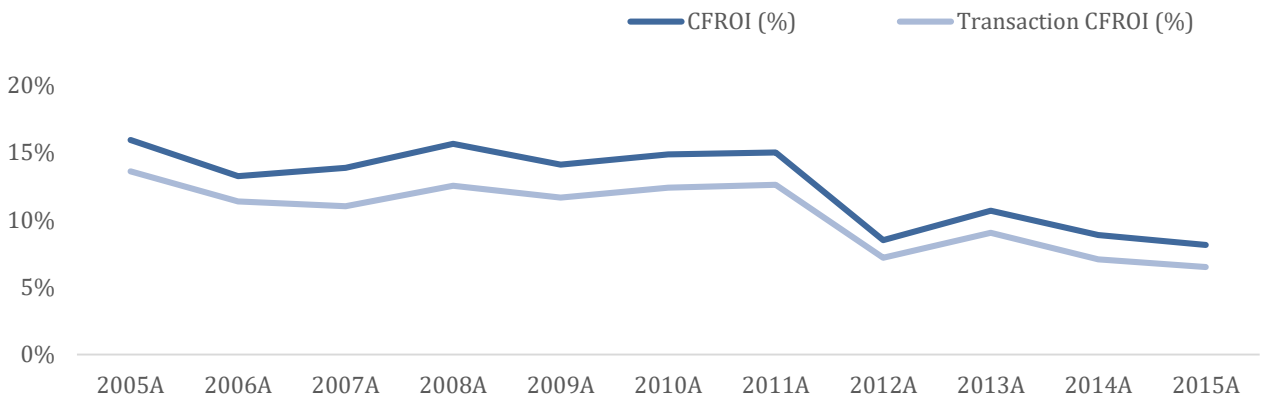


Figure 10. Source: Own creation based on assumptions of Madden (1999, 110)

4.3 MANAGEMENT CONSIDERATIONS

4.3.1 COMMON VALUATION LANGUAGE

The warranted value in the CFROI model serves as the cornerstone when adopting a CFROI framework. The drivers of firm's cash flows in this model is a firm's current assets, its current CFROI, reinvestments rate and the long-term effect of fade in these variables (Credit-Suisse/Holt, 2016). Thus, if a company wishes to improve its performance it can do so by increasing its profit margin or by generating more sales per unit of assets.

These drivers also serve as a device for estimating tradeoffs in valuation and asset allocation decisions. For instance, connecting a higher reinvestment rate to above cost of capital CFROI´s will increase value but also result in a faster fade as previously mentioned (Madden, 1999: 1). In other cases, costs deductions can increase reported CFROI´s in the short run as sales has gone up, but in the long-run, it can also create a faster fade. In such cases, there exists a trade-off and identifying a common valuation language such as the CFROI assists in solving the issues by providing common ground internally in the firm.

Ittner and Larcker (1998) pointed out that from a corporate perspective, the key question is not to what degree the performance metric is more correlated with returns in the stock market than conventional accounting figures are. It's rather a question if the use of value measures for internal decision making, measurement and

compensation can improve firm performance. In this light, the valuation model also serves as reinforcement tool for making decisions that incase shareholder value. I.e. investing in projects that earns CFROI´s below the cost of capital, reinvest in business that earns CFROI´s below the cost of capital and develop strategies that can deliver advantageous fade rates (Madden, 1999: 1).

Vieberg & Varmaz (2008: 158) mentioned three key rules managers should ask themselves when accessing CFROI:

- What is the current level of CFROI?
- What´s the firm discount rate?
- Given the current spread of the two variables above, should the firm concentrate on growing on contracting?

When CFROI is lower than the cost of capital, firms should focus on growing the business even further. In case where there are limit possibilities for growing, the CFROI should be maintained or aimed to be improved. When firm experience CFROI level equal to their cost of capital, growth will neither create or destroy firm value, thus management should improve CFROI before growing, either by asset utilization or by margins improvements. In cases where CFROI is below the cost of capital, firms should focus on down scaling or contacting assets. Growth in this stage will destroy value (Vieberg & Varmaz, 2008: 158).

4.3.2 Implications of CFROI on compensation incentives

Conceptually, implementing CFROI incentives throughout an organization faces three categories of risk of doing so (Young & O´Byrne, 2000: 420). The first risk firm's faces are represented by the capital game. This happens when managers are being vvaluated on the assets in place. In such situation, they will be motivated to keep that capital down since the value of the firm in CFROI both depends on invested capital and the variable CFROI. Thus, the capital invested and CFROI are both sensitive to the measurement of capital invested. For example, if the capital invested is reduced while operating income is held constant, the first term will drop but the CFROI will rise proportionately (Damodaran, 2013: 23). Second, when managers are Evaluated on CFROI either in the present year or at a year-to-year basics – mangers may be tempted to give up long-term investments and instead pursue short-term targets. In other words, managers can be encouraged to increase CFROI from the asset in place at the expense of future growth (Young & O´Byrne, 2000: 420). Thirdly, the risk game is characterized as

the trade-off between the increase in the metric versus the increase in the overall riskiness of future investments (Venanzi, 2012: 65) and thus their cost of capital that lowers the PV of growth.

4.4 SUMMARY

4.4.1 INTERPRETATION CFROI AND EVA

The case study and the literature review provided us with a solid base of knowledge which allows us to compare the two metrics. CFROI and EP/EVA both seeks to measure value, but they have very different vantage points:

The EVA framework was designed by management consultants (Stewart, 1999) as a subset of Economic Profit from the viewpoint of managing corporate portfolios from the point of view of internal corporate managers looking to optimize value creation. In contrast, CFROI was designed by capital market consultants (Holt Associates) as a comprehensive system approach to valuing investments opportunities from the point of view of external capital market participants looking for an alpha edge. CFROI is further based on comprehensively adjusted financials – where the most notably is done by restating the asset base for historic inflation. In addition, the required rate of return is implied by market values and expected performance of an aggregate of companies representing the market. Adjustments are made for size and financial leverage and Cash flow captures tax shields. EP measures enterprise value creation as nominal return on capital (ROIC) over a nominal measure of average cost of capital considering all investors (WACC). ROIC is based on readily observable financials with a number of potential adjustments. The required rate of return (WACC) is generally based on the Capital Asset Pricing Model (CAPM) - or versions thereof where cost of debt captures tax shields.
Further, we can make some general assumptions. At first sight, both measures focus on additional value or surplus. This idea stretch that it is not the amount of profits a firm makes which characterize its value, but how much it has exceeded its cost of capital. EVA expresses this amount in nominal terms whereas CFROI uses a relative excess rate. Metrics such as EVA and CFROI have their roots in VBM and in the DCF/NPV methodology in particular as noted in earlier chapters. Therefore, it comes as no surprise that if both measures was given the same theoretical assumptions, they would yield the same NPV (Myers, 1996).

CFROI as developed by Holt Value/BCG can be defined as the percentage of the cash invested in a firm's assets (Martin & Petty, 2000: 117). It compares a firm's inflation adjusted cash flows to its capital providers with the inflation-adjusted investment made to generate those cash flows. This ratio is then transformed into an IRR by

recognizing the finite economic life of firms depreciating assets and the value of non-depreciating assets (Credit-Suisse/Holt, 2016). CFROI is thus the internal rate of return of all projects within a firm and therefore represents a multi-period return. To calculate CFROI, following inputs are needed; Asset life, total gross assets (depreciating assets and non-depreciating assets) and the inflation adjusted gross cash flow.

On a practical level, the CFROI metric is calculated from publicly available financial statements and Holt Value do not use re-stated data (Madden, 1999: 3). Real numbers are used in the CFROI calculation and the inflation adjustments extends to all parts of the balance sheet, income statement, and in the measurement of real CFROI and real growth rates. By this, Holt value follows the theory of Irving Fisher (1930), who claimed that investors demand a real required return as opposed to a nominal return. Inflation has the effect of reducing the purchasing power of a currency, with each unit of currency able to purchase fewer goods and services. This affects corporations and their profits as high inflation also impact corporate profits through higher input costs (wages, material costs and production costs). Holt´s view on inflation is that it can mislead profits depending on a firm's accounting treatment and that differences in inflation across countries, economic zones, and time can reduce the comparability significantly. Instead, Holt removes the distortion caused by inflation by measuring the real economics of corporate returns. The goal of inflation adjusting is to restate the cash flow and operating assets into current units of purchasing power (current dollars). This adjustment typically has the effect of i) increasing Gross Investment, ii) decreasing Gross Cash Flow, iii) generally depressing CFROI (Madden, 1999).

EVA as proposed by Stern & Stewart, is calculated as the net operating profit after tax less the opportunity cost of the capital invested. Similar to conventional measure of economic profit, EVA differs as it is not constrained by accounting principles (GAAP) and takes the total cost of capital into account. Stern Stewart (1991) makes various accounting adjustments to convert from accrual accounting to cash accounting - many which is also shared with CFROI. For example, the capitalization of lease, exclusion of reserves and provision and abnormal non-operating items. According to literature as many as 160 adjustments to EVA exists. However, it is recommended that these changes are made in respect to taxation, meaning that changes to items on the income statement should be offset by the relevant item on the balance sheet (Monks & Minow, 2001: 56). Stern and Stewart (1991) do not advocate one specific definition of EVA, and it is acknowledged that EVA in practice can be customized with respect to the user.

CFROI differs from other cash flow measure because it uses a firm specific discount rate rather than the tradition WACC method as described in section 2.2.2. This discount rate is based on a CFROI levels, asset growth rates as

well as market derived discount rate (Martin & Petty, 2000: 117). Although CFROI is an IRR measure, it is important to remember that it cannot be interpreted exactly the as one. The CFROI level itself, does not indicate whether wealth have been created or destroyed. In order to make this conclusion, it must be compared to its benchmark i.e. its cost of capital as described above. In cases where firms CFROI exceeds its cost of capital, the NPV is positive and shareholder value has been created (Fabozzi & Grant, 2000: 25).

4.4.1 Learnings and Insights

From the case study and the literature review, we found that EVA/ROIC is more accessible and easier to calculate and interpret. Being an absolute measure, it's also easier to communicate. Such attributes, make it more suitable for corporate performance communication and for non-financial managers. The fact that it's an absolute measure, also avoids the shared issue of IRR Ratios, - which is the hurdle rate problem. IRR does not capture the magnitude of wealth created and as a consequence, we can end up in a situation where small companies with high returns are valued over large companies with low returns. By turning ROIC into a nominal value, the fair amount of capital is incorporated. This is a useful starting point for corporate managers as the more capital put into work will create value in a positive spread firm.

From the perspective of the investor however, this propose some risks. Being advantageous to earn positive returns on a larger capital base, - the advantage may result in investors overseeing smaller firm's high returns. As stated in the introduction of this paper, - shareholders are interested in "excess return" and for shareholders it's a relative matter based on share growth rather than absolute value. Thus for investors it is more important to understand and be able to identify positive spread trends among firms. If one lists a number of firms in an industry based on its EVA values, - this will put larger companies at top and smaller at bottom which might have better returns than those at the top (i.e. less capital employed but better operating returns).

CFROI on the other hand gives a better understanding of where return is coming from i.e. the differences between working capital and sales. Further, the CFROI framework takes inflation into consideration. This feature enables comparability of firms across a peer group, national borders and time. Under an inflationary environment EVA can be distorted and be less adequate when estimating profitability. ROIC is also a relative measure, which do allow for benchmarking however, ROIC is subject to inflation not to mentioned asset age and asset mix which distorts and limits their use for benchmarking. Focusing on gross investments and asset life,

CFROI recognize the fact that asset efficiency declines over time. In EVA/ROIC the focus is towards net assets, which leads to a different result: In situations where asset age declines faster than its efficiency, EVA would rise although its asset efficiency are declining. This scenario would be even more difficult with acquisitions being made. For the same reason variations between the two measures decreases as the level of non-depreciating assets in the asset mix increases.

CFROI also uses fade rates when forecasting CFROI´s and its cost of capital converges to an industry average, which eliminates the perpetuity problem we have in most standard DCF valuations models. This is in line with the statement from section 2.2 that firms continuously face competition forcing excess profits to zero and once at zero, future investments add no incremental value.

5.0 CONCLUSION AND RECOMMENDATION

This thesis investigated Cash Flow Return on Investment (CFROI) conceptualized by Holt Associates/BCG and its merits against EVA and ROIC. The thesis showed that CFROI and EVA both seeks to measure value, but have very different vantage points.

The proxy of economic return in the CFROI methodology, is like the IRR calculation of a firm's project. The metric expands this concept and applies to the entire firm by comparing a firm's inflation adjusted cash flows to its capital providers with the inflation adjusted investment made to generate those cash flows. A key advantage of CFROI compared to EVA is that it's not distorted by inflation or depreciation. This enables comparability and benchmarking of firms, peers and business units across time and geography. Under an inflationary environment EVA can be distorted and be less adequate when estimating profitability. ROIC is also a relative measure, which do allow for benchmarking however, ROIC is subject to inflation not to mentioned asset age and asset mix which distorts and limits their use for benchmarking. Focusing on gross investments and asset life, CFROI recognize the fact that asset efficiency declines over time. In EVA/ROIC the focus is towards net assets, which leads to a different result: In situations where asset age declines faster than its efficiency, EVA would rise although its asset efficiency are declining. This scenario would be even more difficult with acquisitions being made. For the same reason variations between the two measures decreases as the level of non-depreciating assets in the asset mix increases.

In a valuation setting, CFROI incorporates fade rates forecasting CFROI´s and its cost of capital converges to an industry average. This concept of mean reversion removes the perpetuity problem we have in DCF models. Through a case study of Smith and Nephew, it was evident that CFROI requires comprehensive accounting adjustments unlike standardized EVA/ROIC models which uses only a few variables and accounting figures. Chapter two showed that calculating EVA/ROIC is straightforward without the accounting adjustment suggest by Stern (1999) and he´s expansion of EP. The fact that EVA/ROIC is easier to calculate and interpret makes it more suitable for corporate performance communication and for non-financial managers. At a divisional level, EVA/ROIC can be used for target setting and incentive plans because it's an absolute measure. As such, EVA also avoids the hurdle rate problem. Turning ROIC into a nominal value, mangers have a useful starting point as the more capital they put into work, the more value they create in a positive spread firm. CFROI on the other hand, provides better insight in the differences between operating capital and sales by separating goodwill. The case

study showed that CFROI unquestionably, is time consuming and most likely costly to implement within an organization like Smith and Nephew. Especially making inflation adjustments to fixed assets and estimating asset lives. The estimation of asset lives in the CFROI methodology is very subjective and quality will depend on the person making them. Further, CFROI assumes that cash flows are stable over the life of the assets which can be questioned. Most of the adjustments made in the CFROI methodology, are made with the purpose of enhancing comparability of firms. For this reason, CFROI is an excellent tool evaluating investment opportunities.

This thesis can ultimately conclude that there is no simple answer when evaluating different value based performance measures and there is no substitute for sound business judgments. Value based metrics can equip managers and executives with the tools needed to answer question about true economics. However, it does not tell us anything about the quality and assumptions that goes behind the calculations. Cash flow measures such as ROIC and CFROI makes implicit assumptions about future cash flows and investments, which can be highly dependent on the person making them. With that being said, CFROI will unlike EVA/ROIC works as an excellent measure when comparing on firm to another and is therefore a very useful tool when evaluating investment prospects. CFROI is also being marketed as an alpha enhancing buy-side tool and the conclusion of this thesis is that this is where it belongs for the most part.

However, this does not mean that a firm such as Smith and Nephew should lay off CFROI completely. Smith and Nephew and many other firms would do very well in understanding analysts and investors who do look for CFROI when evaluating firms. Although in theory, all value based metrics will yield the same results with laboratory data - the metrics will yield very different answers when applied to real business situations. For this reason, companies will do well understanding them all.

5.1 RECOMMENDATION

Based on the observations and conclusions above, the recommendation to Smith & Nephew is to focus on EVA and ROIC over CFROI as it is easier to comprehend and simpler to implement. In particular, my recommendation can be summed to three points:

A) CFROI is a complex and proprietary framework developed specifically for investment management with accompanying tools and databases made available to buy-side investors. CFROI is likely not anywhere near as widely used and understood as EVA, neither in the investment community nor among corporates. However, **Smith & Nephew would do well in understanding CFROI better so that they are able to communicate with investors who do look to CFROI for their investment decisions.**

B) That said, CFROI does not lend itself well for portfolio management and granular internal value based management as it is harder to comprehend and very technical to implement in its original form. Modifying CFROI for internal use would likely not make it easier to comprehend than EVA and it would arguably dilute its advantages to a point where it is not technical superior. Thus Smith & Nephew should **stick with EVA/ROIC for internal value based management.**

C) **The strategic department in Smith & Nephew should make their own version of CFROI at the Group model level** to assist Executive Management in its dialogue with the capital market.

6.0 PERSPECTIVE

After the review of CFROI, its accounting adjustments, economic reasoning and merits, - one could ask, - When should this measure be applied at the expense of EVA/ROIC? Section 4.4.2 stated that for firms with lumpy capital expenditures patterns, CFROI Is the preferred metric as these expenses have little effect on the firm's ability to generate cash flows in the CFROI methodology. In contrary, ROIC will rise to levels which are not representative to the projects IRR while CFROI will be a better measure as operating cash flow are stable. In contrary, ROIC is a better and more accurate measure of IRR when investments are stable as these are needed to support sales. As an example, one could think of a firm with that makes investment constituently and frequent in order to upgrade and or renew business line and products. Maybe because such investments are necessary in order to stay alive in a competitive market. In this situation the depreciated capital base is a good estimate of a firms true IRR (Copeland et. al, 2000: 428). The chapter on asset life in this thesis, showed how Holt normalizes capital expenditures over a number of years by averaging these for the most asset classes rather than using the latest observed data. As a consequence, we avoid the risk of overestimating (We could have had a year where a new plant was being build) or underestimated it (if the plant was built in earlier years). One must however, estimate different asset lives between asset classes which can be a difficult task as large capital expenditure outlays will vary from firm to firm.

This is also recognized by one of the leading consulting firms who said that CFROI is more appropriate in businesses where investments are lumpy. McKinsey argues in its seminal publication on corporate valuation "Valuation – Measuring and Managing the Value of Companies (Koller et al. 2010) - that CFROI makes most sense for companies with…

- …Lumpy capital expenditure patterns
- …Fixed assets with long lives of >15 years
- …Large ratio of fixed assets to working capital

McKinsey proceeds to argue that CFROI removes subjectivity of year-by-year forecasting of cash flows by making standardized "project" assumptions and then solve for cash flows, but because of the reliance on these very assumptions for its derivation, CFROI does not offer a consistent measure of historical performance.

7.0 BIBLIOGRAPHY

Journals:

Brewer, Peter. "Economic Value Added (EP): Its Uses and Limitations." *Journal of Finance* (1999). *ResearchGate*. Web.

C., L. R., and Irving Fisher. "The Theory of Interest." *Journal of the Royal Statistical Society* 93.3 (1930): 450.
Cakici, Nusret. "The Five-Factor Fama-French Model: International Evidence." *SSRN Electronic Journal SSRN Journal*. Web.

Koller, Timothy. "McKinsey Quarterly." *McKinsey & Company*. Web. 25 May 2016.

Koller, Timothy. "What Is Value-based Management?" McKinsey & Company. McKinsey Quarterly. Web. 25 May 2016.

Lintner, John. "The Cost of Capital and Optimal Financing of Corporate Growth."The Journal of Finance 18.2 (1963): 292. Web.

Moskalev, Sviatoslav, and Seung Chan Park. "South Korean Chaebols and Value-Based Management." *J Bus Ethics Journal of Business Ethics* 92.1 (2009): 49-62. Web.

Ross, Irwin. "The Stern Stewart Performance 1000." Journal of Applied Corporate Finance J Appl Corporate Finance 11.4 (1999): 122-26. Web.

Websites:

"Ratings Definitions." *About Moody's Ratings:*. Web. 26 May 2016. <https://www.moodys.com/Pages/amr002002.aspx>.

"History of HOLT - Credit Suisse." *History of HOLT - Credit Suisse*. Web. 26 May 2016. <https://www.credit-suisse.com/sites/holt/en/about-holt.html>.

Books:

Berk, Jonathan. *Fundamentals of Corporate Finance*. Frenchs Forest, N.S.W.: Pearson, 2006.

Brandenburg, Marcus. *Quantitative Models for Value-based Supply Chain Management*. Berlin: Springer-Verlag, 2013.

Brealey, Richard A., Stewart C. Myers, and Franklin Allen. *Principles of Corporate Finance*. New York, NY: McGraw-Hill/Irwin, 2006.

Copeland, Tom, Tim Koller, and Jack Murrin. Valuation: Measuring and Managing the Value of Companies. New York: Wiley, 1995.

Dahya, Jay, Orlin Dimitrov, and John J. Mcconnell. "Dominant Shareholders, Corporate Boards and Corporate Value: A Cross-Country Analysis." *SSRN Electronic Journal SSRN Journal*. Web.

Damodaran, Aswath. Investment Valuation: Tools and Techniques for Determining the Value of Any Asset. New York: Wiley, 2002.

Damodaran, Aswath. *The Dark Side of Valuation: Valuing Young, Distressed and Complex Businesses*. Upper Saddle River, NJ: FT, 2010.

Daniels, Aubrey C. Performance Management: Changing Behavior That Drives Organizational Effectiveness. Atlanta, GA: Performance Management Publications, 2004.

Fabozzi, Frank J., and Pamela Peterson Drake. *Finance: Capital Markets, Financial Management, and Investment Management*. Hoboken, NJ: Wiley, 2009.

Kerzner, Harold. Project Management Metrics, KPIs, and Dashboards: A Guide to Measuring and Monitoring Project Performance. Hoboken, NJ: Wiley, 2011.

Keuleneer, Luc, and Willem Verhoog. *Recent Trends in Valuation: From Strategy to Value*. Chichester, England: J. Wiley, 2003.

Knight, James A. Value Based Management: Developing a Systematic Approach to Creating Shareholder Value. New York: McGraw-Hill, 1998.

Koller, Tim, Marc Goedhart, and David Wessels. Valuation: Measuring and Managing the Value of Companies. New York: John Wiley and Sons, 2010.

Madden, Bartley J. *CFROI Valuation: A Total System Approach to Valuing the Firm*. Oxford: Butterworth-Heinemann, 1999.

Martin, John D., and J. William Petty. *Value Based Management: The Corporate Response to the Shareholder Revolution*. Boston, MA: Harvard Business School, 2000.

McTaggart, James M., Peter W. Kontes, and Michael C. Mankins. The Value Imperative: Managing for Superior Shareholder Returns. New York: Free, 1994.

Mitchell, John Steward., John E. Hickman, and Joe E. Amadi-Echendu. Physical Asset Management Handbook. Houston, TX: Clarion Technical, 2007.

Morin, Roger A., and Sherry L. Jarrell. Driving Shareholder Value: Value-building Techniques for Creating Shareholder Wealth. New York: McGraw-Hill, 2001.

Neely, A. D. Business Performance Measurement: Unifying Theories and Integrating Practice. Cambridge: Cambridge UP, 2007.

Neely, A. D., M. J. Gregory, and K. W. Platts. Performance Measurement System Design: A Literature Review and Research Agenda.

Otley, David T. Issues in Accountability and Control: Some Observations from a Study of Colliery Accountability in the British Coal Corporation.

Rappaport, Alfred. *Creating Shareholder Value: The New Standard for Business Performance*. New York: Free, 1986.

Rogers, Walter. The Professional Practice of Landscape Architecture: A Complete Guide to Starting and Running Your Own Firm. Hoboken, NJ: Wiley, 2011.

Stern, Joel M., John S. Shiely, and Irwin Ross. *The EP Challenge: Implementing Value-added Change in an Organization*. New York: Wiley, 2001.

Stewart, G. Bennett. *The Quest for Value: A Guide for Senior Managers*. New York, NY: HarperBusiness, 1991.
Viebig, Jan, Armin Varmaz, and Thorsten Poddig. Equity Valuation: Models from Leading Investment Banks. Chichester, England: John Wiley & Sons, 2008.

Yin, Robert K. *Case Study Research: Design and Methods*. Thousand Oaks, CA: Sage Publications, 2003.

Young, S. David, and Stephen F. O'Byrne. *EP and Value Based Management: A Practical Guide to Implementation*. New York: McGraw Hill, 2001.

Zhang, Chi-Keong, and K. C. Tan. Evolutionary Multi-objective Optimization in Uncertain Environments: Issues and Algorithms. Berlin: Springer, 2009.

8.0 APPENDIX

APPENDIX A: CFROI OUTPUTS

smith&nephew	2005A	2006A	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A
CFROI Inputs											
Gross Investment (PV)	3435	3870	4655	4796	5198	5534	5753	6495	6896	7900	8076
Depreciating Assets	2460	2791	3423	3429	3721	3974	4244	5055	5323	6473	6761
Non-Depreciating (FV)	975	1079	1232	1367	1477	1560	1509	1440	1573	1427	1315
Gross CF´s (PMT)	725	750	946	1062	1078	1171	1231	1161	1324	1449	1452
Asset life (N)	7.9	7.6	7.3	6.9	7.0	7.1	7.2	6.5	6.7	6.7	6.7
CFROI Outputs											
CFROI (%)	**15.93%**	**13.26%**	**13.86%**	**15.66%**	**14.11%**	**14.86%**	**15.00%**	**8.50%**	**10.68%**	**8.88%**	**8.13%**
Transaction CFROI (%)	**13.62%**	**11.38%**	**11.02%**	**12.55%**	**11.66%**	**12.40%**	**12.60%**	**7.18%**	**9.04%**	**7.07%**	**6.51%**

APPENDIX B: ASSET LIFE

smith&nephew	2005A	2006A	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A
Asset Life											
Gross Plant	1327	1420	1669	1702	1881	2001	2114	2229	2279	2360	2413
Less:Land	12	10	11	13	14	10	14	15	15	20	19
Less:CIP	45	38	39	59	27	67	42	73	80	123	156
Adjusted Gross Plant	1270	1372	1619	1630	1840	1924	2058	2141	2184	2217	2238
Inflation Adjusted Gross Plant	1289	1393	1643	1654	1868	1953	2089	2173	2217	2261	2238
Depriciation	118	142	181	204	206	203	217	212	209	222	226
Gross Asset Life	**10.9**	**9.8**	**9.1**	**8.1**	**9.1**	**9.6**	**9.6**	**10.3**	**10.6**	**10.0**	**9.9**
Asset life R&D	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Asset life Lease (3 year average)	**10.6**	**10.4**	**10.1**	**9.5**	**9.0**	**9.0**	**9.1**	**9.6**	**10.0**	**10.1**	**10.2**
Intangibles	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CFROI Asset life	**7.9**	**7.6**	**7.3**	**6.9**	**7.0**	**7.1**	**7.2**	**6.5**	**6.7**	**6.7**	**6.7**

APPENDIX C: GROSS CASH FLOW CALCULATION

	2005A	2006A	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A
Gross Cash Flow ($M)											
Total Assets	2881	3121	4315	4294	4363	4509	4524	5478	5674	7229	7167
Pretax Income	441	550	469	564	670	895	848	1100	802	714	559
Income Tax	120	156	153	187	198	280	266	371	246	213	149
Tax	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Net income	**321**	**394**	**316**	**377**	**472**	**615**	**582**	**729**	**556**	**501**	**410**
Less: Special Items (after tax)	-63	-5	-152	-101	-91	-23	-55	134	-85	-171	-264
Plus: Depreciation	118	142	181	204	206	203	217	212	209	222	226
Plus: Amoritzation	19	24	46	55	60	68	78	94	152	191	219
Plus: Adusted Interest Expense	17	9	40	71	42	13	13	9	10	49	49
Financial Subsidiary Interest Expense	0	0	0	0	0	0	0	0	0	0	0
Plus: Rental expense	38	46	52	57	55	59	65	50	51	56	57
Plus: R&D	115	120	142	152	155	151	167	171	231	235	222
Plus: Minority Interest	0	0	0	0	0	0	0	0	0	0	0
Plus: Pension Adjustments to Cash Flow	6	-6	-10	-2	13	9	7	3	11	-7	11
Plus: Monetary Holdings (Loss)	2	-7	-5	-5	-6	-7	-8	-7	-4	-3	1
Plus: Share-based Compensation	9	10	16	17	13	15	22	24	21	24	22
Less: LIFO Charge	17	13	16	35	-23	23	34	10	2	10	-29
Total Gross CF	**725**	**750**	**946**	**1,062**	**1,078**	**1,171**	**1,231**	**1,161**	**1,324**	**1,449**	**1,452**

APPENDIX D: GROSS CASH OPERATING ASSETS

smith&nephew	2005A	2006A	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A
Gross Investments ($M)											
Sales	2415	2779	3369	3801	3772	3962	4270	4137	4351	4617	4634
Cash	161	346	170	145	192	207	184	178	137	93	120
Account Receivable	554	630	758	786	796	881	900	915	935	968	1138
Less: Financial Subsidiary Reveivable	--	--	--	--	--	--	--	--	--	--	--
Inventory	609	619	837	879	933	923	859	901	1006	1181	1217
Other Current Assets	65	50	140	175	150	143	137	150	178	198	0
Current Assets Adjusted	**1389**	**1645**	**1905**	**1985**	**2071**	**2154**	**2080**	**2144**	**2256**	**2440**	**2475**
Account Payable	294	405	508	544	547	584	549	646	751	807	842
Income Tax Payable	213	227	204	192	167	203	171	177	184	218	263
Other Current Liabilities	278	65	117	117	104	70	93	69	94	98	193
Current Liabilities Adjusted	**785**	**697**	**829**	**853**	**818**	**857**	**813**	**892**	**1029**	**1123**	**1298**
NWC Adjusted	**604**	**948**	**1,076**	**1,132**	**1,253**	**1,297**	**1,267**	**1,252**	**1,227**	**1,317**	**1,177**
Land & Improvements	12	10	11	13	14	10	14	15	15	20	19
Inflation Assumption	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Inflation Adjustment	1	1	1	1	1	1	1	1	1	1	1
Inflation Adjusted Land & Improvements	13	11	12	14	15	11	15	16	16	21	20
Long Term Investments	228	10	9	7	7	6	4	2	2	5	0
Other Assets Excluding Deferred Charges	130	110	135	214	202	246	223	170	328	84	118
Total Non Depreciating Assets	**975**	**1,079**	**1,232**	**1,367**	**1,477**	**1,560**	**1,509**	**1,440**	**1,573**	**1,427**	**1,315**
Inflation Adjusted Gross Plant	1425	1540	1819	1794	1991	2055	2197	2280	2353	2488	2474
Construction in Progress	45	38	39	59	27	67	42	73	80	123	156
Capitalized Operating Leases	303	356	393	410	386	419	474	400	410	455	475
Capitalized R&D	505	548	596	645	698	734	782	812	893	974	1269
Adjusted Intangibles	182	309	576	521	619	698	749	1490	1588	2433	2388
Goodwill Net	582	640	1198	1189	1093	1101	1096	1186	1256	2027	2012
Total Depreciating Assets	**2,460**	**2,791**	**3,423**	**3,429**	**3,721**	**3,974**	**4,244**	**5,055**	**5,323**	**6,473**	**6,761**
Total Gross Investments	**3,435**	**3,870**	**4,655**	**4,796**	**5,198**	**5,534**	**5,753**	**6,495**	**6,896**	**7,900**	**8,076**
Total Gross Investment with all intangibles	**4,017**	**4,510**	**5,853**	**5,985**	**6,291**	**6,635**	**6,849**	**7,681**	**8,152**	**9,927**	**10,088**

APPENDIX E: INTANGIBLES INCLUDED IN DEPRECIATING ASSETS

smith&nephew	2005A	2006A	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A
Gross Plant adjusted											
Gross Plant	1327	1420	1669	1702	1881	2001	2114	2229	2279	2360	2413
Less:Land	12	10	11	13	14	10	14	15	15	20	19
Less:CIP	45	38	39	59	27	67	42	73	80	123	156
Adjusted Gross Plant	**1,270**	**1,372**	**1,619**	**1,630**	**1,840**	**1,924**	**2,058**	**2,141**	**2,184**	**2,217**	**2,238**
Capitalized Operating Lease											
Asset Life	10.61	10.43	10.08	9.48	9.02	8.97	9.11	9.64	10.03	10.12	10.17
Lease Expense	38.00	46.00	52.00	57.00	55.00	59.00	65.00	50.00	51.00	56.00	57.00
Inflation Factor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inflation Adjusted Lease Expense	38.08	46.09	52.10	57.11	55.11	59.12	65.13	50.10	51.10	56.11	57.11
Corporate Bond Yield	0.05	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04
PV	**304**	**357**	**394**	**411**	**387**	**420**	**475**	**401**	**411**	**456**	**476**
Capitalized R&D / R&D Outlays											
R&D Expense	115	120	142	152	155	151	167	171	231	235	222
Inflation Factor	0	0	0	0	0	0	0	0	0	0	0
R&D Adjusted for Inflation	117	122	145	155	158	154	170	174	236	240	226
Sum of last 5 periods	**505**	**548**	**596**	**645**	**698**	**734**	**782**	**812**	**893**	**974**	**1,047**
Intangibles											
Goodwill Net	582	640	1198	1189	1093	1101	1096	1186	1256	2027	2012
Acquisition Intangibles	0	0	0	0	0	0	436	1109	1165	1951	1546
Software	0	0	0	0	0	0	170	205	229	267	289
Distribution Rights	0	0	0	0	0	0	60	43	70	75	77
Patent & Intelectual Property	0	0	0	0	0	0	143	176	194	215	215
Intangibles	182	309	576	554	686	751	0	0	0	0	0
Total	**182**	**309**	**576**	**554**	**686**	**751**	**749**	**1,490**	**1,588**	**2,508**	**2,127**
Gross Plant	1327	1420	1669	1702	1881	2001	2114	2229	2279	2360	2413
Plus: Inflation Adjustment	150	165	198	162	150	131	139	139	163	168	153
Inflation Adjusted Gross Plant	**1,425**	**1,540**	**1,819**	**1,794**	**1,991**	**2,055**	**2,197**	**2,280**	**2,353**	**2,488**	**2,474**

APPENDIX F: CHANGES TO GROSS CASH FLOW

	2005A	2006A	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A
Changes to Gross Cash flow											
Cash & Short tem investments	63	346	170	145	192	207	184	178	165	142	120
Receivables total	570	630	834	899	882	959	971	992	995	1019	1138
Other current assets	45	50	64	62	64	65	66	73	90	98	0
Monetary Assets	677	1026	1068	1106	1138	1231	1221	1243	1250	1259	1258
Account Payable	294	405	508	544	547	584	549	646	751	807	842
Income Tax Payable	213	227	204	192	167	203	171	177	184	218	263
Other Current Liabilities	278	65	117	117	104	70	93	69	94	98	193
Current Liabilities Adjusted	785	697	829	853	818	857	813	892	1029	1123	1298
Net monetary Assets	108	-329	-239	-253	-320	-374	-408	-351	-221	-136	40
GDP Defaltor	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Monetaty Gain/Loss	**2**	**-7**	**-5**	**-5**	**-6**	**-7**	**-8**	**-7**	**-4**	**-3**	**1**
LIFO Charge to FIFO Inventory											
Inventory	609	619	837	879	933	923	859	901	1006	1181	1217
Assumed FIFO %	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5
FIFO Amount	305	310	419	440	467	462	430	451	503	1181	609
% Change in PPI Index	0.0553	0.0405	0.0382	0.0792	-0.0495	0.0497	0.0781	0.0212	0.0041	0.0083	-0.0470
LIFO Charge	**17**	**13**	**16**	**35**	**-23**	**23**	**34**	**10**	**2**	**10**	**-29**
Net Pension											
Defined Benefits Plan											
Total Pension Cost	33	23	19	27	39	35	35	32	40	15	-9
Pension Plans - Service Cost	27	29	29	29	26	26	28	29	29	22	-20
Cash Flow Adjustment	**6**	**-6**	**-10**	**-2**	**13**	**9**	**7**	**3**	**11**	**-7**	**11**

APPENDIX G: CFROI DRIVERS