THE RELIABILITY OF VALUATION METHODS USED BY INVESTMENT BANKS IN EMERGING MARKETS RELATIVE TO THE MARKET TRADING PRICES; A CASE OF THE KENYAN MARKET

BY

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DECLARATION

The Student
This research project is my original work and has not been presented for examination purposes in any university.

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Reg No: D61/72803/2009

The Supervisor
This research project has been submitted for examination with my approval as university of Nairobi supervisor.

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DEDICATION

This work is specially dedicated to my dear mum Nyambura for believing in me and her relentless support and encouragement in my studies. Your encouragement and support has brought me this far.
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<td>Arbitrage Pricing Theory</td>
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<td>CMA</td>
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<td>COE</td>
<td>Cost of Equity</td>
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<td>Debt/Equity ratio</td>
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<td>DCF</td>
<td>Discounted Cash flow</td>
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<td>EBIT</td>
<td>Earnings before Interest and Taxes</td>
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<td>EBITDA</td>
<td>Earnings Before Interest, Taxes, Depreciation and Amortization</td>
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<td>EM</td>
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<td>EMRP</td>
<td>Equity Market Risk Premium</td>
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<td>ESOP</td>
<td>Employee Stock Ownership Plan</td>
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<td>EVA</td>
<td>Economic Value Added</td>
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<td>FDI</td>
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<td>GDP</td>
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<td>GNP</td>
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<td>IFC</td>
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<td>IMF</td>
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<td>Internal Rate of Return</td>
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<td>LDC</td>
<td>Less Developed Countries</td>
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<td>MRP</td>
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<td>NPV</td>
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<td>NSE</td>
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<td>P/E</td>
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<td>Weighted Average Cost of Capital</td>
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ABSTRACT

With the increasing interest in investment in the emerging/developing markets, valuation is gaining greater importance. It ensures that both buyers (acquirers) and sellers achieve value for their investment. Valuation is an art or science of estimating the value of a particular interest in property for a specific purpose at a particular moment in time taking into account all features of the property and also considering all other market factors. The complication regarding income attributable to equity holders has led to a number of models and this study sought to test two of this valuation models

There are practical problems in firm valuation due to uncertainty and the instability surrounding income attributable to equity holders. Given the high risks of the Kenyan market and increased interest of investors in this market, it is of great importance to research on how practitioners carry out valuation in Kenya and the extent to which their work can be relied on. The objective of the study was to determine the reliability of the valuation methods used by investment banks in the Kenyan market.

The findings were that when the market values were compared with the equity values derived from discounted free cash flow method, the regression resulted in an $R^2$ of 0.31 within a confidence level of 95%. The market value when compared with equity value derived from the economic value added model derived an $R^2$ of 0.01 and the p-value was more than 0.05. The conclusion was that the cash flow model is a more reliable indicator of the market equity value while the economic value added model is not a good indicator of the market equity value.
CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Valuation is the process of estimating the current worth of an asset or company (Damodaran, 2002). Valuations can be done on assets (for example, investments in marketable securities such as stocks, options, business enterprises), intangible assets (such as patents and trademarks) or on liabilities (e.g. bonds issued by a company). Valuations are needed for many reasons such as investment analysis, capital budgeting, merger and acquisition transactions, financial reporting, taxable events to determine the proper tax liability, and in litigation. Common terms for the value of an asset or liability are fair market value, fair value, and intrinsic value. The meanings of these terms differ. For instance, when an analyst believes a stock's intrinsic value is greater/less than its market price, an analyst makes a "buy"/"sell" recommendation. Moreover, an asset's intrinsic value may be subject to personal opinion and vary among analysts (Barker, 2001).

An emerging market is defined as an economy with low to middle per capita income (Brealy and Myers, 2000). The International Finance Corporation (IFC) of the World Bank defines emerging financial markets to refer to the financial markets in a set of countries considered to be in transition to higher levels of economic development. Emerging financial markets form the category of economies just below the developed economies. According to Pereiro (2002), the World Bank defines an economy as emerging if its level of wealth creation, measured as gross national product (GNP) per capita, is below that of the developed economies. Using this criterion, out of a universe of 207 countries, 51 are considered as developed; the remaining 156 countries, one of which is Kenya, are considered emerging economies. Also, an emerging market can be defined as one that is undergoing the process of globalizing. This means that the market is opening its borders for inflow of international trade and investment and to managerial best-practices (Pereiro, 2002). These markets are highly vibrant and promising
economies, which, from an investment point of view, make up an intermediate stratum between the developed and less active economies. Direct investments in financial and real assets explode in emerging markets, and that is why properly valuing assets in such markets is of utmost importance (Pereiro, 2002). The Kenyan economy has seen increased cash inflows from the Diasporas, leading to the current boom in the real estate sector. Kenya, with 39 million people (projected 2009 census) and as an economy to watch, presents itself as an important emerging economy.

One key characteristic of an emerging market is an increase in both local and foreign investments (portfolio and direct). A growth in investment in a country often indicates that the country has been able to build confidence in the local economy. Moreover, foreign investment is a signal that the world has begun to take notice of the emerging market, and when international capital flows are directed towards an emerging market, the injection of foreign currency into the local economy adds volume to the country's stock market and long-term investment to the infrastructure. For foreign investors or developed-economy businesses, an emerging market provides an outlet for expansion by serving, for example, as a new place for a new factory or for new sources of revenue. Due to the fact that these markets are in transition and hence not stable, emerging markets offer an opportunity to investors who are looking to add some risk to their portfolios (Brealy and Myers, 2000).

Another key characteristic of an emerging market is that the risk of an emerging market investment is higher than an investment in a developed market. Panic, speculation and knee-jerk reactions are more common, and therefore investors need to determine the risks when considering investing in an emerging market. However, the bigger the risk, the bigger the reward, and so emerging market investments have become a standard practice among investors aiming to diversify while adding to their risk (Luehrman, 1997).

An investment bank is a financial intermediary that performs a variety of services. This includes assisting individuals, corporations and governments in establishing the real worth of investments in financial assets and liabilities through valuations. They also
assist in raising capital by underwriting and/or acting as the client's agent in the issuance of securities. An investment bank may also assist companies involved in mergers and acquisitions, and provide ancillary services such as market making, trading of derivatives, fixed income instruments, foreign exchange, commodities, and equity securities. Analysts working for investment banks perform valuation calculations on the various debt or equity securities being offered. These calculations are important because investors will pay what they perceive to be a fair price for an equity or debt investment, based on expected cash yield sometime in the future. If a security is over or undervalued, the investment bank (and issuing company) will garner less capital than required. Critical thinking skills are supremely important, as an investment bank's services extend to appraising entire entities for a pending merger, acquisition or corporate restructuring (Damodaran, 2002).

Market value is the highest price that a marketable asset will bring in an open and competitive market, assuming that both the buyer and the seller are informed and acting independently. In theory, this is the highest price a seller is willing to accept and the lowest price a buyer is willing to pay, and it may differ from the appraisal value. This value is established in the capital markets. Market valuation levels are determined by the company’s absolute level of long-term performance and growth, that is, expected revenue and earnings growth and return on invested capital (ROIC). Total return to shareholders is measured by changes in the market valuation of a company over some specific time period and is driven by changes in investor expectations for long-term future returns on capital and growth. The relative market value of a company, as measured by the market-value-to-capital ratio, is determined by the company’s growth and its spread of ROIC over the weighted average cost of capital (WACC). Higher returns (for the same level of growth) lead to higher valuations. Also, when the return on invested capital exceeds the cost of capital, growth leads to higher value. When ROIC falls below the cost of capital, it leads to lower valuations (Brealey, 2001).

There are many techniques that can be used to determine value. Some are subjective and others are objective. Fernandez (2002) states that a professional investor can use his
knowledge and models of investment markets to non-domestic arenas, but that the models may not apply in all markets. For example, the standard approach to discounted cash flow (DCF) valuation technique assumes that the company to be valued is profitable and solvent. That usually implies positive taxable income, no major obstacles to obtain external financing and no financial distress. This is not true in the emerging markets, since most of the firms in emerging markets suffer from financial distress and on the brink of insolvency. Kenya for example experienced banking problems in the late 80’s and early 90’s, culminating in major bank failures (37 failed banks as at 1998) following the crisis of; 1986 - 1989, 1993/1994 and 1998 (Mwenda, 2007; Mugenda, 2003). There is an increasing trend of failure of Kenyan businesses such as uchumi supermarkets (for which the Kenyan government came to its rescue) and kenatco (Mwenda, 2007).

Following the globalization of world economies and capital becoming more mobile, valuation (determination of the financial worth of a company or project) is gaining importance in emerging markets for stock exchange listings, privatization, joint ventures, mergers and acquisitions, reorganization and reconstruction, empire building and for the basic task of running businesses to create value. According to James and Koller (2000), valuation is difficult in developing markets because buyers and sellers face greater risks and obstacles than they do in developed markets. Similar studies carried out in other markets such as Argentina (Pereiro, 2002) and Nigeria (Chikanayo, 2006) revealed that the discounted cash flow techniques (DCF) were the most popular. The Kenyan scenario could be different. A difference in the valuation methods used in Kenya would suggest that the Kenyan market is fundamentally different in terms of value and hence difficult to carry out comparison with other markets. The problem therefore arises as to whether the valuation methods used are the same and consistent with the academicians’ recommendations, and whether the values obtained correlate with market values.

There is currently no clear single best practice for the valuation of assets and securities in emerging markets that is widely accepted by both academicians and practitioners (Kehl, 2007). Traditional valuation techniques do not provide much guidance on how they should be applied in emerging markets (Pereiro, 2002). Though most valuation techniques
apply in efficient markets (developed economies), the fact that there exists financial inefficiency in emerging stock exchange markets cannot be ignored. This is because emerging stock markets are small, concentrated and susceptible to manipulation. The problem is complicated more by the fact that stock market information tends to be scarce and unreliable.

This study sought to examine the reliability of the methods used by investment banks and how they incorporate the country’s risk in the valuation of companies in this markets based on the perception of investment professionals so that potential investors have an idea of how real value of an asset, project or company is arrived at. The focus was on firms quoted on the NSE because for small privately held firms, market values may not be available since most privately held companies are not listed and thus not traded on the stock exchange. Accordingly, the price prediction performance of alternative valuation models that incorporate earnings, book value and amount of invested capital in the firm would be investigated to find correlation with market prices and use this to estimate value of private firms. The risks in the Kenyan market may include currency risk, the limited financial and stock exchange markets, limited information on companies/market, high levels of inflation, macroeconomic volatility, capital controls, political changes, civil unrest such as the 2007/2008 post election violence, regulatory changes, poorly defined or enforced contracts and investor rights, lax accounting controls and corruption (James and Koller, 2000).

1.2 Statement of the Problem

What is clear from researches so far is that there is no single best practice on which all professionals agree, and the wise investment action is to apply adjustments to the standard tools and concepts of valuation obtained from developed markets in order for these tools to fit emerging markets (Pereiro, 2002). Traditional valuation techniques are applied in emerging markets in conjunction with adjustments such as country risk adjustment, unsystematic or distinctive risk adjustments (pereiro, 2002). Company valuation is a delicate concoction of both science and art. The former takes the form of quantitative risk-return models, and the latter, experience and judgment on the part of the
appraiser. Valuation Methods not only vary but also often involve making arbitrary adjustments based on gut-feelings and limited empirical evidence (James and koller, (2000).

Locally, Omondi (2003), in his study to establish the reliability of the discount model which is based on the discounted cash flow techniques on the valuation of common stock at the NSE found out that the dividend discount model is not reliable in the valuation of common stock at the NSE. Nyaboke (2003), in her study on the relationship between debt financing and the value of the firms quoted on the NSE found out that there is no significant relationship between debt and value of the firm. Wangechi( 2010), in her study on the relationship between firm valuation methods and market value for companies quoted at the NSE found out that the valuation method used may not give a fair market value of the firm.

Further research on the above studies could be done as they only provided partial insights on valuation methods of companies and since they mainly focused on the developed markets and without due regard to the key aspects in emerging markets. None of these studies had done a case study on investment banks. This project has focused on the modern and most popular methods among practitioners, the risks and challenges they encounter while using these methods and the adjustments made, if any, so that the methods can be consistent with the recommendations in literature and the conditions prevailing in less developed markets like the Kenyan market.

1.3 Objectives of the study

The objectives of the study were:

i. To establish the methods used by investment banks in determining the financial worth of companies in Kenya

ii. To establish the accuracy and reliability of the valuation methods used in relation to the market value of a company’s shares

iii. To establish the challenges faced by investment banks in valuation of companies in the Kenyan market and how they cope with them
1.4 Significance of the study

Investors - This research work has provided vital information to investors; both current and prospective on the variables they can use to value companies and large capital investment projects for maximum returns. This is because they will be able to objectively identify the risk factors prevalent in emerging markets that can adversely impair their investments.

Regulatory authorities – The research work has provided vital information for the regulatory authorities which will assist in policy formulation to spur economic growth and development through encouragement of local and foreign direct investments.

Academic – The study has added to the body of knowledge on the complexities involved in doing valuations in developing markets as compared to the well developed markets and hence adds value to the way academicians advance knowledge in this area.

Professional practitioners - The research work will assist professional practitioners by creating awareness on the reliability of techniques that are mostly preferred in valuation of capital projects and companies and the adjustments that are usually added thereto for easier application. This will make their valuations and recommendations comparable and acceptable to all the stakeholders.

This research work will further provide vital information to other researchers and hence create a forum for comparing the reliability of valuation methods applied in Kenya and other emerging markets and any deviations that may be in existence.

This research has also opened up avenues for further research to gain a deeper insight into what transpires in the emerging markets as far as valuation of companies and other investment projects is concerned. Both private and corporate investors will benefit from understanding the current practices of valuation in Kenya and how these fit with recommendations in literature.
CHAPTER TWO

LITERATURE REVIEW

2.1 Chapter overview

The literature review in this chapter gives background explanations of the elements of the research work such as valuation methods, emerging markets, the Kenyan emerging market and the interrelations between these elements. Theories touching on the area of study as well as past research work done related to the study, both local and international, was highlighted. These areas provided a setting for this research. A summary on this chapter has covered the knowledge gap in the area under study and how this research has filled the identified gap.

2.2 Emerging Financial Markets

According to Brealy and Myers (2000), the International Finance Corporation (IFC) of the World Bank defines emerging financial markets to refer to the financial markets in a set of countries considered to be in transition to higher levels of economic development. Emerging financial markets form the category of economies just below the developed economies. According to Kehl (2007) an emerging financial market (emerging market) is identified by international creditors as one that has institutions to support a capital market or a stock market. They must have labour markets, feeder industry markets, raw material markets, consumer markets and they must exhibit an increase in overall national economic activity. The International Finance Corporation defines an emerging market as one which is found in a developing country (Mwenda, 2007).

The emergence of new markets is arguably the most important aspect of foreign investments, finance and economic development in contemporary Africa (Kehl, 2007). Emerging markets are said to be characterized by high average returns, high volatility and excellent diversification prospects (Barry and Lockwood, 1995). The Kenyan Capital Market/Stock Exchange as seen with other emerging markets is very attractive to financial investors. However, high returns as mentioned above are not without additional volatility and unpredictability and thus need to be handled with caution (Mwenda, 2007).
2.2.1 Differences between Emerging Markets and Developed Markets

According to Brealy and Myers (2000), emerging market countries can be compared with developed markets on the following terms:

(a) Macroeconomic Characteristic

Emerging market countries have considerably lower GDP per capita and a lower investment market capitalization relative to developed markets (Kehl, 2007).

(b) Measures of Market and Company Size

Generally, Least Developed Countries (LDCs) have small market sizes. This translates to small holder firms due to low demand. The low demand has curtailed the scale of operation of most firms, thus remain small in size. According to Brealy and Myers (2000), emerging market countries have five characteristics related to size: relative market capitalization, number of companies listed in stock exchange, average company market capitalization for the market, number of actively traded stocks, and number of stocks open to foreign investors. Market capitalization is highly correlated with the classification of a market, and another measure of the relative size of a financial market is the number of companies listed for trading on it. Except for the very large developed markets (such as the United States, Japan, and the United Kingdom), there seem not to be much difference between the numbers of listed firms in the two sets of markets (Brealy and Myers (2000).

Emerging markets are smaller in market capitalization than developed markets. Emerging markets differ not only in size of the market as a whole but also in average company size. That is, simply having a large number of companies does not make a market attractive. This view is reinforced if one considers how many of the listed stocks are actively traded within the domestic market and which of these stocks are open to foreign investment. The openness of a market to foreign investment is clearly an important issue for investors (Kehl, 2007).
(c) Market Liquidity
Liquidity varies for all markets. Emerging markets however have illiquidity tendencies which differentiate them from developed ones. This refers to the ability to get in and out of investments quickly and at low costs. Developed markets offer greater depth of trading i.e. the ability to make a large trade without an accompanying large change in the traded stock’s price. In trading, a turnover ratio of 5% appears to be the threshold that separates developed markets from the emerging ones (Kehl, 2007).

(d) Transparency, Competitiveness, and Corruption
These risk factors in emerging markets are the most salient and are crucial because they determine the ability for investors to gain information and develop performance prospects. Every market has challenges in these areas, but the difficulties are magnified in emerging markets (Kehl, 2007).

(e) Diversification, Return, and Volatility
Emerging markets show low correlation with world equity markets but potential future growth in market capitalization. Listed companies operating in emerging markets tend to have higher average returns and higher volatility than those operating in developed markets (Kehl, 2007).

(f) Efficiency in Emerging Markets
According to empirical studies, most developed markets, with some variation, show evidence of the weak form and semi-strong form of market efficiency. Historic prices do not predict future prices, and asset prices adjust fast to the release of new information (such as earnings announcements and dividend changes). Interim financial results released by companies also have a similar effect. The evidence is less obvious for emerging markets (Fernandez, 2002).

Since developed markets do not themselves exhibit the strongest form of market efficiency, it is unlikely to occur in emerging markets. Overall, emerging markets do not seem to be efficient and only have a traded long-term fixed-rate instrument in the local currency. All of them have less company-specific information than developed markets.
Not surprisingly, only about half of the markets can be considered to exhibit even the weak form of market efficiency. Evidence suggests, however, that emerging markets differ greatly in efficiency relative to each other (Kehl, 2007).

2.3 Market value

Market value does not equal the book value because share price is based on the returns or cash flows that the investor expects to receive from owning the share (depends on the ability of the company to earn a profit) while book value depends on the historical costs of the firm's assets. However, the book value is a good value driver of the market value. The replacement value of the firm’s assets does not necessarily reflect the ability of the firm to turn the assets into profits. Market value is determined by the ability of the firm to earn a return on its investments above the opportunity cost of capital. Compared to bonds, stocks are more difficult to value because cash flows are not pre-specified, have no maturity date and one cannot easily determine or observe the required market return.

2.4 Valuation

Valuation is the process of determining the current financial worth of an asset, project or company. Firm valuation involves drawing up information from three sources; the current financial statements for the firm, from which one can determine the profitability of a firm’s investments, how much it reinvests to generate future growth and to extract other inputs required for valuation, the past history of the firm, both in terms of earnings and market prices, from which one can make judgements on how cyclical a firm’s business has been and the firm’s price history can help in measuring risk and the firm’s competitors or peer group which can help one gauge how much better or worse a firm is than its competition and to estimate key inputs on risk, growth, and cash flows (Damodaran, 2002). There are various valuation methods that are used by practitioners in the market. The methods give a lot of varied results and do not apply on less developed markets.

2.4.1 Purpose of Valuation

There are usually different purposes for which valuation is undertaken. These include the following: To determine whether to invest in a particular company or project, to facilitate
initial public offerings (IPOs), for identification of key value drivers for the company, for evaluation of the going concern viability of the business, to facilitate strategic planning for the company, to sell a business at the fair market value, for purposes of inheritance and testamentary dispositions, to plan for mergers, acquisition or stock offering, developing tax plans or making transfers with tax implications, setting-up an Employee Stock Ownership Plan (ESOP), to effect partial transfer of shareholding.

2.4.2 Company Value

The value of a company actually depends on what is being valued, for whom, for what purpose and how, Pereiro (2002). In line with the purpose of this study, value in this case first focuses on the nature of the economy in which value is determined. How much a business is worth is an inverse function of the risk involved in its operation. Such risk is highly dependent on the broad risk of the economic environment in which it is existent. In emerging markets like Kenya, companies show a large volatility in returns as compared with similar companies in a more stable, mature, and developed environment. Volatility means more risk; more risk means, in turn, less business value in an unpredictable arena (Pereiro, 2002).

According to Damodaran (2006), three fundamentals determine the value of a business and these include a firm’s capacity to generate cash flows from existing investments, the expected growth in these cash flows over time, and the uncertainty about whether or not these cash flows will be generated in the first place”. Damodaran (2006) argues that in valuation, “these fundamentals remain the same no matter what type of firm is in question – large or small, manufacturing or service, and technology or non technology, although the emphasis placed on each may be different for different firms”.

Further, according to Pereiro (2002), company value may vary according to the customer for whom the value is being assessed. As such, there are different forms of value, which include: Intrinsic or fundamental value; this is the figure determined by an unbiased, qualified professional appraiser and is computed with reference to the company’s free cash flow or dividends. Extrinsic or fair market value; this is the value given by the
market, usually by willing buyers and sellers who are under no pressure to relate and all have reasonable knowledge of the significant facts of the situation. Enterprise, firm & corporate value, and market value of invested capital; this is the value that a specific individual investor assigns to a company or bundle of real assets. This investor holds his or her perceptions and preferences on the risk and return attached to the asset (Pereiro, 2002). Equity value; this is the part of a firm that is owned by the shareholders. Net present Value (NPV); this is the economic surplus generated by a firm over and above the initial investment performed in it. It is computed by subtracting such investments from firm value (Pereiro, 2002). Strike value; This is the end price of a buy-sell transaction. After a bargaining process among two or more individual buyers and sellers, all willing and able to interact with each other, each in full knowledge of the relevant facts, and each seeking his or her best individual interest (Pereiro, 2002). Firm value made out by each entrepreneur can be valuable for creating his or her bargaining plan. The return expected and subsequently the prices an investor is willing to pay for a company can differ according to the investors (risk, strategic or financial) nature (Pereiro, 2002).

2.5 Theoretical framework

According to Barker (2001), a good understanding of valuation methods requires two main things. The first is an analytical review of the models, identifying their relationship and exposing their assumptions. The second is an evaluation of the data that is available for use of these models. Therefore, there is a significant relationship between the choice of valuation models and the available data.

2.5.1 Models Based On Discounted Cashflow (DCF)

The discounted cash flow based method relies on the capital asset pricing model (CAPM) to compute the cost of capital. In the early part of the twentieth century, Alfred Marshall and Bohm-Bawerk listed the intellectual basis for discounted cash flow and touched on the concept of present value in their research (Marshall, 1907; Bohm-Bawerk, 1903). Irving Fisher developed the principles of modern valuation in his two books, “The rate of Interest” (Fisher, 1907) and “The Theory of Interest” (Fisher, 1930). Boulding (1935) derived the internal rate of return for an investment from its expected cash flows and an initial investment, while Samuelson (1937) examined the differences between the internal
rate of return and net present value (NPV) approaches and argued that rational investors should maximize the latter and not the former.

According to Damodaran (2006), there are four variants of discounted cash flow models in practice. Firstly, the expected cash flows on an asset (or a business) are discounted at a risk-adjusted discount rate to arrive at the value of the asset. Secondly, the expected cash flow is first adjusted for risk to obtain the risk-adjusted or certainty equivalent cash flows, which is then discounted at the risk free rate to estimate the value of the risky asset. The third is termed the adjusted present value (APV) approach in which the business is first valued, without the effects of debt, the marginal effects on value is then considered. Finally, a business can be valued as a function of the excess returns that it is expected to generate on its investments. However, there are common assumptions that bind these approaches together, but there are variants in assumptions in practice that result in different values (Damodaran, 2006).

2.5.1.1 Discount Rate Adjustment and Cashflow Adjustment Models

Amongst others, the risk adjusted discount rate approach is the most common, where a higher discount rate is used to discount expected cash flows when valuing riskier assets, and a lower discount rate is used when valuing safer assets (Damodaran, 2006). According to Pereiro (2002), some companies assess all projects using a single discount rate; however, this method can work only when all the projects under analysis have the same level of risk, but this is usually not the case. There are two ways in which discounted cash flow valuation can be approached according to Damodaran (2006). “The first is to value the entire business, with both assets-in-place and growth assets; this is often termed firm or enterprise valuation. The second way is to value just the equity stake in the business, and this is called equity valuation. The cash flows after debt payments and reinvestment needs are called free cash flows to equity, and the discount rate that reflects just the cost of equity financing is the cost of equity.

It is also important to note that one can always get from the former (firm value) the latter (equity value) by netting out the value of all non-equity claims from firm value. Done
right, the value of equity should be the same whether it is valued directly (by discounting cash flows to equity at the cost of equity) or indirectly (by valuing the firm and subtracting out the value of all non-equity claims)” (Damodaran, 2006,). In cashflow adjustment, cash flows for each alternative are adjusted before the comparison, based on its probability of occurrence. The present value of each alternative is estimated using value scenarios as: Optimistic, Expected or Pessimistic. However, in practice, analysts and investors find these probabilities challenging, since they do not have a magical way to determine which one of the probabilities will occur for every cash flow (Pereiro, 2002). Corporate risk is still debatable in investment valuation. This is because it is conceived differently in decision theory, which uses probabilities, and in financial economics, which adjusts the discount rate of the cash flows instead (Ruefli et al, 1999).

2.5.1.2 The Hybrid Method

The hybrid method simultaneously adjusts both the cashflow and discount rates. The cash flows are first discounted for each state at a rate higher than the risk-free rate, but lower than the rate used in a pure rate adjustment model after which a probability-weighted, single economic value is found for the scenarios (Pereiro, 2002). This procedure is controversial because it is difficult to say which portion of risk corresponds to each adjustment.

2.5.1.3 Adjusted Present Value (APV) or Weighted Average Cost of Capital (WACC)

Under this model, the cost of equity \( (K_e) \), which is usually computed by using the capital asset pricing model (CAPM), is used for discounting free cash flows of equity (FCFE) (Pereiro, 2002). With CAPM, expected risk premium on stock = beta x expected risk premium on market. Based on CAPM, \( K_e \) is equal to the risk-free rate plus a risk premium. This premium is the product of the sensitivity of returns of the company’s shares to the market return (the beta factor) and the so-called systematic risk premium (the difference between the average market return and the risk-free rate) (Pereiro, 2002).

The entire mass of assets invested in the company in economic terms reflected by free cash flows for the firm is usually discounted at a cost of capital, which reflects the costs of both equity and debt as the weighted average cost of capital (WACC) (Pereiro, 2002).
WACC captures in a single figure that combines costs of equity and debt and the cost is reduced whenever the tax rate generates a tax shield, because debt interests are deductible as an expense in the income statement; interest expenses reduce reported income and therefore total tax payments (Pereiro, 2002).

The need to recalculate the cost of capital for each and every year is a disadvantage with the use of WACC and may impel the analyst to directly apply the adjusted present value (APV) method (Luehrman, 1997).

2.5.2 Models Based On Relative Valuation or the Multiples Approach

This approach involves computing value multiples for a representative sample of comparable companies or transactions, similar to the target under appraisal (Pereiro, 2002). According to Vernimmen (2005), the multiples approach is based on three fundamental principles: firstly, that the company is valued in its entirety; secondly, that the company is valued at a multiple of its profit-generating capacity. The most generally used is the P/E (Price-Earnings Ratio), EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) and EBIT (Earnings Before Interest and Taxes) multiples; and finally, that the Markets are efficient and comparisons are therefore justified.

Pereiro (2002) explains further that, the procedure consists of selecting a group of public companies similar to the target, and obtaining an average market value multiple of some relevant economic parameter, such as sales revenue, earnings, or book value. The multiple is then applied to the same economic parameter of the company under valuation, to estimate the market value of the latter. Alternatively, economic multiples of buy-sell transactions on the stock of similar companies can be used as an extrinsic value reference.

Finding comparable assets that are priced by the market is not an easy task. Analysts frequently use other companies in the same sector as comparable, but whether similar values are obtained with the practice is not certain (Damodaran, 2006). The next step involves scaling the market prices to a common variable to generate standardized prices
that are comparable especially when comparing assets that vary in size or units. Then, adjusting for differences across assets when comparing standardized values has to be done. With stocks, differences in pricing across stocks can be attributed to all of the fundamentals in discounted cash flow valuation. Higher growth companies, for example, should trade at higher multiples than lower growth companies in the same segment. Many analysts adjust for these differences qualitatively leaving no particular yardstick for judging their valuation practice such that different scenarios are created for every relative valuation (Damodaran, 2006).

2.5.3 Real Option Pricing Models

The real option pricing models are derived from derivatives. A derivative instrument is an asset whose performance is based on (derived from) the behavior of the value of an underlying asset. The most common underlying assets are commodities, shares, bonds, share indices, indices and interest rates. Derivatives are contracts which give the right and sometimes the obligation, to buy or sell a quantity of the underlying, or benefit in another way from a rise or fall in value of the underlying. It is the legal right that becomes an asset, with its own value, and it is the right that is purchased or sold. Derivative instruments include, Futures, options, swaps and forwards. Acquiring a real option means buying the option to exercise the right to invest in the future in a real asset business opportunity, in order to benefit from the future returns on those assets.

Acquiring a financial option means deploying today an initial payment (initial investment) to acquire the right to buy (call) or sell (put) an underlying asset (e.g., the stock of a certain company) at a given term (expiration horizon), at a fixed price (strike price, exercise price) that is set today. According to Pereiro (2002), “a real option embedded in a real underlying asset is valued by analogy to a financial option with characteristics similar to those of the underlying asset e.g., similar volatility of returns and similar expiration term” (Pereiro, 2002, p. 223).

The discount value used varies continuously with the volatile value of the underlying asset, hence is not a constant value as the DCF method assumes. The Black-Scholes
formula makes it possible to obtain the value of a financial option in which there is a
single source of uncertainty measured by the volatility or the standard deviation of
returns of the underlying asset and a single decision date (the time of exercising the
option).

According to Pereiro (2002), there are many types of real options and these include
expansion or growth, delay, abandonment, and liquidation. Expansion options are
inherent to projects of great uncertainty, where returns are highly volatile and the asset’s
value changes many times throughout the project’s life cycle. Staged investments are
examples of this type in which the total investment is divided into parts and deployed in
stages instead of deploying the total investment at the beginning of a project. Each sub-
investment is then released only if previously specified goals are attained. Delay option is
applied when considering an attractive project and the investor has the option of
postponing it for a certain time; but retains the right to invest by paying an entry price. A
typical example of this type of option is patents of invention on the development and/or
exploitation of products and technology. Abandonment option is used if a project does
not yield the expected results, but can be discontinued before the conclusion date to avoid
further losses. It carries with it the additional value of the abandonment option which is
equal to the financial put (Pereiro, 2002). Liquidation option applies where the equity
(which is also known as the residual value left for the shareholders after repaying debts to
third parties) can be considered as a call option. This arises from the option the
shareholder has to liquidate the company at the end of a certain period, in order to repay
debts (exercise price) and pocket the remaining value (Pereiro, 2002).

2.5.4 The Economic Value Added (EVA) Approach/Method
The Economic Value Added (EVA) measures the surplus value created by an investment
or a portfolio of investments. Excess return models have their roots in capital budgeting
and the net present value rule such that an investment adds value to a business only if it
has positive net present value, no matter how profitable it may seem on the surface. This
would also imply that earnings and cash flow growth have value only when it is
accompanied by excess returns, i.e., returns on equity (capital) that exceed the cost of
equity (capital). Excess return models take this conclusion logically and compute the value of a firm as a function of expected excess returns (Damodaran, 2006). The definition of EVA has three basic inputs needed for its computation - the return on capital earned on investments, the cost of capital for those investments and the capital invested in them. In measuring each of these, many of the same adjustments applied in the case of discounted cash flow valuation will be needed (Damodaran, 2006).

Stewart (1991) in his book, “The quest for value” extensively covered the computation of EVA. EVA shows the increase in the economic value of a company during a specific time period. Weaver (2001), in a study of practices of firms that used EVA, notes that firms make several adjustments to operating income and book capital in computing EVA. The typical EVA calculation involves 19 adjustments from a menu of up to 34 adjustments. Firms adjust book value of capital and operating income for goodwill, research and development (R&D), lease etc, before computing return on capital (Damodaran, 2006).

Advocates of EVA have proposed that it can be used for project appraisal or company valuation, and can replace the free cash flow in the DCF. EVA seems to supply more information to the analyst; however, both DCF and EVA render exactly the same results (Pereiro, 2002; Copeland et al, 2000). The equivalence of discounted cash flow firm valuations and EVA valuations is also shown in several papers including those by Fernandez (2002), Detken and Hartman (2000), Shriives and Wachowicz (2000). The accounting nature of EVA is its main drawback. Accounting measures are greatly resisted in corporate finance, because they can be influenced by management, and can lead to faulty data evaluations and analysis (Pereiro, 2002).

2.6 Empirical studies

Mylonakis and Vardavaki (2007) empirically tested the firm valuation models in a sample of UK food and drug retailers. The empirical results derived from the financial statements of the UK food retail industry for the accounting years 1998-2001 supported the Feltham and Ohlson model (1995) which suggests that together the stock and flow...
components capture to a higher degree, the different aspects of Firm valuation than models strictly based on balance sheet or profit and loss items. In fact, the separation of the financial from operating assets contributes highly to the precise estimation of Firm values. From their study, Mylonakis, and Vardavaki (2007) also found out that the empirical tests that are applied to Firm valuation in the examined sector are based on the following models: a) asset-based, b) earnings-based and c) combined valuation model which captures the spirit of the Feltham and Ohlson (1995) valuation framework, when Eleven alternative Firm valuation models are introduced and tested empirically, using the OLS estimation method on a sample of 10 UK food and drug retailers. These tests include the estimation of linear regressions with the firms’ Firm market values as the dependent variable and various components taken from the financial statements as independent variables. Thus, the empirical analysis supports the view that the asset-based or the earnings-based model produces benchmark valuations that can be used as a starting point but cannot capture all the determinants of Firm values (Mylonakis and Vardavaki, 2007). In practice, income before interest, tax, depreciation and amortization alone, explains the smallest proportion of cross-sectional variation in Firm values. On the other hand, book value alone gives a satisfactory degree of explanatory power. However, a combination of both book value and current earnings in a separate valuation model provides a better and more accurate estimation of Firm market price.

Mylonakis and Vardavaki (2007)’s findings were generally consistent with the empirical evidence of prior studies concerning the Feltham and Ohlson (1995) valuation model suggesting that the combined model is more informative than models based only on assets or earnings. This accrual accounting valuation model incorporates the value already recognized in the balance sheet (the book value) and calculates the difference between balance sheet value and intrinsic value from forecasts of earnings and book value that are reported in future forecast income statements and balance sheets. These are the two primary statements in financial accounting which include stock components, that reflect the net ‘stock’ of assets of a firm at a given point in time, represented by book Firm value, and flow components, that denote the accretion (or reduction) to the net stock of assets during the period, represented by the bottom line net income. Therefore, with
the use of this accrual accounting valuation model, fundamental analysis can identify mispriced securities and thus yield abnormal returns.

Nyaboke (2003) conducted a study on the relationship between debt financing and the value of the firms quoted on the NSE. The objective of the study was to find out whether there exists a relationship between debt and the value of Kenyan firms quoted on the NSE. She used a sample of 34 companies quoted on the NSE for the period 1993 to 2001. She observed that there is a weak relationship between debt and the value of the firm. Hence changes in the debt level may not have a significant effect on the value of the quoted firms. Thus the findings from her study did not support the study conducted by Modigliani and Miller (1963/58). This is because there seems to be no significant relationship between debt and value of the firm.

Omondi,(2003) conducted a study to establish the reliability of the discount model which is based on the discounted cash flow techniques on the valuation of common stock at the NSE. Data was collected in form of share prices, market indices and dividend per share from the NSE and were used to predict share prices for each of the 18 companies studied. Analysis was by use of t-test. He concluded that the dividend discount model is not reliable in the valuation of common stock at the NSE.

Chege (2006) carried out a survey on valuation methods used by business valuation practitioners in Kenya. The objectives of the study were to find out which methods are preferred by the practitioners and the reasons for the use of those methods. He used a sample size of 96 companies which included accounting firms, investment bankers, stock brokers and investment advisory firms. The primary data was collected through questionnaire and the data collected was analyzed through descriptive statistics and presented in tabular and graphical formats. The finding of the study was that the discounted cash flow method is the most widely used method.

Rees (1999) concludes that free cash flow is a superior performance and value indicator, but only if investors take the time to understand it and how to calculate it properly. The so called cash flows that most organizations and many analysts quote is flawed as a
measure of true cash flow that a company is generating because it usually omits the necessary capital spending to replace worn out assets.

Ndete (1999) conducted a study of 30 quoted companies to find out whether the price earning ratio is an indicator of investment performance of ordinary shares by using the multiple regression analysis to establish the nature and type of relationship between price earning ratio and the rate of growth of earnings, the variations in earnings and the dividend payout ratios of companies quoted at the NSE. He found out that there was a weak relationship between the price earning ratio and the earnings growth, dividend payout and variation in earnings growth.

Chelangat (2007) conducted a study of 20 quoted companies which make up the Nairobi 20 share index, relating the price earning ratio to share performance. He used the one way ANOVA to test the results and concluded that for those companies, the returns of the low price earning stocks are not significantly higher.

2.7 Chapter Summary

Literature review shows there has been considerable research in the area of study. Firm valuation itself constitutes a fairly significant issue that has generated the intense interest of various economic and financial analysts. Valuation research has emerged as a central theme in the accounting research of the 1990s. This literature has had a substantial impact on the research agendas of academics and on the day-to-day work of practitioners.

Most of the studies provide partial insights in valuation methods of companies as it happens in the more efficient markets. However, the studies were without due regard to the key aspects in emerging markets, the risks and challenges encountered while using these methods and the adjustments made, if any, so that the methods can be reliable and consistent with the recommendations in literature and the conditions prevailing in the less developed markets and this presents a knowledge gap that this study intends to fill.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Chapter overview

This chapter has described the overall approaches that were employed in the study. This includes description of the research design, population, sample and sampling techniques, data collection procedures, data analysis and data validity and liability.

3.2 Research Design

A descriptive research design was used in this study. A descriptive research design is one which aims at explaining the characteristics of a group and enables the researcher to summarize and organize data in an effective and meaningful manner. It describes the state of affairs as it is at the present. A descriptive research design provides tools for collection, describing statistical data and summarizing it into a simple and understandable form. It’s a convenient method because it can be completed relatively quickly and it’s cost effective.

3.3 Population of the study

The target population of the study was all the 17 investment banks licensed in Kenya by the CMA. Given that the population size of the investment banks is not very large as it’s less than 50, no sample was drawn but rather the whole population was subject to this study.

3.4 Data collection

Both primary and secondary data sources were used in the study to ensure accuracy of the results. Primary data was collected through semi-structured Questionnaires which were self-administered to senior managers of the investment banks in the population through the ‘drop and pick’ later method which was the most appropriate method with the respondents. Personal interviews were also conducted with the respondents so as to obtain detailed explanations on those areas which could not be properly expressed in a questionnaire. Further, secondary data was collected in form of financial statements from
the NSE, books in the library and the internet to comprise a rich pool of literature material.

3.5 Data analysis and presentation

The data obtained was analyzed using the statistical package for social sciences (SPSS 7th edition) and factor analysis procedures. Qualitative data was analyzed through content analysis while quantitative data was analyzed by descriptive statistic. For the discounted cashflow model: Equity value=company’s operations - market value of debt + market value of preferred stock, and for the economic value added model: Equity value=book value of equity+present value of future EVA

Regression analysis was then performed on the values obtained to establish if there is a relationship between the variables computed under the two models above and the market values, the strength of the relationship and the nature of the relationship. Correlation coefficient r and coefficient of determination $r^2$ were used to determine the strength of the relationship. A t-test was performed at 95% confidence level to test the significance of the two models. Regression is a powerful tool for analyzing relationships between variables and that’s why it was used. The results are presented in tabular, prose and graphical form.

3.6 Data validity and Reliability

The filled questionnaires received were checked to make sure they had been properly completed and to ensure consistency in the responses. Questionnaires that were not properly completed were removed as “unusable”. Adequate time was given to the respective managers for them to fill the questionnaires. The questionnaires had been pre-tested before commencing data collection to help in validation and elimination of misunderstanding of the questions there-in and any omissions in the questionnaire had been corrected to improve reliability of the research instruments.
CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The study sought to determine the reliability of the different valuation models in relation to the market values. The study focused on 17 investment banks licensed by the CMA, and two models studied in chapter two were used to value 10 firms quoted on the NSE and which had traded over the period of study which was between the years 2006 and 2010. Data was collected in form of the market equity value of each of the firms studied and comparisons done with valuations obtained using two of the models studied.

4.2 Discounted cash flow method (DCF)

The discounted cash flow method was found to be the most popular method among the investment banks in Kenya, and hence was taken as one of the two models used to estimate the values of companies trading at the NSE. The five year (2006-2010) statements of financial position and statements of income and expenditure were tabulated so as to analyze the historical performance. Calculations were then done so as to obtain the free cash flow, invested capital and NOPLAT (Net operating profits less adjusted taxes).

A forecast was done for a ten year performance and the reasonableness of the Forecast was checked. An estimation of the weighted average cost of capital was done by combining the proportionate weight of the estimated cost of equity financing and the proportionate weight of the estimated cost of non-equity financing. An estimation of the continuing value was done and then discounted to the present using the cost of capital estimated above. Equity values were then calculated and regressed against the market values and the statistics below were the results:
Table 1: A summary of the discounted cashflow model

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R</th>
<th>Std. Error of the square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCF</td>
<td>0.558745489</td>
<td>0.312196521</td>
<td>0.25784529</td>
<td></td>
<td>45.64713823</td>
</tr>
</tbody>
</table>

The above regression statistics gives the overall goodness of fit measures, with \( r^2 \) giving the variation of market equity value(y) around its mean, explained by discounted cash flow value(x) at 95% Confidence Level. With an \( R^2 \) of 0.312 it means that the value derived using the discounted cash flow model explains up to 31.2% of the market value. The correlation between the market price and the calculated equity value based on discounted cash flow is 0.31.

An analysis of variance table is given below and it splits the sum squares into its components, i.e. residual sum of the squares and regression sum of squares. Residual is also known as the error while regression is the explained.

Table 2: Discounted cashflow model analysis of variance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCF</td>
<td>Regression</td>
<td>1</td>
<td>15275.2315</td>
<td>6.637821</td>
<td>0.023597</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>14</td>
<td>2254.326782</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td>46509.5435</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The F statistic column has the associated P-value. Since 6.637821 > 0.05, we do not reject the relationship that exists between the computed value and the market value at significance level 0.05. The P-value is 0.023 which is less than 0.05 and therefore within the 95% confidence level.

Table 3: Discounted cashflow model coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Std.Error</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCF (Constant)</td>
<td>38.1123742</td>
<td>15.1987428</td>
<td>2.649648512</td>
<td>0.024296</td>
</tr>
<tr>
<td>Cash flow model</td>
<td>0.38945178</td>
<td>0.15346471</td>
<td>2.657365459</td>
<td>0.023217</td>
</tr>
</tbody>
</table>
market value = 38.1123742 + 0.38945178 × (Discounted cash flow value)

The regression equation can thus be expressed as per the equation shown above on market value based on the coefficients in the given table.

4.3 Economic value added method (EVA)

The statements of financial position and statements of income and expenditure for the five year period (2006-2010) were tabulated in excel so as to analyze the historical performance. Calculations were then done so as to obtain the free cash flow, invested capital and NOPLAT (Net operating profits less adjusted taxes). A forecast was done for a ten year performance using the forecast function and the reasonableness of the Forecast was checked.

The weighted average cost of capital was estimated by combining the proportionate weights of the estimated costs of equity financing and non-equity financing. An estimation of the continuing value was done and then discounted to the present using the cost of capital estimated above. Equity values were calculated and then regressed against the market values and the following regression statistics were observed:

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R</th>
<th>Std. error of the estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evm</td>
<td>0.112314681</td>
<td>0.01261458</td>
<td>0.0616741</td>
<td>57.27576982</td>
</tr>
</tbody>
</table>

With an $r^2$ of 0.012 it means that the value derived using EVA (economic value added) model explains up to 1.2% of the market value. The correlation between the calculated equity value based on the economic value added model and the market price is 0.012. This is insignificant and therefore shows no relationship with the variables.

An analysis of variance table is given below:
Table 5: Economic value added model analysis of variance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evm</td>
<td>501.132458</td>
<td>1</td>
<td>501.132458</td>
<td>0.162321</td>
<td>0.687936</td>
</tr>
<tr>
<td>Regression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>44632.2378</td>
<td>14</td>
<td>3241.675390</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>45133.3703</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The F-statistic column has the associated P-value. Since $0.1623 < 0.687$, we do reject the relationship that exists between the computed value and the market value at a significance level of 0.05. The P-value is 0.687 which is greater than 0.05 and therefore not within the 95% confidence level. This means that the relationship is insignificant and unreliable.

Table 6: Economic value added model coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Std.Error</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evm (Constant)</td>
<td>57.5462849</td>
<td>18.1368218</td>
<td>3.988321473</td>
<td>0.005842</td>
</tr>
<tr>
<td>Economic value model</td>
<td>0.0686539</td>
<td>0.17894021</td>
<td>0.416719036</td>
<td>0.701428</td>
</tr>
</tbody>
</table>

Whereas the constant coefficient (intercept) in the equation has an associated p-value of 0.0058 and therefore within the 95% confidence level, the same cannot be told of the coefficient slope which has a p-value of 0.701 which is above the confidence level of 0.05.

From the above output the fitted line can be summarized as follows:

\[
\text{Market book value} = 57.5462849 + 0.0686539 \times \text{EVA}
\]

4.4 Summary and interpretation of findings

From the analysis above it can be seen that empirical results heavily depend on the methodology employed in assessments. The type of data available as well as the way the method is applied also has an impact on the results. Tests on the discounted cash flow method shows it explains a higher percentage of the relationship between the calculated...
value and the market value at 31.2% while the economic value added method explains only 1.2%. Thus the economic value added method is not significant in predicting the market values and thus cannot be relied on.

When the market values were compared with the equity values derived from discounted free cash flow method, the regression resulted in an $R^2$ of 0.312 within a confidence level of 95%. The market value when compared with equity value derived from the economic value added model derived an $R^2$ of 0.012 and the p-value was more than 0.05. This means that the valuation obtained by use of the discounted free cash flows gives a higher reliability when comparing the same with the market values as compared to the reliability of the value obtained by use of the economic value added model and compared to the market value.

For the discounted free cash flow model, the regression statistics gives the overall goodness of fit measures, with $r^2$ giving the variation of the market equity value ($y$) around its mean, explained by Discounted cash flow value ($x$) at 95% Confidence Level. With an $R^2$ of 0.312 it means that the value derived using DCF (Discounted cash flow) model explains up to 31.2% of the market value. The correlation between the market price and the calculated equity value based on discounted cash flow is 0.312

The analysis of variance splits the sum squares into its components, i.e. residual (or error) sum of the squares and regression (or explained) sum of squares. The F statistic has the associated P-value. Since 6.637821 > 0.05, we do not reject the relationship that exists between the market value and the computed value at significance level 0.05. The P-value is 0.023 which is less than 0.05 and therefore within the confidence level of 95%. 
For the economic value added model, the regression statistics give the overall goodness of fit measures, with $r^2$ giving the variation of $y$ (market equity value) around its mean, explained by $x$ (Discounted economic value added) at 95% Confidence Level. With an $R^2$ of 0.012 it means that the value derived using EVA (Economic value added) model explains up to 1.2% of the market value. The correlation between the market price and the calculated equity value based on the economic value added is 0.012. This is insignificant and it means that there is no relationship between the variables.

The analysis of variance splits the sum squares into its components, i.e. residual (or error) sum of the squares and regression (or explained) sum of squares. The F statistic has the associated P-value. Since 0.1623 < 0.687, we do reject the relationship that exists between the market value and the computed value at significance level of 0.05. The P-value is 0.687 which is greater than 0.05 and therefore not within the confidence level of 95%. While it can be said to be true for the economic value added model that the constant coefficient (intercept) in the equation has an associated p-value of 0.0058 and therefore within the confidence level of 95%, the same cannot be told of the coefficient slope which has a p-value of 0.701 which is above the 0.05 confidence level.

From the analysis done, the $r^2$ for the discounted cash flow was 0.312 while the economic value added method had an $r^2$ of 0.012 to the market, showing a high correlation for the discounted cash flow method to the market as compared to the economic value added method. Thus the economic value added method shows no relationship with the variables because of the non significance of the Eva coefficients and thus a bad predictor of the market value.
CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The objective of this study was to establish the reliability of firm valuation methods used by investment banks in relation to the market value of a firm, and specifically looking at the case of companies quoted on the Nairobi stock exchange. To achieve this, two models discussed in Chapter 3 (Discounted cash flow and Economic value added) were used to predict the equity value per share and then compared with the market value. Regression analysis was performed on the values obtained to establish if there is a relationship between the variables computed under the two models above and the market values, the nature of the relationship and the strength of the relationship.

Data was collected on the valuation methods used by investment banks by way of questionnaires while secondary data was obtained from books and publications on company’s performances. The performance of selected firms trading at the NSE was first forecasted for a period of ten years using the forecast function and the reasonableness of the forecast was checked. An estimation of the weighted average cost of capital was done by first estimating the cost of equity financing and the cost of non-equity financing, then combining the weight of each. An estimation of the continuing value was done and then discounted to the present using the cost of capital estimated above.

Equity values were then calculated and regressed against the market values so as to establish if there is a relationship between the variables computed under the two models above and the market values, the nature of the relationship and the strength of the relationship. The strength of the relationship was determined by correlation coefficient $r$ and coefficient of determination $r^2$. A t-test was also performed to test the significance of the two models with a confidence level of 95%. Regression was used as it’s a powerful tool for analyzing relationships between variables. The results are presented in prose, tabular and graphical form.
5.2 Conclusions

From the analysis and findings of the study, it can be concluded that the cash flow model is a good indicator of the market equity value while the economic value added model is not a good indicator of the market equity value. A test of significance was carried out to determine whether the two prices were significantly different. While the discounted cash flow showed the differences were not significant and therefore the model was a good indicator of the market price, the economic value added method showed the differences were significant and therefore the model was not a good indicator of the market price.

The economic value added model was not significant is predicting the market values as there was no relationship between the variables. The distortions in EVA probably affect the correlation between EVA and share prices. This might also be one reason why in spite of its "theoretical superiority", EVA does not correlate with share prices much better than other accounting based measures like ROI and EPS. The distortions are probably also the main reason why the changes of EVA correlate better with share prices than absolute values.

The difference between the market value and the predicted value could be caused by the absence of a perfect market, inappropriate discount factors, or the possibility of the irrelevance of dividend policy in determining equity value. It’s also evident from the study that the valuation of equity is quite difficult since the variables included, i.e. future financial position and market prices are uncertain in amount and time of occurrence. The
valuation models are only as good as the assumptions used in estimating these variables, and inaccurate data would also result in incorrect valuation.

However, this does not mean that the use of such models in financial decision making is undesirable. Without such models there would be no means to value a firm. By using such theoretical models, the financial or investment manager is forced to identify the real economic factors that affect equity values and therefore shareholder value. This results in better investment decisions. This study should therefore be understood in light of such shortcomings.

5.3 Policy recommendations

Valuation knowledge needs to be increased among Kenyan valuation practitioners in several areas. Country specific issues such as market premium and country risk premium are among the highest areas of uncertainty. This is not surprising since country specific issues with respect to valuation in emerging markets is an area where valuation/financial experts disagree while knowledge is still growing towards best practices in this area.

Sharing of information among valuation practitioners and other stakeholders should be paramount in ensuring that the differences between the market values and the predicted values caused by the absence of a perfect market, inappropriate discount factors, or the possibility of the irrelevance of dividend policy in determining equity value are sorted out, and hence improve on the efficiency of the market.

The use of corporate bond spreads in obtaining premiums as recommended by Damodaran (2000) should be applied to the Kenyan case considering the low number of
participants in the market and the high levels of volatility, as well as the fact that future financial position and market prices are uncertain in amount and time of occurrence. The valuation models are only as good as the assumptions used in estimating these variables, and inaccurate data would also result in incorrect valuation.

Valuation practitioners should also change their valuation practices either based on new knowledge or on changing circumstances in the market. Knowledge management with respect to the issues of valuation is an important aspect in ensuring accurate and reliable results.

5.4 Limitations of the study

The study focused on a few selected firms trading at the NSE. The procedure of selecting the firms was judgmental and therefore difficult to generalize the results. Data availability could skew the results of the valuations making generalization of the results difficult although it’s a good starting point.

The particular models have inbuilt limitations as they assume a similar state in projecting the financial statements like steady growth or decline while in real situations this may not apply. Therefore, errors in forecasting of financial statements and assumptions will also manifest themselves in the values computed.

Past performance was used to forecast the expected future profit or loss and the statement of financial position. However, these forecasted numbers may not fit the reality. The
inherent assumption is that what happened in the past will be the greatest determinant of the future performance which may not be the case.

The time selected for the study (years 2006 to 2010) may not be very representative and may have been affected by other external factors in the economy which have not been isolated in the study. Such factors may include the post election violence in late 2007 and early 2008, as well as the world economic recession in the year 2009/2010 and high fuel prices in the world market during the same period.

5.5 Suggestions for further research

There is scope for further development of this analysis. Valuation models are very sensitive to firm characteristics, most notably firm size. Thus, the analysis could be extended by including an additional variable in the models e.g firm size which has a strong impact on the explanatory power and the estimated coefficients. Firm size is positively related with value and the results are consistent with either lower cost of capital or higher growth for larger firms. The inclusion of size is useful since size can be a risk proxy and a proxy for a variety of economic phenomena including earnings persistence, accounting practices, political costs and financial health. Following normal practices, size can be measured as the natural logarithm of the market capitalization of the Firm.

The periodizing problem of financial performance measures has to be managed with focus on long-term. Even though current financial performance is poor, there is no reason to view things with narrow, short-term perspective. This wrong periodizing will even out in the long run, if the investments really are profitable. The average age of company’s
asset portfolio can be taken into account in interpreting periodic EVA. It can be expected that companies with a lot of new and thus undepreciable assets have negative EVA in the near future. Thus a further study should be conducted with a different and longer time frame for the study to capture more factors affecting the derived prices. A longer frame could capture more macroeconomic factors as well as financial statements for a longer period of time. This will help to remove any skewness caused by the period of study.

A study on the role of change in investor expectations should be done as this has not been scoped in the study. This would determine what investors look at when making investment decisions because such expectations in turn affect the market values therefore making comparison with the other valuation models complicated.

A separate study looking at financial institutions which have peculiar characteristics would be important as they are an important sector of the economy. Banks have been excluded due to the problems associated with financial institutions as there are conceptual difficulties experienced in determining the quality of the loan portfolio, measuring the amount of current accounting profits attributable to interest rate mismatch (difference between long term rates earned on loans and short term rates paid on deposits).

A modified model would be required for financial institutions to address the challenge of establishing the transfer price between the various departments (retail, corporate, treasury) so as to arrive at how a bank should allocate its marginal resources, and also differences among banking business units reflected in their expected free cash flow to shareholders.
REFERENCES


Omondi,T.O. (2003). The dividend discount model; its reliability on the valuation of common stock at the NSE, University of Nairobi (MBA) project, unpublished research.


APPENDICIES

APPENDIX 1: INTRODUCTORY LETTER

Antony Ndegwa Mwangi
School of Business
University of Nairobi
P.o. Box 34279-0010
Nairobi.
Mobile phone No: 0721- 802228
Email Address: ndegwa@yahoo.com

Dear respondent,

Ref: MBA project data collection

I am a student pursuing a degree in Master of Business Administration at the University of Nairobi’s school of business. In this regard, am carrying out a research study, in partial fulfillment of the requirement for the award of the degree of Master of Business Administration. The information will assist me in assessing the valuation methods of companies as applied in the Kenyan market.

Your input in terms of views, and answers in the project study will serve as a great inspiration in making the study a success. The information will be used only for academic purposes and treated with confidentiality as much as possible. I am hereby requesting you to assist me in carrying out this study by completing the attached questionnaire which will be collected/ returned within two weeks.

Thanks in advance for your cooperation.

Yours sincerely

Antony Ndegwa
APPENDIX 2: QUESTIONNAIRE

PART A

1. Background information
   1. Name of the respondent………………………………………………………(optional)
   2. Name of the company…………………………………………………………(optional)
   3. Position held in the company
      i. Senior management [ ]
      ii. Middle management [ ]
      iii. Junior management [ ]
   4. Number of years of experience
      a) 0-2 years [ ] b) 2-6 years [ ] c) over 6 years [ ]

PART B

2. Do you perform company valuations as part of your day to days work?
   Yes [ ] No [ ] Sometimes [ ]

3. If Yes, what business Valuation Technique do you use? (Please select that which applies to you)
   a) Models based on discounted cash flows (DCF) [ ]
   b) Models based on relative valuation (multiples) [ ]
   c) Models based on real options (option pricing) [ ]
   d) The Economic Value Added (EVA) method [ ]
   e) Others (e.g. intuition), please specify [ ]………………

a) If Models Based on Discounted CashFlow Method

How do you use DCF models?
   i. Use DCF as a primary tool [ ]
   ii. Use DCF as a secondary tool [ ]
   iii. Primary or secondary depending on the case [ ]
   iv. Use DCF for specific project valuation [ ]
   v. Use DCF for ongoing company evaluation [ ]
vi. Do not use DCF [ ]

If DCF, which of the following do you use?
   i. NPV (Net Present Value) [ ]
   ii. IRR (Internal Rate of Return) [ ]
   iii. Payback (Simple) [ ]
   iv. Payback (Discounted) [ ]
   v. Profitability Index [ ]

Which one in (a) above is most relevant to you?
   vi. NPV (Net Present Value) [ ]
   vii. IRR (Internal Rate of Return) [ ]
   viii. Payback (Simple) [ ]
   ix. Payback (Discounted) [ ]
   x. Profitability Index [ ]
   xi. Others, please specify [ ] ....................

When using DCF, how do you account for project risk?
   i. Cashflow adjustment [ ]
   ii. Rate adjustment [ ]
   iii. Get different NPVs by applying sensitivity analysis [ ]
   iv. Get different NPVs by applying decision trees [ ]
   v. Other, please specify [ ] ....................

Do you use a different Beta for each investment, Project, or Company under appraisal?
   Yes [ ] No [ ]

Do you use a discount rate to account for the cost of capital?
   Yes [ ] No [ ] Sometimes [ ]

If Yes
   i. Is the Rate computed as an opportunity cost [ ]
   ii. Is the rate WACC [ ]
   iii. Others, please specify [ ] ....................
When using DCF, do you use a Terminal value?
Yes [ ] No [ ]

If Yes, how do you compute it?
   i. Perpetuity [ ]
   ii. With growth [ ]
   iii. Without growth [ ]
   iv. Other, please specify [ ] ..........................

Do you use a different discount rate to compute?
Yes [ ] No [ ]

When using DCF, which of the following methods do you use?
   i. CAPM [ ]
   ii. Modified CAPM [ ]
   iii. APT [ ]
   iv. Other, please specify [ ] ..........................

Do you use CAPM as the stacking up of the Risk-free rate and a market risk premium?
Yes [ ] No [ ]

b). If Models Based On Relative Valuation (Multiples) Techniques

How do you use multiples?
   i. Use multiples as a primary tool [ ]
   ii. Use multiples as a secondary tool [ ]
   iii. Use multiples for valuing single projects [ ]
   iv. Use multiples for valuing ongoing companies [ ]
   v. Do not use multiples [ ]

c). If Models Based On Real Options (Option Pricing) Technique

How do you use real options?
   i. Use real option as a primary tool [ ]
   ii. Use real option as a secondary tool [ ]
d). If the Economic Value Added (Eva) Method

How do you use EVA?

i. Use EVA as a primary tool
ii. Use EVA as a secondary tool
iii. Use EVA for valuing single projects
iv. Use EVA for valuing ongoing companies
v. Do not use EVA

PART C

4. Please select appropriate answers below

How do you define risk?

i. Probability of loss
ii. Return of variance
iii. Lack of information
iv. Size of the loss
v. Average return
vi. Covariance with the rest of investments
vii. Others, please specify

5. What adjustment do you use for each risk below? *(Please tick where applicable)*

<table>
<thead>
<tr>
<th></th>
<th>Unexpected inflation</th>
<th>Exchange risk</th>
<th>Sovereign risk</th>
<th>Tax differentials</th>
<th>Political risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flow adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. What bond/technique do you use to compute the Kenyan country risk premium?
   i. PAR [ ]
   ii. CBK [ ]
   iii. Global [ ]
   iv. Spread between own corporate bond and US corporate bond of similar term [ ]
   v. Others, please specify [ ]………………………………………

7. What value do you use as Kenya’s Country risk premium?
   ……………………………………………………………

8. Which index do you use to compute the Market risk premium?
   i. NSE 20 share index [ ]
   ii. NSE All share index [ ]
   iii. S&P Africa index series [ ]
   iv. Other, please specify [ ]

9. Which type of average do you use when computing Market risk premium?
   i. Arithmetic mean [ ]
   ii. Geometric mean [ ]
   iii. Harmonic mean [ ]
   iv. Other, please specify [ ] …………………..

10. What value do you use as the Market risk premium?
    ……………………………………………………………
11. What is your source of the local Beta?
   i. Own calculation [ ]
   ii. NSE indices [ ]
   iii. Banks research department [ ]
   iv. Other, Please specify [ ]

12. Where does your Beta come from?
   i. Local quoting comparable company [ ]
   ii. Local sector average [ ]
   iii. Accounting beta [ ]
   iv. US sector [ ]
   v. Others, please specify [ ]

13. Do you adjust US Betas when applying them to the Kenyan local market?
   Yes [ ] No [ ]

**PART D**

14. What type of Debt/Equity ratio do you use?
   i. Target value [ ]
   ii. Current value [ ]
   iii. Industry value [ ]
   iv. Others, please specify [ ]

15. What type of Debt do you use?
   i. Marginal cost [ ]
   ii. Current average [ ]
   iii. Not sure [ ]
   iv. Others, please specify [ ]

16. What type of tax rate do you use?
   i. Marginal or statutory [ ]
   ii. Historical average [ ]
   iii. Not sure [ ]
iv. Others, please specify [ ] ..................................

17. How frequently do you re-estimate the cost of capital?
   i. Monthly Quarterly [ ]
   ii. Twice a year Yearly [ ]
   iii. Continuously/For each Project [ ]
   iv. Rarely [ ]

18. Which Unsystematic risk premium do you use?
   i. Size Premium [ ]
   ii. Illiquidity premium [ ]
   iii. Own estimate [ ]
   iv. Other, please specify [ ] ..................................

19. On a scale of 1 – 5 what do you think about your method/result of valuation?
   i. Poor [ ]
   ii. Very Excellent [ ]
   iii. Dissatisfied [ ]
   iv. Satisfied in part [ ]
   v. Satisfied [ ]
   vi. Very satisfied [ ]

20. Have you made changes to the way you do valuation in the last 5 years?

   Yes [ ] No [ ]

THANK YOU FOR YOUR RESPONSE
APPENDIX 3: INTERVIEW SCHEDULE

a) Why do valuations obtained from the use of the models differ from the market values?

b) In a situation where the market values are significantly different from the calculated values, how do you make your investment decisions?

c) How do you keep abreast with the current trends in valuation of companies in the more developed markets and how do you adjust them for application in the local market?

d) What are the main challenges that you face when making valuations in an inefficient market like the Kenyan market?

e) From your past experiences, what changes would you recommend on the current valuation models for them to be more reliable in relation to the market values?
**APPENDIX 4: LIST OF INVESTMENT BANKS IN KENYA**

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dyer &amp; Blair Investment Bank Ltd</td>
<td>P.O. Box 45396 - 00100 Nairobi</td>
</tr>
<tr>
<td>2. Suntra Investment Bank Ltd</td>
<td>P.O. Box 74016 - 00200 Nairobi</td>
</tr>
<tr>
<td>3. African Alliance (k) Investment Bank Ltd</td>
<td>P.O. Box 11019 - 00100 Nairobi</td>
</tr>
<tr>
<td>4. Sterling Investment Bank Ltd</td>
<td>P.O. Box 45080 - 00100 Nairobi</td>
</tr>
<tr>
<td>5. Apex Africa Investment Bank Ltd</td>
<td>P.O. Box 43676 - 00100, Nairobi</td>
</tr>
<tr>
<td>6. Faida Investment Bank Ltd</td>
<td>P. O. Box 45236 - 00100 Nairobi</td>
</tr>
<tr>
<td>7. Standard Investment Bank Ltd</td>
<td>P. O. Box 13714 - 00800 Nairobi</td>
</tr>
<tr>
<td>8. CFC Stanbic Financial Services</td>
<td>P.O. Box 47198 - 00100 Nairobi</td>
</tr>
<tr>
<td>9. Drummond Investment Bank Limited</td>
<td>P.O. Box 45465 - 00100 Nairobi</td>
</tr>
<tr>
<td>10. Kestrel Capital (EA) Limited</td>
<td>P.O. Box 40005 - 00100 Nairobi</td>
</tr>
<tr>
<td>11. Equity Investment Bank Ltd</td>
<td>P.O Box 1670 - 00100 Nairobi</td>
</tr>
<tr>
<td>12. ABC Capital Ltd</td>
<td>P.O. Box 34137 - 00100 Nairobi</td>
</tr>
<tr>
<td>13. NIC Capital Securities Ltd</td>
<td>P.O. Box 63046 - 00200 Nairobi</td>
</tr>
<tr>
<td>14. Renaissance Capital (Kenya) Ltd</td>
<td>P.O BOX 40560 - 00100 Nairobi</td>
</tr>
<tr>
<td>15. Equatorial Investment Bank Ltd</td>
<td>P.O Box 48231 - 00100 Nairobi</td>
</tr>
<tr>
<td>16. Barclays Financial Services Ltd</td>
<td>P.O Box 43256 – 00100 Nairobi</td>
</tr>
<tr>
<td>17. CBA Capital Ltd</td>
<td>P.O Box 35423 – 00200 Nairobi</td>
</tr>
</tbody>
</table>
APPENDIX 5: LIST OF VALUED COMPANIES

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Sector</th>
<th>Market Price 31st Dec 2010</th>
<th>Free cash Flow method</th>
<th>Economic Value added method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Marshalls (E.A) ltd</td>
<td>Commercial</td>
<td>14.10</td>
<td>(16.98)</td>
<td>(9.76)</td>
</tr>
<tr>
<td>2. E.A. cables Ltd</td>
<td>Industrial</td>
<td>15.95</td>
<td>7.33</td>
<td>4.45</td>
</tr>
<tr>
<td>4. Total Kenya Ltd</td>
<td>Industrial</td>
<td>28.25</td>
<td>(29.67)</td>
<td>5.78</td>
</tr>
<tr>
<td>5. Williamson Tea Kenya ltd</td>
<td>Alternative investment</td>
<td>172</td>
<td>169.17</td>
<td>145.43</td>
</tr>
<tr>
<td>6. Mumias Sugar Co.</td>
<td>Industrial</td>
<td>9.30</td>
<td>12.89</td>
<td>189.51</td>
</tr>
<tr>
<td>7. Bamburi Cement Ltd</td>
<td>Industrial</td>
<td>190</td>
<td>126.63</td>
<td>97.74</td>
</tr>
<tr>
<td>8. Kakuzi ltd</td>
<td>Agricultural</td>
<td>81</td>
<td>232.12</td>
<td>242.78</td>
</tr>
<tr>
<td>9. Standard group Ltd</td>
<td>Commercial</td>
<td>43.25</td>
<td>22.16</td>
<td>7.03</td>
</tr>
<tr>
<td>10. TPS East Africa (Serena) Ltd</td>
<td>Commercial</td>
<td>68</td>
<td>37.89</td>
<td>42.35</td>
</tr>
</tbody>
</table>
### APPENDIX 6: INDIVIDUAL COMPANY VALUATIONS

**Kakuzi Ltd**

#### Summary of the free cashflow valuation

<table>
<thead>
<tr>
<th>Year</th>
<th>FCF</th>
<th>Discount Factor at WACC</th>
<th>PV of FCF</th>
<th>FCF at WACC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>529.6</td>
<td>0.8045</td>
<td>426.06</td>
<td>2011</td>
</tr>
<tr>
<td>2012</td>
<td>562.3</td>
<td>0.6472</td>
<td>363.92</td>
<td>2012</td>
</tr>
<tr>
<td>2013</td>
<td>756.9</td>
<td>0.5206</td>
<td>394.04</td>
<td>2013</td>
</tr>
<tr>
<td>2014</td>
<td>523.7</td>
<td>0.4188</td>
<td>219.33</td>
<td>2014</td>
</tr>
<tr>
<td>2015</td>
<td>876.5</td>
<td>0.3369</td>
<td>295.29</td>
<td>2015</td>
</tr>
<tr>
<td>2016</td>
<td>867.5</td>
<td>0.271</td>
<td>235.09</td>
<td>2016</td>
</tr>
<tr>
<td>2017</td>
<td>984.3</td>
<td>0.2181</td>
<td>214.68</td>
<td>2017</td>
</tr>
<tr>
<td>2018</td>
<td>1,123.7</td>
<td>0.1754</td>
<td>197.10</td>
<td>2018</td>
</tr>
<tr>
<td>2019</td>
<td>1,083.8</td>
<td>0.1411</td>
<td>152.92</td>
<td>2019</td>
</tr>
<tr>
<td>2020</td>
<td>1,243.7</td>
<td>0.1135</td>
<td>141.16</td>
<td>2020</td>
</tr>
<tr>
<td>Continuing</td>
<td>1,798.7</td>
<td>0.0913</td>
<td>164.22</td>
<td>Continuing</td>
</tr>
</tbody>
</table>

#### Summary of the Economic value added valuation

<table>
<thead>
<tr>
<th>Year</th>
<th>Economic Profit</th>
<th>Discount Factor at WACC</th>
<th>PV of Economic Profit</th>
<th>EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>324.0</td>
<td>0.8045</td>
<td>260.66</td>
<td>2011</td>
</tr>
<tr>
<td>2012</td>
<td>342.5</td>
<td>0.6472</td>
<td>221.67</td>
<td>2012</td>
</tr>
<tr>
<td>2013</td>
<td>424.6</td>
<td>0.5206</td>
<td>221.05</td>
<td>2013</td>
</tr>
<tr>
<td>2014</td>
<td>501.6</td>
<td>0.4188</td>
<td>210.07</td>
<td>2014</td>
</tr>
<tr>
<td>2015</td>
<td>566.4</td>
<td>0.3369</td>
<td>190.82</td>
<td>2015</td>
</tr>
<tr>
<td>2016</td>
<td>654.8</td>
<td>0.271</td>
<td>177.45</td>
<td>2016</td>
</tr>
<tr>
<td>2017</td>
<td>735.8</td>
<td>0.2181</td>
<td>160.48</td>
<td>2017</td>
</tr>
<tr>
<td>2018</td>
<td>867.5</td>
<td>0.1754</td>
<td>152.16</td>
<td>2018</td>
</tr>
<tr>
<td>2019</td>
<td>916.8</td>
<td>0.1411</td>
<td>129.36</td>
<td>2019</td>
</tr>
<tr>
<td>2020</td>
<td>1,124.8</td>
<td>0.1135</td>
<td>127.66</td>
<td>2020</td>
</tr>
<tr>
<td>Continuing</td>
<td>2,245.8</td>
<td>0.0913</td>
<td>205.04</td>
<td>Continuing</td>
</tr>
</tbody>
</table>

#### Value of operations

- Value of operations: \( \mathbf{2,803.82} \)
- Present value of economic profit: \( \mathbf{2,056.42} \)
- Invested capital: \( \mathbf{956.76} \)
- Value of operations: \( \mathbf{3,013.18} \)
- Value of non operating investments: \( \mathbf{1,745.34} \)
- Total equity value: \( \mathbf{4,758.52} \)
- Equity value: \( \mathbf{4,549.60} \)
- Number of shares: \( \mathbf{19,600.00} \)
- Equity value per share: \( \mathbf{232.12} \)

#### Equity value

- Equity value: \( \mathbf{4,549.60} \)
- Total equity value: \( \mathbf{4,758.52} \)
- Less: value of debt: \( \mathbf{0.00} \)
- Number of shares: \( \mathbf{19,600.00} \)
- Equity value per share: \( \mathbf{242.78} \)
## Crown berger ltd
### Summary of the free cashflow valuation

<table>
<thead>
<tr>
<th>Year</th>
<th>FCF</th>
<th>Discount Factor at WACC</th>
<th>PV of FCF at WACC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>(18.7)</td>
<td>0.7465</td>
<td>(13.94)</td>
</tr>
<tr>
<td>2012</td>
<td>24.8</td>
<td>0.5572</td>
<td>13.82</td>
</tr>
<tr>
<td>2013</td>
<td>27.4</td>
<td>0.416</td>
<td>11.40</td>
</tr>
<tr>
<td>2014</td>
<td>36.0</td>
<td>0.3105</td>
<td>11.17</td>
</tr>
<tr>
<td>2015</td>
<td>42.1</td>
<td>0.2318</td>
<td>9.76</td>
</tr>
<tr>
<td>2016</td>
<td>51.4</td>
<td>0.173</td>
<td>8.89</td>
</tr>
<tr>
<td>2017</td>
<td>49.5</td>
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<td>6.40</td>
</tr>
<tr>
<td>2018</td>
<td>53.7</td>
<td>0.0964</td>
<td>5.18</td>
</tr>
<tr>
<td>2019</td>
<td>62.5</td>
<td>0.072</td>
<td>4.50</td>
</tr>
<tr>
<td>2020</td>
<td>76.4</td>
<td>0.0537</td>
<td>4.10</td>
</tr>
<tr>
<td>Continuing</td>
<td>267.9</td>
<td>0.0401</td>
<td>10.74</td>
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</tbody>
</table>

### Summary of the Economic value added valuation

<table>
<thead>
<tr>
<th>Year</th>
<th>Economic profit</th>
<th>Discount Factor at WACC</th>
<th>PV of Economic profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>(345.3)</td>
<td>0.7465</td>
<td>257.77</td>
</tr>
<tr>
<td>2012</td>
<td>(453.7)</td>
<td>0.5572</td>
<td>252.80</td>
</tr>
<tr>
<td>2013</td>
<td>(487.4)</td>
<td>0.416</td>
<td>202.76</td>
</tr>
<tr>
<td>2014</td>
<td>(523.1)</td>
<td>0.3105</td>
<td>162.42</td>
</tr>
<tr>
<td>2015</td>
<td>(542.8)</td>
<td>0.2318</td>
<td>125.82</td>
</tr>
<tr>
<td>2016</td>
<td>(573.6)</td>
<td>0.173</td>
<td>99.23</td>
</tr>
<tr>
<td>2017</td>
<td>(598.3)</td>
<td>0.1292</td>
<td>77.30</td>
</tr>
<tr>
<td>2018</td>
<td>(623.6)</td>
<td>0.0964</td>
<td>60.12</td>
</tr>
<tr>
<td>2019</td>
<td>(674.4)</td>
<td>0.072</td>
<td>48.56</td>
</tr>
<tr>
<td>2020</td>
<td>(692.6)</td>
<td>0.0537</td>
<td>37.19</td>
</tr>
<tr>
<td>Continuing</td>
<td>16,894.0</td>
<td>0.0401</td>
<td>677.45</td>
</tr>
</tbody>
</table>

Value of operations: 72.01

Present value of economic profit: 2,001.42

Invested capital: 1,476.40

Value of operations: 525.02

Value of non operating investments: 23.67

Value of non operating investments: 45.80

Total equity value: 95.68

Equity value: 269.32

Total equity value: 570.82

Number of shares: 23,727.00

Less: value of debt: (365.00)

Less: value of debt: (167.80)

Equity value: 738.62

Number of shares: 23,727.00

Equity value per share: 31.12